# Reliable Protection for Microscope Lens during PCB Inspection

Compact Laser Profile Sensor Detects Even the Smallest Objects and Reflective Objects

At a Glance

- Reliable object detection, timely stop signal

- Detects even the smallest objects and reflective objects

- Compact device for installation in tight spaces

- Easy to install

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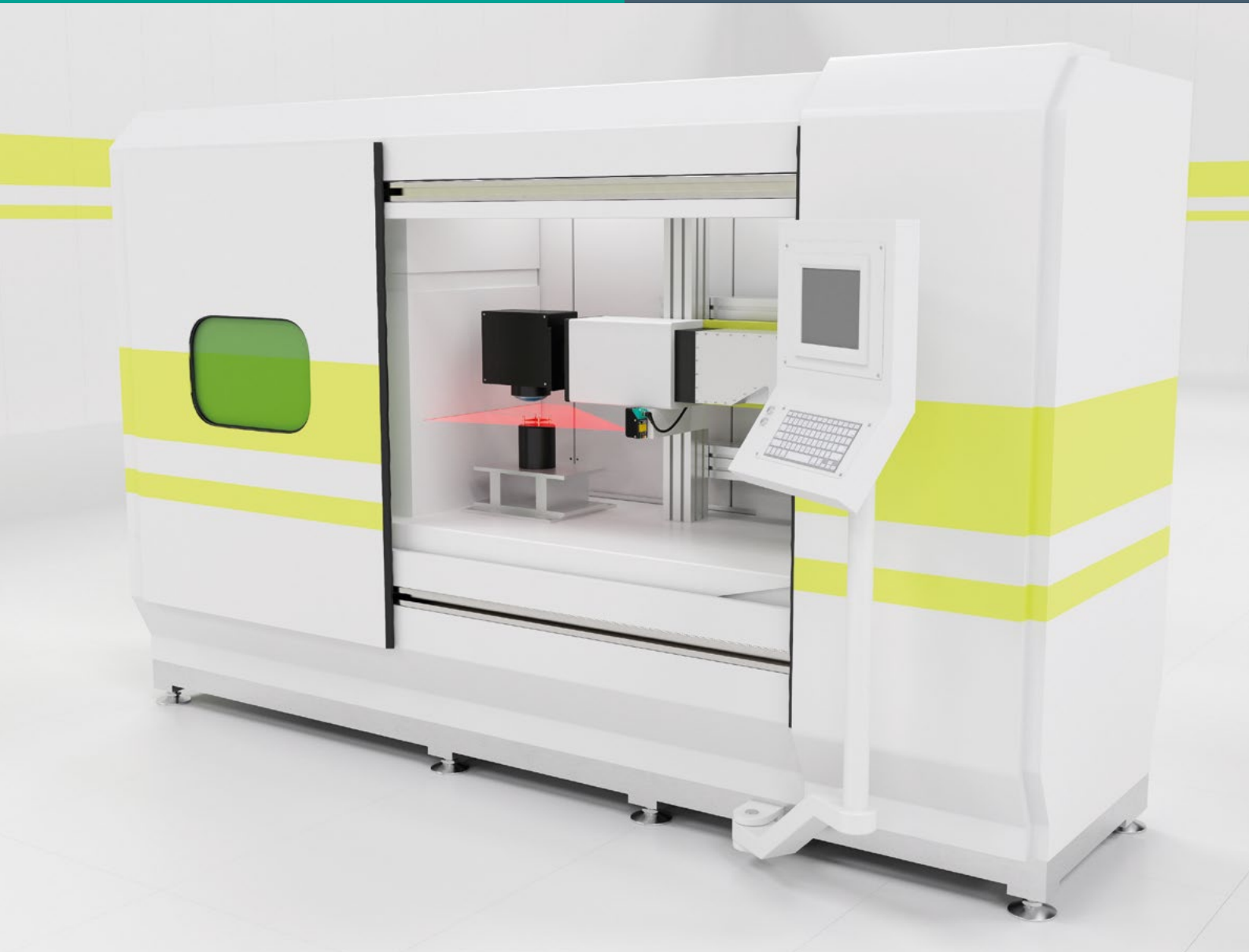
The Application

In the field of electronics manufacturing, microscopes are used to check for faults on assembled printed circuit boards (PCBs). The circuit board is clamped and the microscope moves in until the image is sharp. If the microscope moves too close to the circuit board, the lens may be damaged or destroyed, especially by protruding fixing screws and support elements. There is little space inside the PCB testing device. The safety component for the lens must remain effective even with limited space.

The Goal

The lens must be able to move close to the circuit board, and at the same time physical contact of the lens with any object in the test field must be prevented. Therefore, the control system must know in time whether objects are in the approach area of the lens. The same applies to very small elements: Some mounting screws have a diameter of less than two millimeters. Common detection methods such as the light grids that are often used for safety tasks would be overwhelmed by this. The detection device must not only be reliable, but it must also provide an integrated evaluation and make the data available through a digital output.

The Solution

A SmartRunner Detector laser profile sensor monitors the space in front of the microscope lens at the necessary distance to the critical area. If the lens moves too close to the PCB support, the mounting pins protrude into the sensing range of the sensor and are reliably detected. The sensor emits the stop signal, and the lens is protected against contact damage.

The device detects objects that are less than a millimeter in size, including thin support rods and the smallest screws. Since it evaluates the taught-in background, the sensor detects even highly reflective objects such as metal pins. Such items appear as gaps in the background and trigger the corresponding signal.

The Benefits

The SmartRunner Detector combines high-performance light section technology with a vision sensor and LED lighting. The emitter and receiver are in the same compact housing. This makes the device ideal for installation in particularly tight spaces. Object detection in the inspection area can be read out via the RS-485 interface as a 2-D image, which is made available for control and documentation purposes. As the only laser profile sensor on the market, the SmartRunner Detector can obtain the height profile and capture a 2-D image. Integrated LED lighting ensures that the image is always sufficiently illuminated.

Technical Features

- Detection of objects from 0.25 mm in size
- Measuring range: X: 40 to 310 mm; Z: 60 to 700 mm
- Easy parameterization with Data Matrix control codes at the touch of a button or via the user interface
- The background can be taught in via sensor buttons or the interface
- Free definition of detectable object sizes and the sensing range (region of interest, ROI)
- Interfaces: input/output, RS-485
- Fieldbuses via gateways: PROFINET, PROFIBUS, EtherNet/IP, and EtherCAT
- Max. scan rate: 30 Hz
- Laser class 1, IP67 degree of protection

For more information, visit: **pepperl-fuchs.com/px-smartrunner**