



Industry: Electronic & Solar
Presence and color checking for loading and unloading printed circuit boards

Singapore/Waldkirch, Tour Stop No. 16 2010 - Easy-to-operate switching light grid and color sensors in compact size guarantee the correct coating and handling processes in a pick-and-place machine for printed circuit boards.

Challenge: Flexible Production

In a pick-and-place station for handling printed circuit boards from Transystem FA in Singapore for the end customer in South East Asia, both the material transportation by trolley and the handling of individual interleave layers must be monitored. In order for the robot to pick up the printed circuit boards from the stack on the trolley correctly, the trolley must be completely and correctly positioned when transported. In a further process step, the color of the interleave layers must be checked before they are placed onto the printed circuit boards. The necessary sensor system must be integrated in a process-optimized and space-efficient manner. Sensor solutions adapted to each other and a quick and professional application consultation are what the customer expected when buying from a single source.

Solution: Switching light grid and color sensors from SICK guarantee the correct coating and handling processes in a pick-and-place machine for printed circuit boards

A switching automation light grid (ELG) is used to detect the printed circuit board trolley in the transport area of the pick-and-place station. It ensures reliable projection checking of the trolley over the entire length. Only when the trolley is positioned correctly and completely in the machine the pick-and-place robot can start. The presence and the differentiation between different types of interleave layers were solved using a color sensor (CS8-4) that was mounted directly on the robot.



CS8-4 can also detect PCB panels with different surface treatments and processes, thereby reducing errors and increase effectiveness. Light grid (ELG) is used on the customized robot to provide precision and soft approach when handling thin panels.

Customer Benefits:

- **Avoids operator errors**
- **High process availability**
- **Avoids rejects**

The switching light grid is very easy to integrate. All the components – the sender and receiver modules, the electrical evaluation system, the relay output and the switching outputs – are integrated into the housing. Thus, the optical synchronization of senders and receivers, and the connection systems typical of the industry guarantee cost-effective installation. Cabling costs are saved making integration into systems and controls simple and commissioning fast.

The color sensor can differentiate between many colors in different shades. This guarantees with a high level of reliability that only the correct interleave layers are processed in the pick-and-place machine. The sensor can be taught to detect new colors easily directly on the device or via the control cable. Thus the color sensor offers the greatest reliability and flexibility. Photoelectric proximity sensors are used to center the panels. Contactless centering is achieved by coupling the applied sensors with the servo system to detect edge of PCB panel, thus avoiding damages to very thin panels.

Single-source procurement simplified and shortened the clarification of technical issues for both tasks and simplified the procurement process.

Other SICK products also have been implemented beyond the mentioned applications. The spectrum stretches from miniature photoelectric proximity sensors in the WTB4-3 series, WT9L laser photoelectric proximity sensors, IME inductive proximity sensors all the way to the safety switches in the i12 series. Precisely this extensive product portfolio represents a large additional benefit for the machine manufacturer as well as for the end customer and their stockpiling of spare parts.