Lighting modules for a safety system

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Intended use and function

This lighting module is executed as an MID component and is used in the *V200/V300 Workstation Extended* safety camera system from SICK AG. The module supports the SICK camera technology with a wide aperture angle. The result is flexible field of view geometries and installation possibilities for the access openings that can largely be freely selected. For optical monitoring, LEDs emit invisible light that is reflected back into the monitoring field by reflective tape. This makes it possible to detect interruptions in the field. The V300WS system is the first sensor for protecting hazardous points in Category 3 as defined by EN 61496-1 (SIL2 according to IEC 61508). The V200WS system fulfils the hazard analysis requirements as defined for Category 2. Applications for the camera system are found in the electronics industry, robotics, the packaging industry and the pharmaceutical industry.

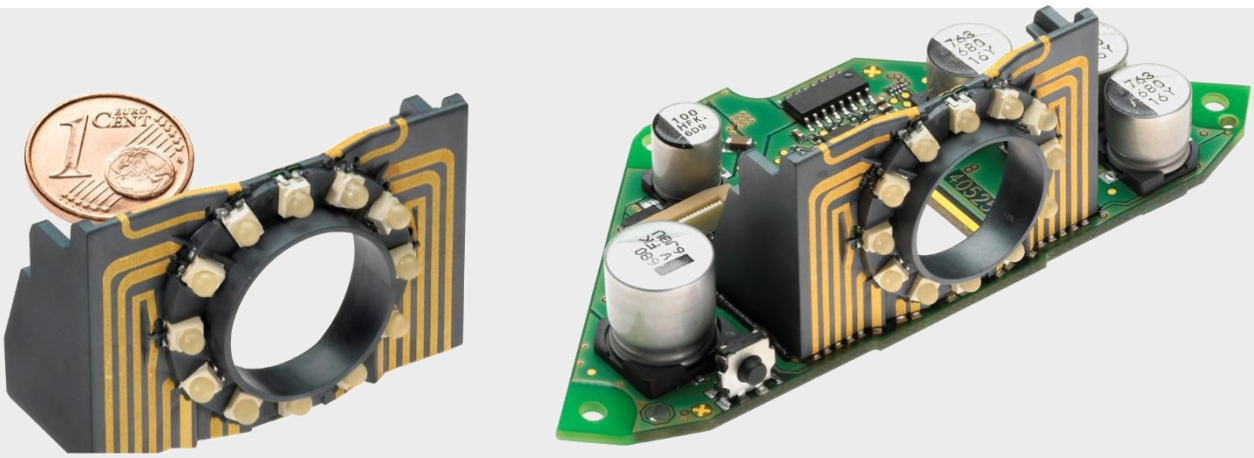

Figure 1: MID lighting module for a safe camera system (left) and mounted on a PCB (right)

Advantages of the MID solution

- The modules are produced in an injection molding procedure, which offers distinct financial advantages compared to conventional methods.
- MID technology allows a more compact design: All components and the analysis unit are integrated in a single housing.
- The three-dimensional arrangement of the LEDs is technically complex and is only economically feasible with the help of an MID component. In this way it is possible to combine the electrical and the mechanical worlds. The LED contacting and the positioning are combined in one component.
- The LED module is assembled at the same time the PCB is packaged.

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Application areas	Industry, sensor systems
User	Sick AG
Product	Lighting module for safety camera system
Main function	Optical function

Project implementation

The company SICK AG, headquartered in Waldkirch, Germany was the client. The project to implement the lighting module in MID technology got underway in March 2006. The first prototypes were presented early in 2007 and the start of production was in November 2007. HARTING Mitronics developed the product concept in close cooperation with SICK AG. The entire manufacturing with injection molding, laser structuring, metallization and assembly of the components is carried out in-house at HARTING Mitronics.

Functions of the MID component

- Spatial carrier for 12 LED components.
- Mechanical and electrical contacting to the FR4 PCB.

Manufacturing aspects

- It was necessary to add positioners to the plant systems for the lasering and component packaging
- Four sides of the component are laser structured.
- Numerous angles have to be taken into consideration when assembling the LEDs.
- LPKF-LDS technology is used to structure the injection molded part from the material LCP. Metallization is performed without external current and consists of Cu-Ni-Au, which is a typical layer composition for MIDs.

Substrate material	LCP (Vectra E 840i LDS)
Structuring	LDS
Metallization	Chemical Cu-Ni-Au
Connection technology	Soldering (vapor phase)/adhesive bonding
Number of components	12
Start of production	2007
Production run	5,000 p.a.
Development period	1.5 years

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