

Ring switch for diagnosing caries

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Intended use and function

The MID contact sleeve is used as a ring scanner in dental instruments and consists of a metallized MID component with flexible leads for contacting soldered on. Based on the difference in fluorescence, the so-called DIAGNOdent pen distinguishes healthy tooth substance from diseased without mechanical intervention or radiation exposure (x-rays). The finding is supported by a visual and acoustic signal. This allows a minimally invasive treatment that preserves the teeth.

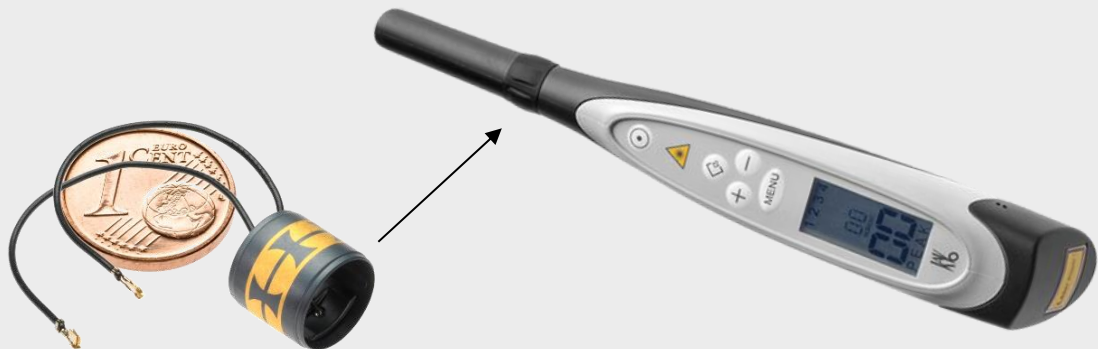


Figure 1: MID ring switch (left) and DIAGNOdent pen (right, image from KaVo Dental GmbH)

Advantages of the MID solution

- Thanks to the MID procedure, the assembly time for the DIAGNOdent pen was reduced from 330 to 20 seconds.
- The error rate during assembly was drastically reduced.
- The number of parts for the component was reduced from eight to three.
- Manufacturing costs were pushed down by 78 percent.

Application areas	Medical technology
User	Kavo Dental GmbH
Product	DIAGNOdent – caries diagnosis
Main function	Scanner



Pushing Performance

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Project implementation

After a solution was jointly found, the first installation tests and design tests were conducted in 2010. In 2011 the first milling samples made of LDS material and the initial parts from the injection molding process were delivered. This was followed by three design optimizations in the mold. The pilot series was manufactured at the end of 2011 and series production kick off in 2012.

Functions of the MID component

- Thanks to the selective metallization, the MID component functions as a scanner.
- The MID component takes over the electrical connection in the assembly.

Manufacturing aspects

- LPKF-LDS technology is employed to structure the injection molded component from the material LCP. Metallization is performed without external current and consists of Cu-Ni-Au, which is a typical layer composition for MIDs.
- The laser structuring is executed in a rotation procedure, for which a special turning device was developed.
- Thin-walled (0.6 mm) injection molding is required for the housing parts in order to achieve a low installation volume.
- The prefabricated flexible leads are mounted by means of hand soldering.

Substrate material	LCP (Vectra E 840i LDS)
Structuring	LDS
Metallization	Chemical Cu-Ni-Au
Connection technology	Hand soldering, plug contacts
Number of components	2 (flexible leads)
Start of production	2012
Production run	7,000 p.a.
Development period	2 years