



New Optical Rotary Encoders

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Institute of Micro Assembly Technology



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BACKGROUND and BASICS

A rotary encoder is a sensor to determine the angular position of a rotating shaft. Magnetic and optical rotary encoders are the economically most important systems. Optical rotary encoders achieve the highest resolutions and accuracies.

Sample applications:

- Automotive: detection of steering angle
- Industrial automation: position sensing in machine tools

HSG-IMAT has competences in design, prototyping and test of optical rotary encoders and related optical systems.

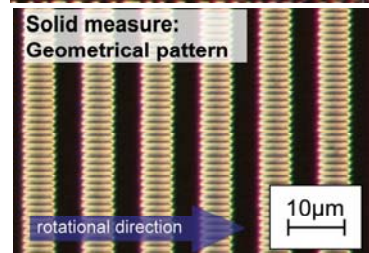
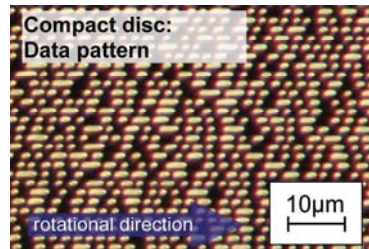


CONCEPT and SOLUTION

A high precise solid measure fabricated by CD technologies is used instead of a cost intensive device made from glass. For signal detection, the solid measure is illuminated by a laser diode and behaves as a diffractive optical phase grating. Standard photo diodes detect the angular dependent diffraction grating pattern. To realize mechanical tolerances which enable a final assembly of the optical path without manual adjustment, the rotary encoders optical detection unit is assembled using a high precise moulded interconnect device (MID) made by micro injection moulding.

Advantages of the new rotary encoder concept:

- Incremental and absolute encoding
- Simple reflective optical setup with cheap components
- Assembly without cost intensive manual adjustment



STATUS and OUTLOOK

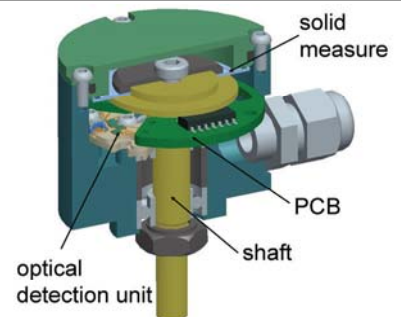
An incremental optical rotary encoder was designed, assembled and tested in the AiF-project 219ZN.

- 2048 lines
- Outer dimensions: \varnothing 36 mm
- Offset compensated standard output signals
- Reference output signal

Current and future activities:

- Improvement of signal quality and disc eccentricity
- Absolute encoded sensors

You are interested in this new sensor concept?
Please do not hesitate to contact us.



Optical detection unit in MID-technology

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