

Incremental optical rotary position sensor

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Messtechnik • Sensorik • Mechatronische Systeme • Umweltsimulationstests

Motivation

Manufacturing tolerances for the conventional incremental optical rotary position sensors are very small in order to achieve sufficiently high accuracy and to avoid errors by counting the increments. These tolerances have to be kept also during operation.

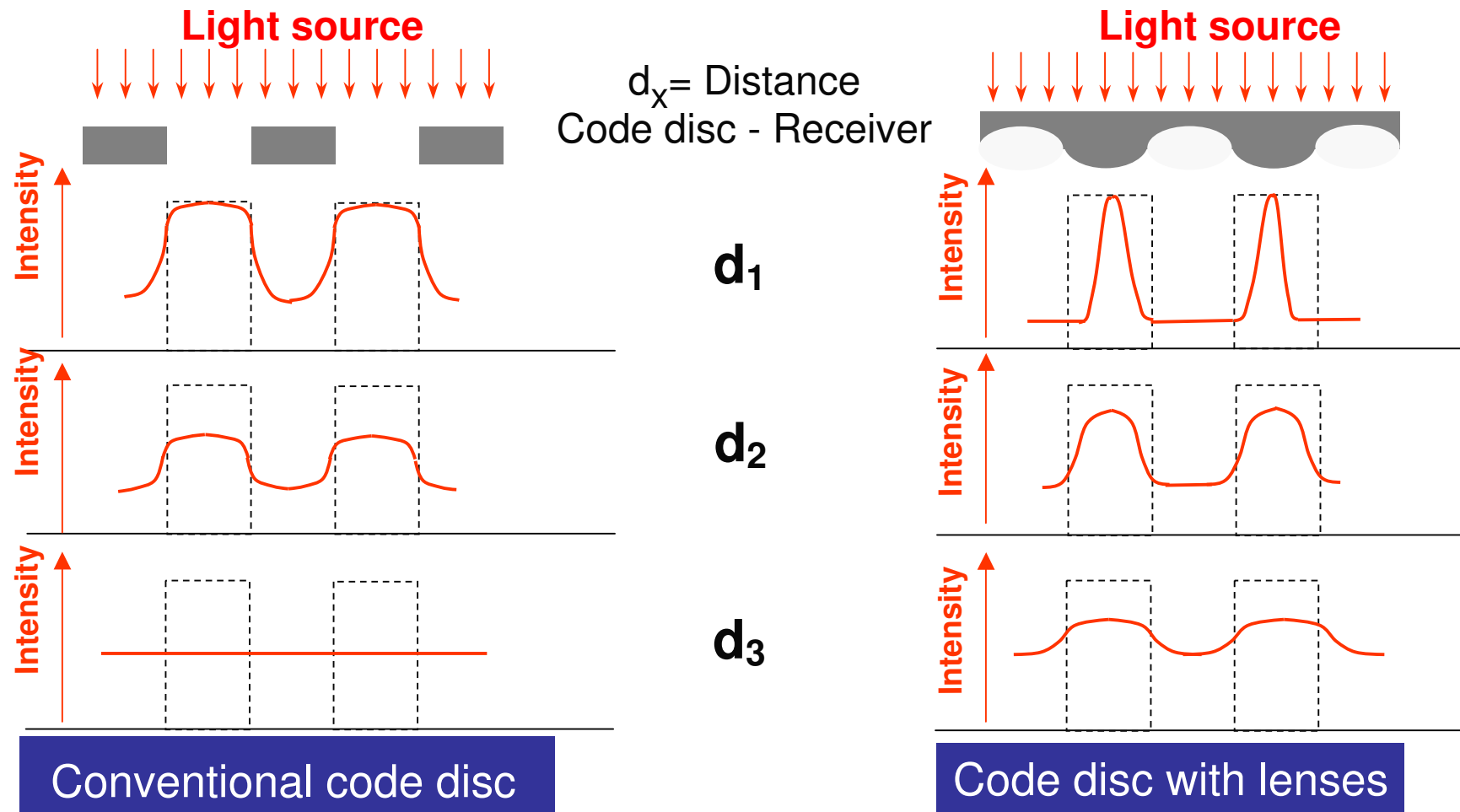
One very sensitive tolerance is the axial code disc position on the rotating shaft. It means that the axial shaft movement influences the position signal.

The development target was to allow axial movement of the code disc within certain range without degrading the position signal.

The cost effective solution for high volume products is the injection moulded transparent code disc with incorporated lens system. This principle shows high signal dynamics over certain range for the axial code disc movement.

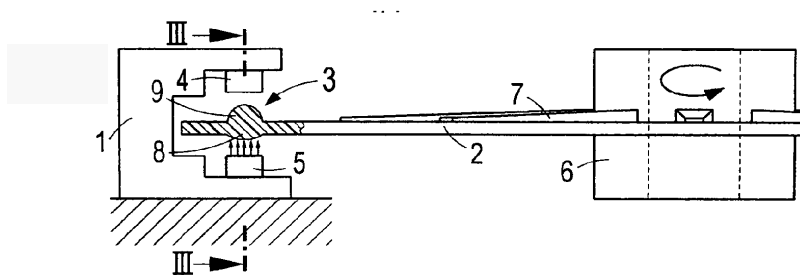
Signal dynamics dependence on the axial distance between the code disc and the photo receiver

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Cross section code disc and photoelectric barrier

There is high design flexibility for packaging all optical components. The variants can include i.e. more sets of photoelectric barrier and lenses for redundancy, for the zero position mark or even for generating a digital code giving absolute angular position. The code disc is injection moulded as one piece with the hub and the lenses. Thus, the process is suitable for high volume production of a low cost product.



The cross section published in the patent DE102005048449A1, 2005

1. Housing with photoelectric barrier
2. Transparent code disc
3. Angular position mark
4. Photosensor
5. Light source (LED)
6. Hub (to be fixed to the shaft)
7. Disc enforcement rib
8. Lens formed with the disc
9. Lens formed with the disc

Thank you for your attention!

***We are looking forward to receive your
requirements!***

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