

New roughness sensor on CMMs for automated measurement of geometric dimensions and roughness parameters

Dr. Dietrich IMKAMP*, Michael ZIMMERMANN, Marek MIGACZ

* *Carl Zeiss Industrielle Messtechnik GmbH, Germany; dietrich.imkamp@zeiss.com*

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Flexibility and speed are important trends in manufacturing measurement technology [1]. The integration of a roughness sensor into CMMs is an example for the technical implementation of these trends. The integration increases CMM's flexibility by enabling complete measurement of machined parts with all their geometrical dimensions and roughness characteristics. This saves also time because it is no longer necessary to transfer the parts to a dedicated surface measuring instrument.

The first version of such a sensor with integrated miniaturized tracing driver and 2 rotational axes for ZEISS's CMMs with the current name ROTOSlight was released in 2014 [2, 3]. A significantly reworked version, called ROTOS, will be released 2018. A new design with now 3 rotational axes and different sensor heads improves the accessibility of measuring locations. Therefore, all characteristics of a technical drawing can be fully captured with a CMM and displayed in one measuring report. Various measuring positions can be reached without relocating the part and a fully automatic run is possible without manual action by an operator. The benefit: a simplified workflow for added measuring certainty and enormous time savings. Examples at pilot customers from different power train components demonstrate the benefits and the limitations of roughness measurements on CMMs.

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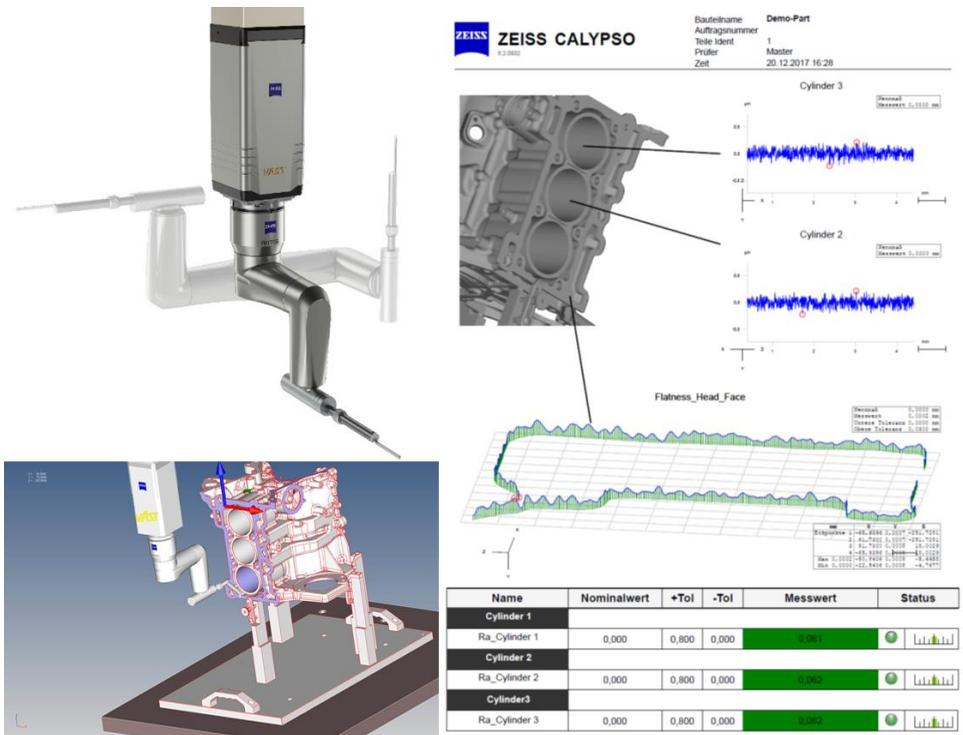


Fig. 1. Roughness Sensor “ROTOS” for CMMs with 3 rotational axis, Simulation in the Metrology Software CALYPSO and Measuring Protocol with Dimensional and Roughness Characteristics