



Fraunhofer Institut
Fabrikbetrieb
und -automatisierung



OPTOINSPECT® – Converter

Optical 3D Measuring Device
for Offline Geometry Inspection
of Catalytic Converters



Converter Measuring Machine

The Technology

»OPTOINSPECT®« is a technology for inspecting the geometric quality of components in manufacturing. The Fraunhofer IFF has extensive, industrially tested hardware and software modules, which, customized, are configured for a measuring device as a function of the range of components to be inspected.

The fully automatic inspection is subdivided into two process steps:

- digitalization and
- analysis and evaluation.

DIGITALIZATION is the process step for capturing the three dimensional geometry of the component to be inspected. The result is a quantity of several hundred thousand measuring points, a so-called 3D point cloud.

ANALYSIS AND EVALUATION is the process step for extracting qualitative and quantitative features from the digital 3D point cloud. The extracted features serve as the basis for geometric quality inspection.

The Measuring Device

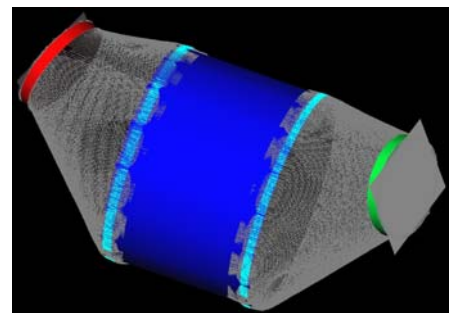
The measuring device » OPTOINSPECT® – Converter« serves to digitalize converters. By means of a motion system, the converter is positioned, translationally and rotationally relative to altogether three 3D split-beam sensors, with a component of a specific inspection component image and the component's external cover is digitalized.

The 3D point cloud available from the digitalization for analysis and evaluation is now oriented analogous to a CAD model. Afterward – on the basis of an inspection program

written beforehand – an approximation and determination of position of standard geometries are performed. A measurement readout documents the results.

Technical Data

- Motion system:
 - Axis of rotation:
 - Absolute accuracy: 0.01°
 - Eccentricity: 4µm
 - Axis of translation:
 - Positioning accuracy: 5µm
- Measuring volume:
 - Height: 600mm
 - Width: 200mm
 - Depth: 200mm
- Measuring uncertainty: 100(50)µm
- Measuring time: 2..3 min
- Ambient conditions:
 - Temperature range: +15-30°C
 - Low-vibration environment (passive vibration damping)



Approximation and determination of position of standard geometries

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measurement readout				
measure	ideal value	tolerance	actual value	shift :
C2	29.2	+/- 1.0	28.1	3B
D2	2.5	+/- 1.0	2.4	operator : Bauer
E2	20.5		20.5	converter-type : 8E0 731 701 J
C6	27.3	+/- 1.0	26.0	date : 08.06.2002
D6	1.9	+/- 1.0	2.1	time : 02:07 p.m.
E6	23.0	+/- 1.0	22.9	
F4	213.0	+/- 2.5	214.8	

Measurement readout