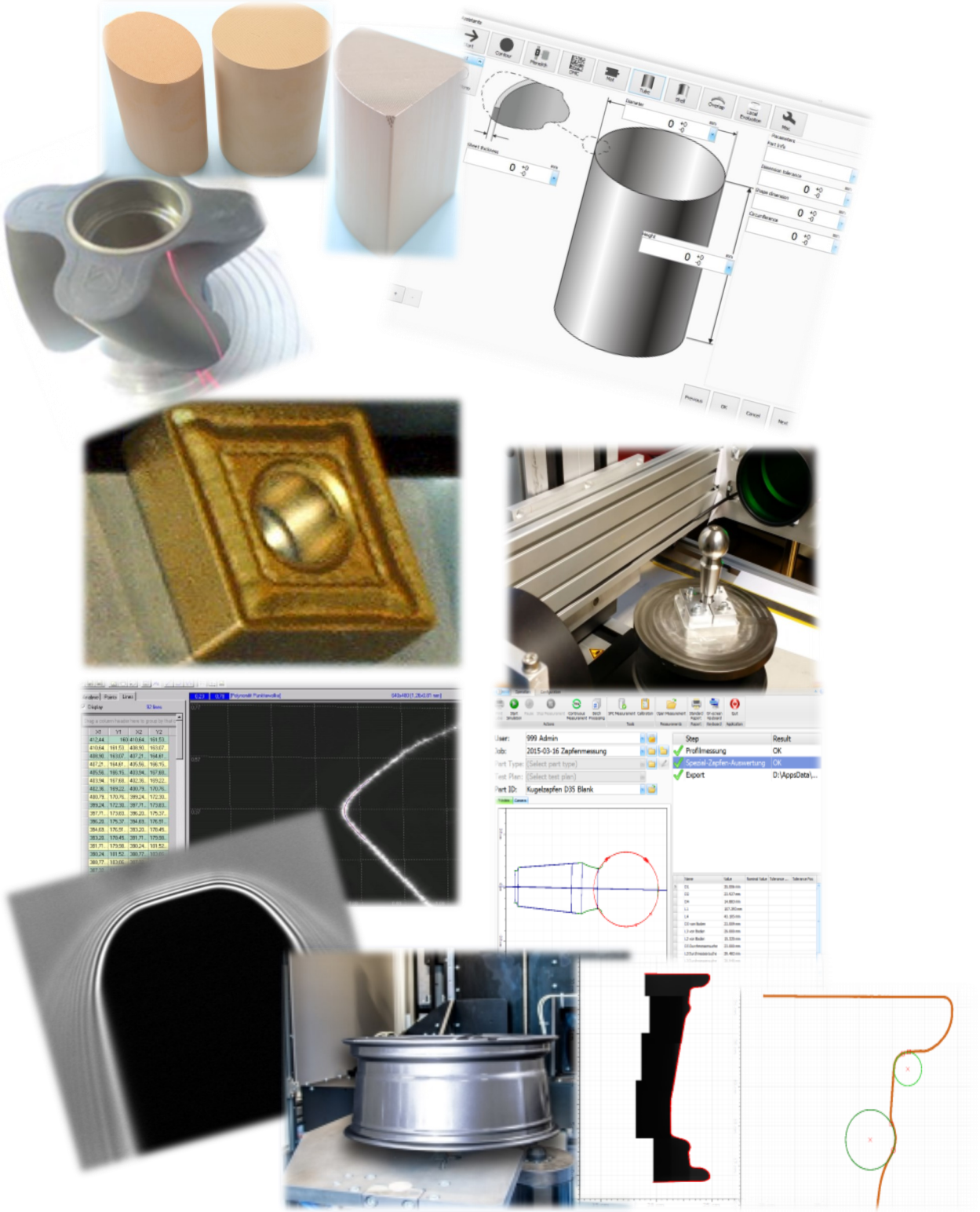
creating precision ...

Qsigma



QSIGMA

Application Guide

MICRO-EPSILON

Solution Partner

Qsigma

…. creating precision

Quality control is a compulsory attribute of any production process. Embedded in the process, mature, smart and rapid?

Qsigma will be your partner in case of precise inspection of geometric shapes and dimensions.

Optical inspection concepts comprising of lasers, dedicated illumination setups, cameras and other suitable sensors are potential tools for optimizing your measurement demands. Process control and evaluation of process parameters are made suitable for your particular measurement duties.

…. providing innovation

Being competitive is an every day's demand for creating new products and breaking new grounds for products having gained their maturity. It's a demand for R&D and last not least for production concepts. However, demands on quality control and product monitoring may increase in consequence.

In many application fields, optical measurement techniques support for an improved combination of precision and duty cycle enhancements in contrast to conventional mechanical methods. Qsigma likes to assist you finding your new way.

…. improving quality

Development of optical measurement systems is the basic concept of Qsigma. Improving quality is the driving force. As a claim for Qsigma's own product range and for improvements on products of our customers as well.

That holds for applications in R&D labs as well as in production environments. Quality improvement of your good products serve for benefits of your customers and yourself.

Just profit of Qsigma's expertise.

…. enhancing efficiency

In a R&D lab process timing is fairly uncritical. Part loading can be manually done.

Being on a production floor it is completely different. Embedding in a production line, automated part loading, monitoring of process capabilities, data transfer, product tracing are few keywords among others. All they are important for enhancements in efficiency and productivity. It is Qsigma's expertise to turn these demands into reality with a special respect to optimum duty cycles.

Just speak to us.

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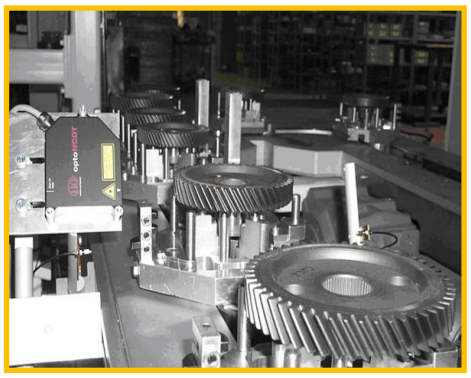
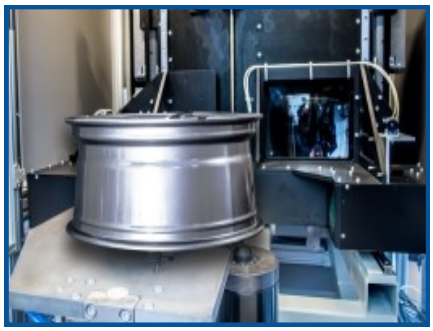
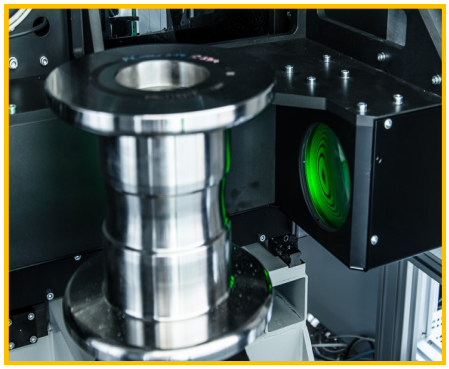
InnoMeas Applications



Gear Wheels



Vehicle Alloy Wheels



Cylinders, Drums, Reels etc.

Measures:

- Circumference
- Shape Contour
- Module
- Edge Geometry
- End Faces

- Cylindrical Tolerance
- Parallelism
- Perpendicularity

- Recognition of Dents
- Pattern Recognition
- Welding Seams

- Comparison Real & Nominal Contour
- Violation of Tolerance Limits
- Approach towards Critical Values

- Statistical Process Capabilites
- Machine Suitability
- Process Suitability
- Reporting

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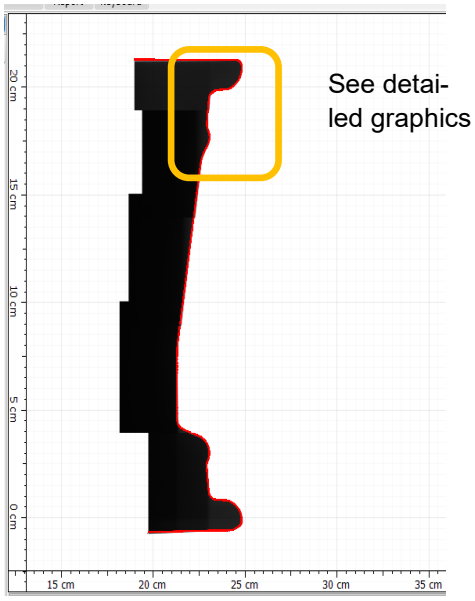
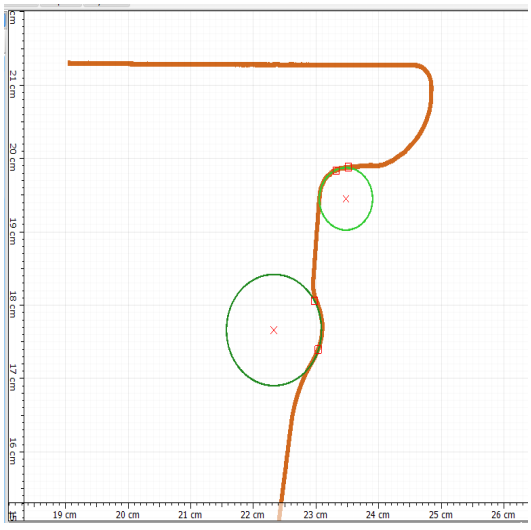
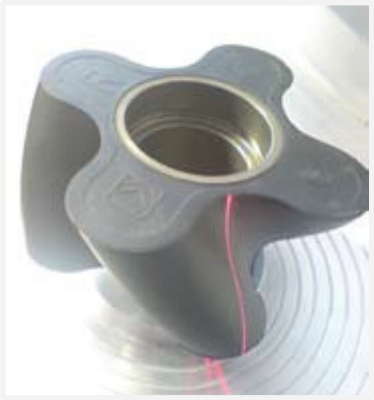
Example:

Contour Evaluation of an Alloy Wheel

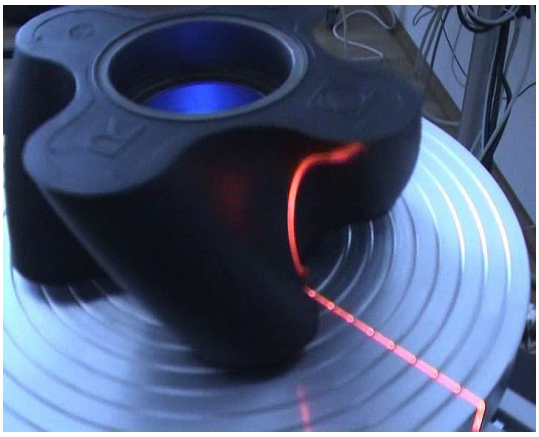




Evaluation of the contour of a car alloy wheel



Rotary Piston of a Slurry Pump



Measures:

- Circumference
- Shape Contour
- Module
- Edge Geometry
- End Faces
- Geometry of Curvatures

- Pattern Recognition
- Welding Seams

- Comparison Real & Nominal Contour
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- Statistical Process Capabilities
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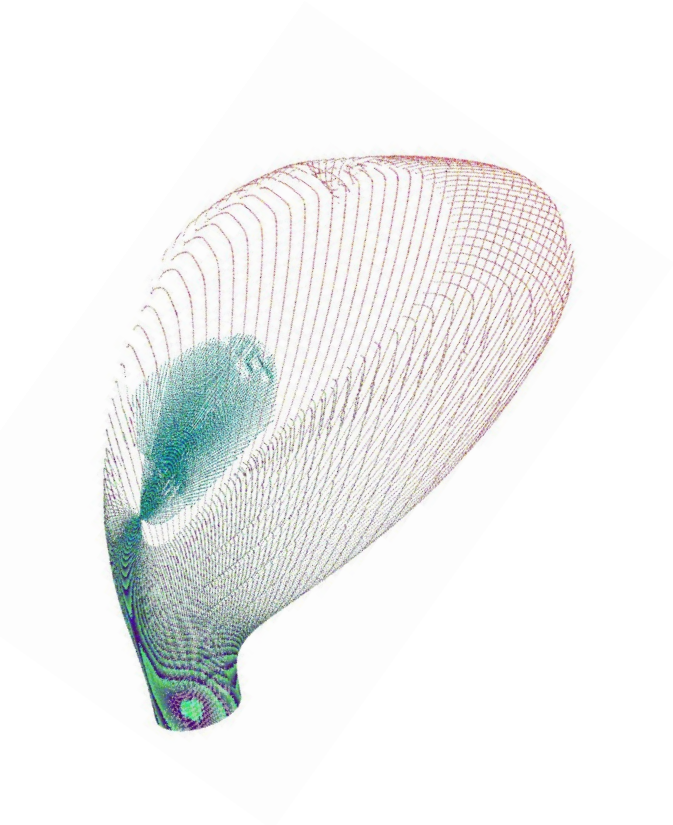
Golf Club



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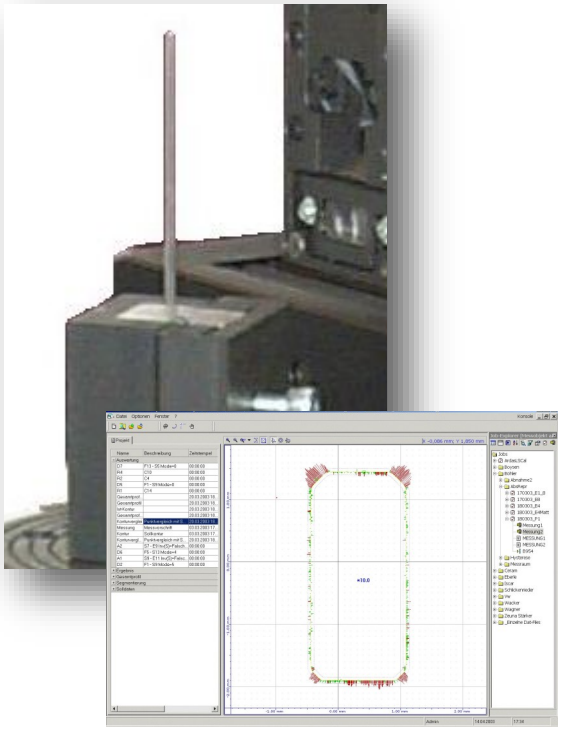

Geometrical Inspection of a Rectangular Wire

Measuremtent of the Edge Geometry of a Silicon Wafer

Measures:

- Edge Geometry
- End Faces

- Parallelism
- Perpendicularity

- Comparison Real & Nominal Contour
- Violation of Tolerance Limits
- Approach towards Critical Values

- Statistical Process Capabilities
- Machine Suitability
- Process Suitability
- Reporting

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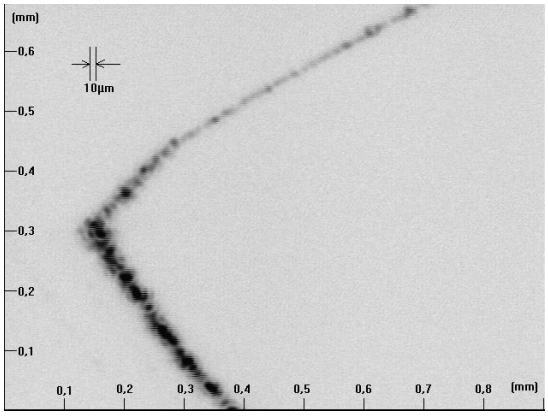
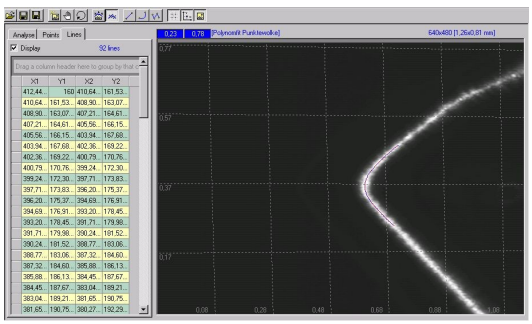
4-edge lathe cutting insert





Messgrößen:

- Edge Geometry
- End Faces

- Parallelism
- Perpendicularity

- Comparison Real & Nominal Contour
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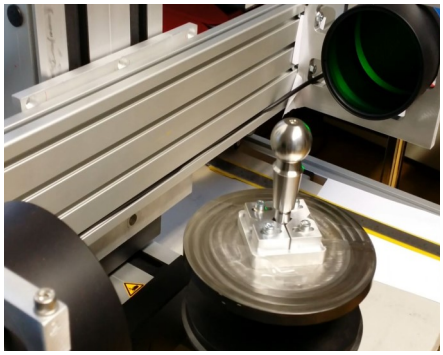
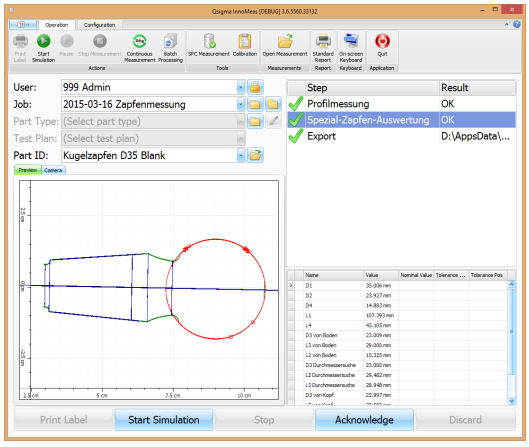
Inspection of a Ball Joint Plug





Measures:

- Dimensions & Geometries
- Leg Angles
- Reognition of Edges

- Comparison Real & Nominal Contour
- Violation of Tolerance Values
- Approach towards Critical Values

- Statistical Process Capability
- Machine Suitability
- Process Suitability
- Reporting

Capabilites:

- Offline sample Inspection
- Inline Production Controlling
- Embedding in Production Process
- Complete Automatic Operation
- Robotic Loading and Deloading

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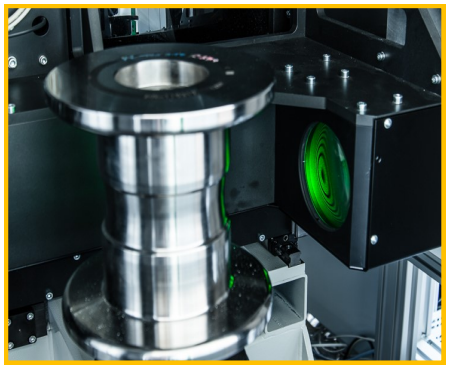
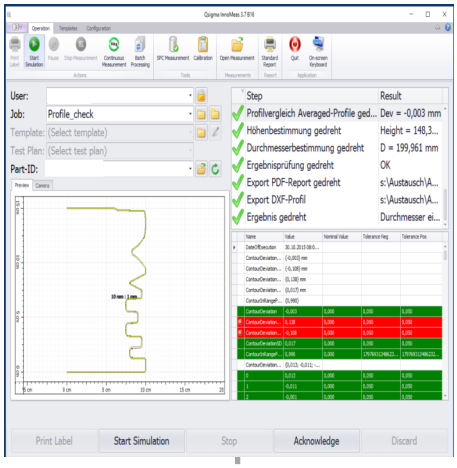
Inspection of Roll Forming Tools





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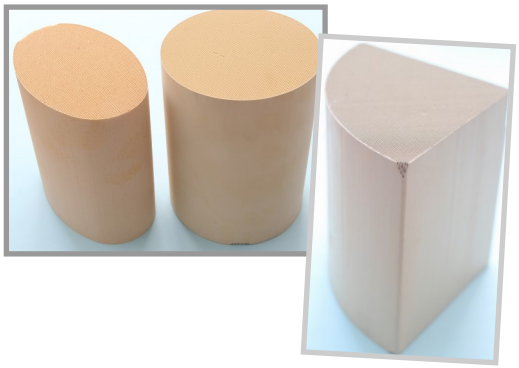
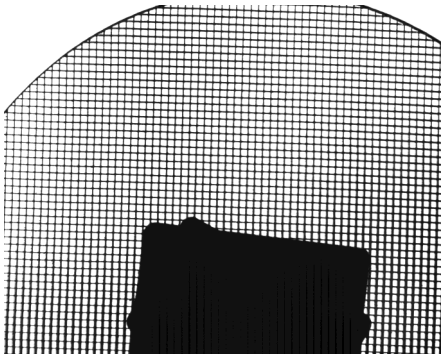
InnoMeas Applications

Automotive Catalytic Converter





Transmission Exposure of an Automotive Catalytic Converter employing Telecentric Lenses

Measures:

- Circumference
- Shape Contour
- Edge Geometry
- End Faces

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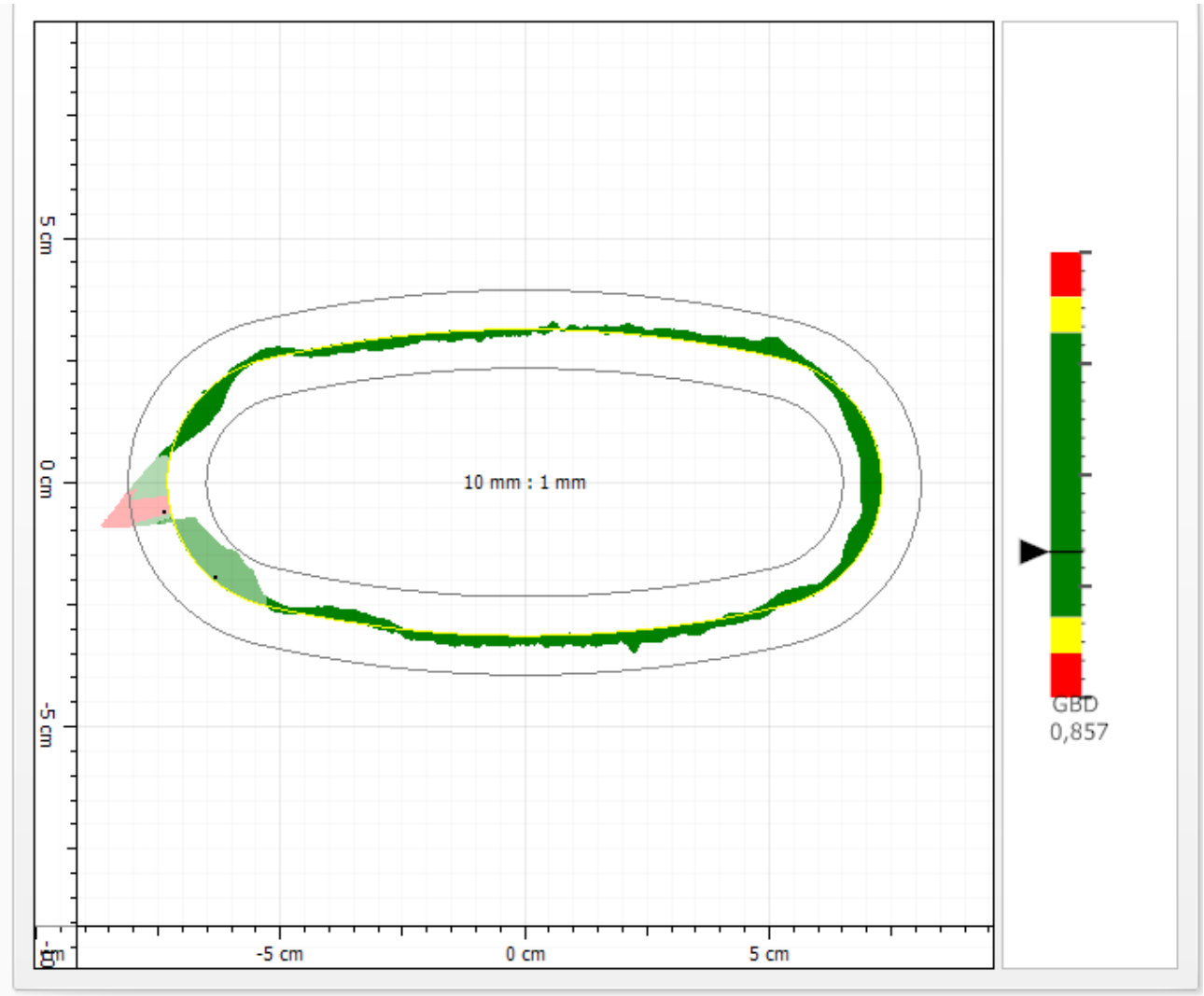
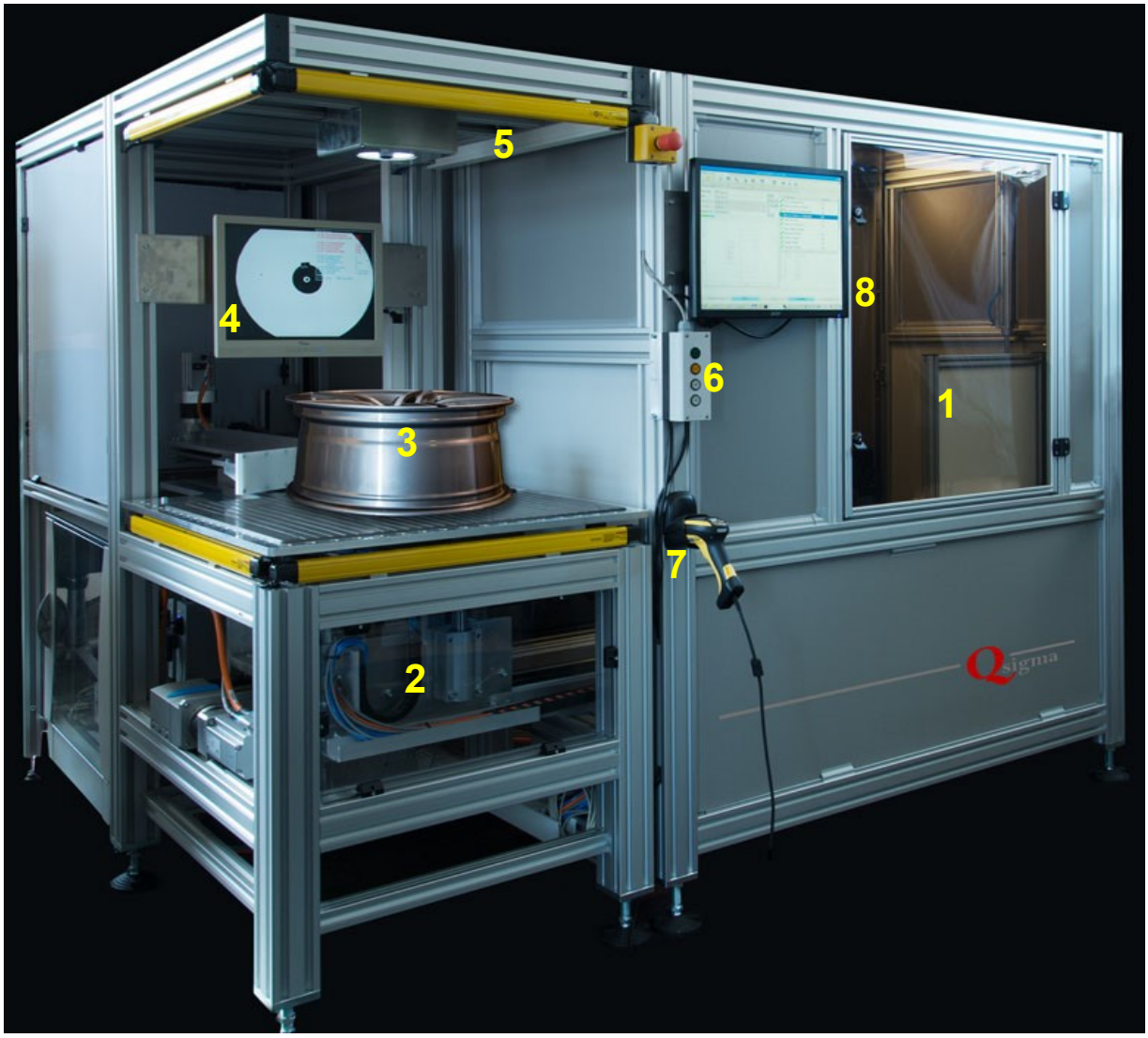


Contour Evaluation of an Oval Automotive Catalytic Converter

InnoMeas RMS Systems

The InnoMeas RMS systems are designed as stand alone comprehensive inspection systems. All processes like feeding the devices under investigation, coarse pre-inspection, inspection of particular details etc. are controlled internally by the InnoMeas RMS station itself. Part loading and deloading can be acchieved by robots or manually. However, InnoMeas RMS systems can be embedded in an automated production line.



1: Measuring chamber

2: Feeding station

3: Device under test (DUT):
i.e. car alloy wheel

4: Monitor for DUT
position & centering

5: Safety light curtain

6: Operator‘s push button assembly

7: Handheld scanner
for DUT identification

8: Monitor for displaying results

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InnoMeas CMS Systems

The InnoMeas CMS systems are designed with special respect to the inspection of automotive catalytic converters. Size and shape are measured before and after the canning process. Employing laser point triangulation preset sectional planes of the monolith and the canned converter can be measured.
Additonally, with proper accesseries installed, the mat weight and bar or DMC codes can be read.
The gap bulk density (GBD) is evaluated as an important measure for quality control. With optional software reporting tools a surveillance of process parameters is possible. Not only round samples can be measured. Elliptic, sectional and even potatoe shaped are possible to be inspected

Basic Setup

The monolith or converter is put on a rotary table (no centering required). The triangualtion laser sensor is mounted on a vertical positioning stage (z-axis), which allows automatic approach to the preset sectional planes for the particular measurement.

Z-axis including the sensor as well as all controllers and supplies for the entire measurement system is implemented in a dust proof shielded housing. The rotary table is accessible for loading the parts of investigation by robots or manually. The housed z-axis assembly and the rotary table are bolted on a bottom rail. Aligning the z-axis with respect to the rotary table, the measuring range of the laser sensor is adjusted.

All measuring features are software controlled and via communication ports prepared for automated operation.

Functions

» precise detection of the shape in defined sectional planes

» diameter (local, averaged), shape contour deviation,

» circumference, maximum inscribed circle, form tolerance

» continuous scanning of the complete shape with error detection: straightness of the shape and edge chipping *)

» height, chunking, parallelism or imbalance of the end face, rectangularity of the shape and end faces *)

» weight of the support mat, sheet thickness *)

» clearance between substrate and sheet (gap), local and global gap bulk density (GBD) *)

» contour target value, diameter target value, closing stroke of the canning process *)

*) optional and/or accessories

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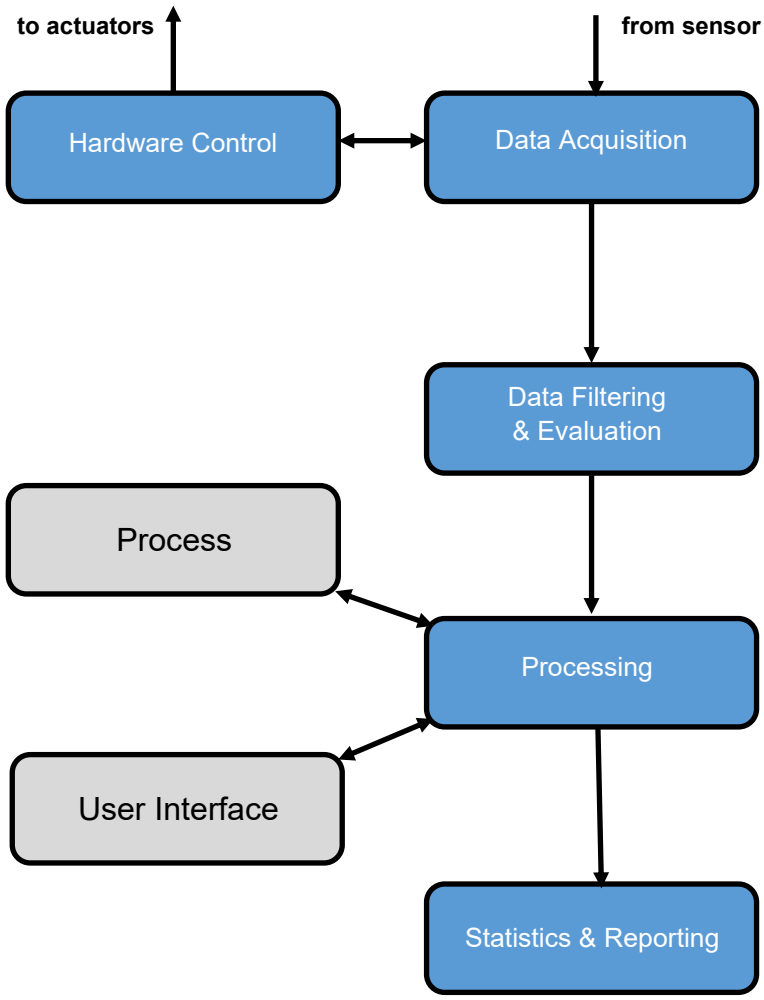
InnoMeas Software

InnoMeas software structure

The brain of Qsigma‘s inspection systems is the *InnoMeas* software. Its modularity warrants keeping pace with changing requirements. Based on Windows operating systems the programming architecture is compatible to newly launched Windows operating systems using Microsoft Dot Net Framework.

Flexible window structures provide adaptions to the particular user requirements, different operational levels can be set and stored. Measurement templates can be created by the user himself or, alternatively, Qsigma offers it as a part of the comprehesive after sales support. The creation of templates as well as entire measurement and evaluation sequences is supported by dedicated wizards.



Updating the evaluation and its algorithms is self evident to improve the effectivity of computing. Even the evaluation process can be adapted to particular requirements.

Neccessary requests of user interactions can be programmed. Alert values for quality control can be set.

Communication with the plant control system is important and of central value within the *InnoMeas* software. Interfacing with designated production line manufacturers already exists. The *InnoMeas* software supports an interface to fieldbus systems (Modbus, EtherCAT, ProfiNet, etc.). A comprehensive data export structure (.csv, .pdf, .dfq, flexible data base input and output, export to Excel spread sheets etc.) rounds off the package.

Optionally a package for statistic evaluation (e.g. process capability) and reporting can be added.

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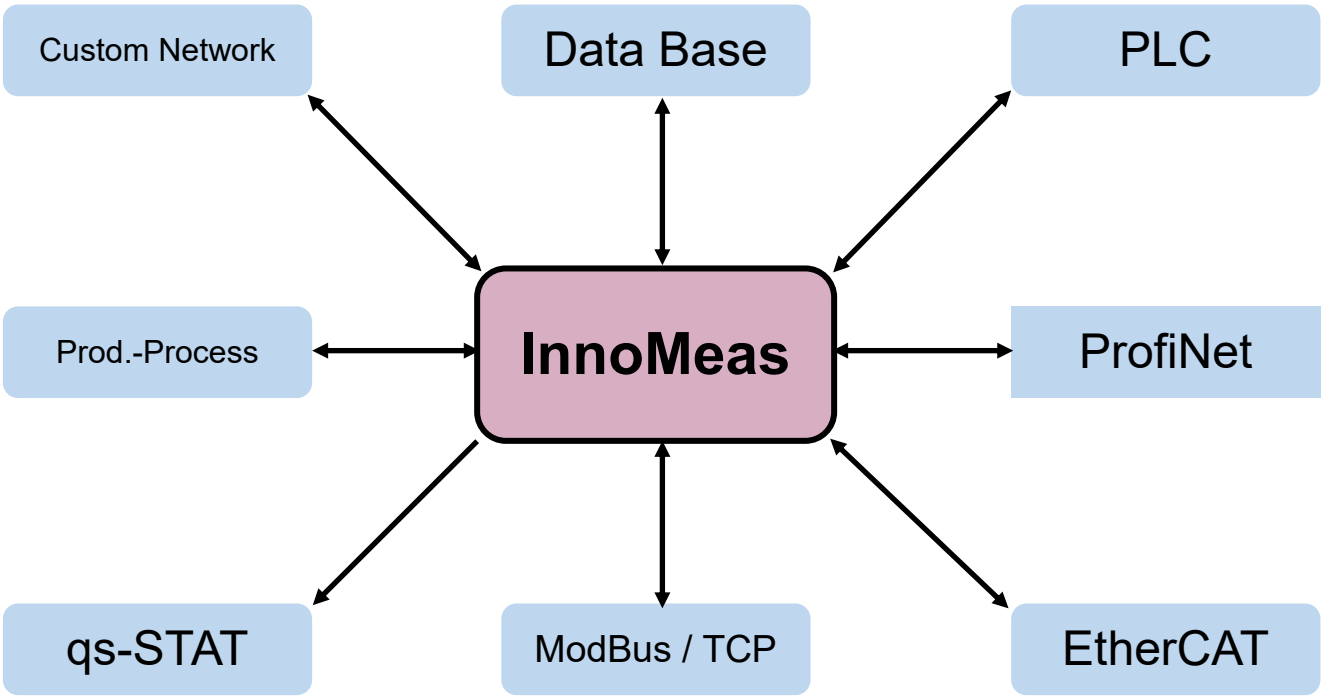
InnoMeas Software

InnoMeas communication capabilities

The InnoMeas software is not an isolated device. Communication is one of the key features of InnoMeas.

InnoMeas controls the measurement itself and cares for computing reults with respect to customer‘s requirements. And, moreover, it implements the communication for the exchange of production parameters, process line status messages, process control commands, data filing, data reporting etc..



Excamples of data exchange capabilities supported by InnoMeas software

Next to controlling the internal processes in the measurement system itself the *InnoMeas* software is the gateway of command and data interchange with external devices. *InnoMeas* supports a variety of interfaces and protocols as well as data exports using definite formats like e.g. .dfq for qs-STAT reporting and process statistics or simple Excel spread sheets.

Thus *InnoMeas* systems can be easily implemented in existing data and command structures of superordinated processes. Moreover, *InnoMeas* can keep pace with future innovation steps.

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