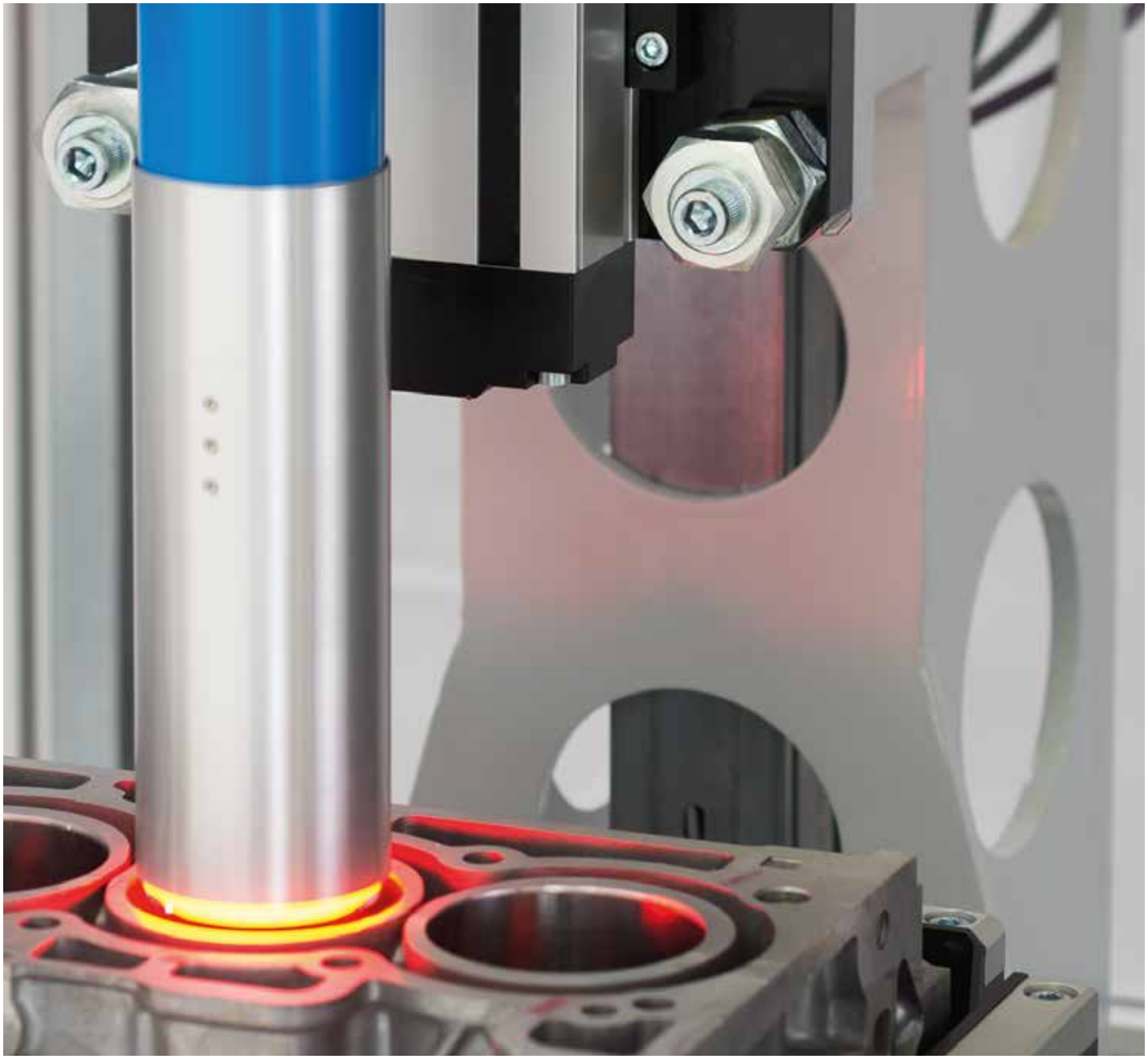
Visionline – Optical surface inspection & profile measurement

# **Reliable and automated** testing of technical surfaces



HOMMEL ETAMIC

A member of the JENOPTIK Group

www.hommel-etamic.com

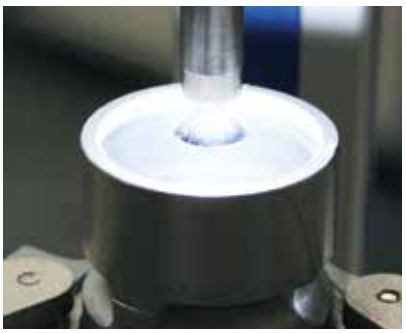
# Precise metrology for efficient quality control

As a leading manufacturer of metrology systems, HOMMEL-ETAMIC offers a broad portfolio of measurement solutions for industrial manufacturing processes. Our technologies include pneumatic measurement, tactile or optical measurement of roughness, contour, form and dimensional features, as well as optical inspection of machined surfaces.

Comprehensive services such as consulting, training, DAkkS-DKD calibration and service, including long-term maintenance contracts, round off our worldwide range of metrology services for quality assurance in industrial manufacturing.

Our measuring systems ensure the quality of the workpiece throughout the entire production process and provide precise measurement data in the shortest possible time.

Automatic measuring technologies enhance overall productivity during production through efficiently designed inspection solutions – whether inline or offline, or using spot checks through 100 % inspection of all manufactured workpieces.



Inspecting inside bores

Inspecting plane surfaces

Measuring micro structures

**Our Visionline solutions provide you with a wide range of application options for optical surface inspection and profile measurement. The systems can be integrated into automated production processes, and deliver reproducible, robust results.**

### Surface inspection

- Cavities
- Pores
- Scratches
- Recesses
- Spalling
- Burrs

### Profile measurement in cylinder bores

- Groove depth
- Groove width
- Ridge width
- Micro structures

### Please scan for detailed Visionline information

# Innovative, optical inspection of various surfaces

### Reliable test results

With Visionline solutions, the inspection process is automated and delivers operator-independent and reproducible results. This avoids the errors of a visual inspection and ensures that only really high-quality products are processed and delivered.

### High quality products

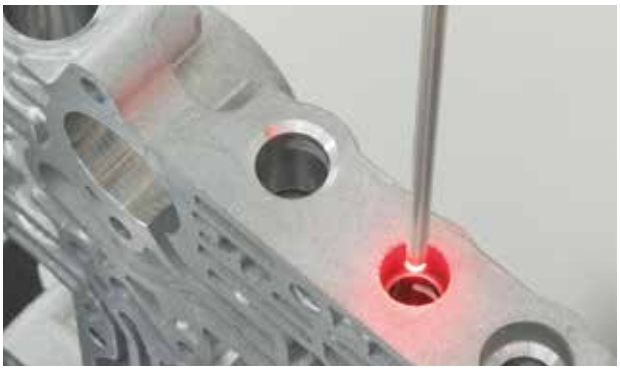
For an optimized quality assurance process, the test results are clearly documented and made available to the production line for further processing. Detailed displays make any defects visible and allow for immediate rectification. This increases the product quality and thus the satisfaction of your customers.

### Optimized processes

The immediate inspection of all workpieces directly after the processing step allows statements about the manufacturing quality. The feedback of the test results into the production process helps to identify and remedy problems at an early stage.

### Reduced inspection costs

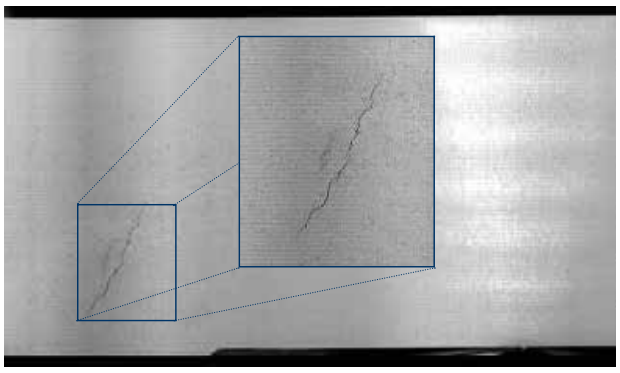
Automated 100 % inspection of technical surfaces saves you time and money. To speed up your inspection process, Visionline systems inspect surfaces in the shortest possible time and deliver objective results without operator influence.



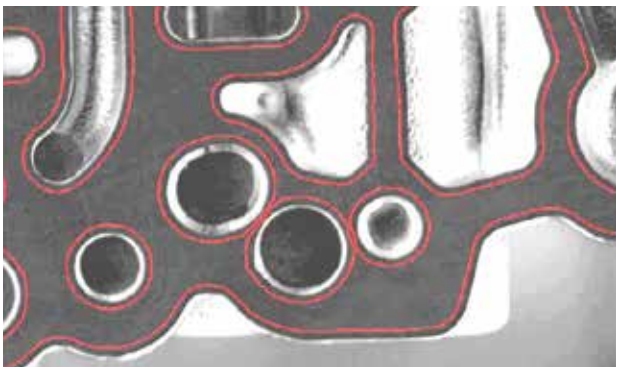
Optical surface inspection in bores (here: valve control plate)

### Advantages of optical inspection

- Wear-free and reliable thanks to optical testing technology
- Fast inspection with short measuring cycles
- No retooling of the systems when changing workpieces
- Safety in case of misalignment of the workpiece thanks to collision protection
- 100 % control
- No operator influence
- Reduction of pseudo-errors and unrecognized defects (slippage)

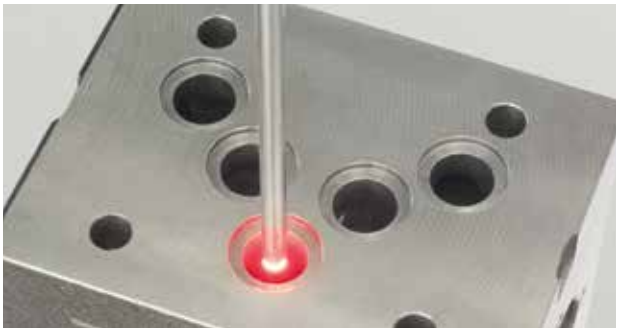


Crack on a cylinder bore surface



Edge-accurate inspection thanks to adaptive dynamic masking

# **Visionline B5, B20 & B100.** Optical inspection systems for reliable defects detection in bores



Inspection of bore surfaces in a mobile hydraulics block

Bore inspection of a cylinder head

Station with manual loading for small series or prototype production

Above-conveyor system for inline engines in large-scale production

**The optical sensors enable precise inspection of bore surfaces and deliver high-resolution and distortion-free images of the surface in order to reliably detect defects within the required cycle time.**

## System features

- Latest CMOS image sensor technology and a 360° lens for reliable and automated inspection
- Objective test results without influence of the operator
- Detection of common surface defects such as cavities, pores, scratches, etc.
- Process-reliable differentiation of defects and residual dirt from drying
- Image pickup whilst in motion and within the required cycle time
- Large diameter ranges, therefore no conversion necessary when changing workpieces
- Head-on collision protection to avoid damage in case of workpiece misalignment

## Modular system concept

- Offline with manual loading
- Inline with automated workpiece handling
- Flexible robot system
- Multiple sensors as well as combination with other sensors (e. g. F200S) in one system possible

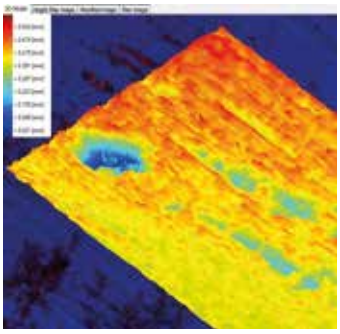
## Application examples

- Valve control plate
- Brake master cylinder
- Pump housing
- Con rod
- Cylinder liner, and many more

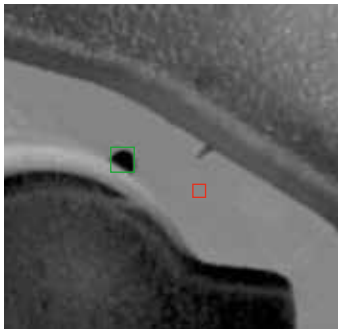
| Model | B5 | B20 | B100 |
|---|---|---|---|
| Test diameter | from 5 mm | from 14 mm | from 68 mm |
| Inspection depth | 190 mm | 240 mm | 400 mm |

# **Visionline F100S, F200S & F400S.** Optical systems for automatic inspection of plane surfaces

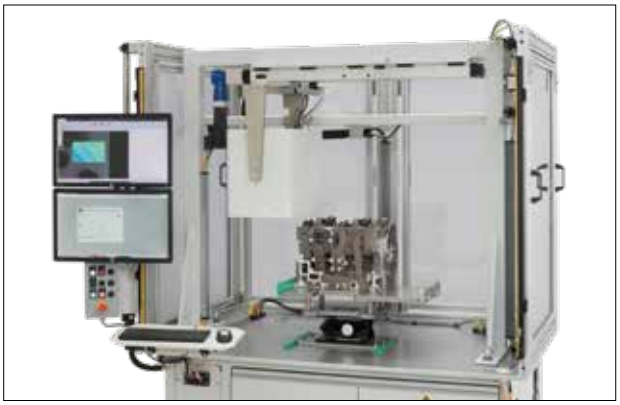
Plane surface inspection using the F200S



Evaluation of surface defects



Red: edge flaw, green: contamination



Offline inspection station

Full inspection of cylinder bore and plane surface on the engine block

**As a result of their fast speed, the F100S, F200S & F400S systems are used for full inspections of plane surfaces. Innovative camera and lighting technology and adaptive, dynamic masking are used to distinguish between genuine surface defects and contamination with a high level of process reliability.**

## System features

- Automatic inspection of plane faces
- Detect common surface defects such as cavities, pores, scratches, casting defects, etc.
- Image pickup whilst in motion and within the required cycle time (fly-over technology)
- Short inspection times thanks to a fast scan rate
- Adaptive, dynamic masking for reliable edge inspection
- Powerful 3D technology
- Offers a complete solution in conjunction with bore inspection sensors for full inspection of e.g. cubic parts
- Custom configurations for 2D inspection possible

## Modular system concept

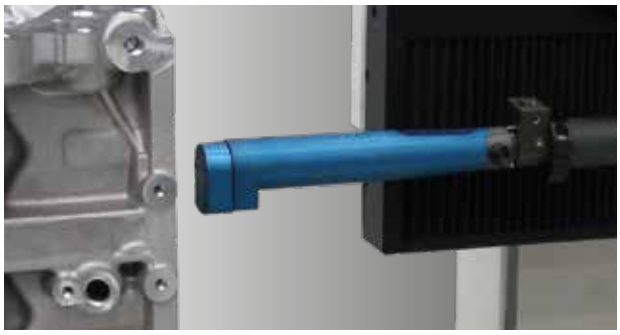
- Offline with manual loading
- Inline with automated workpiece handling
- Multiple sensors as well as combination with other sensors (e. g. B100) in one system possible

## Application examples

- Crank case
- Cylinder head
- Gear housing
- Hydraulic block
- Motor housing
- Labyrinth plate
- Bipolar plate
- Valve control plate
- Shafts
- And many more

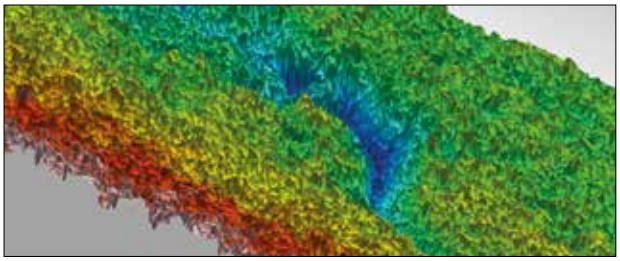
| Model | F100S | F200S | F400S |
|---|---|---|---|
| Scan width | 100 mm | 200 mm | 400 mm |
| Working distance | 60 mm | 60 mm | 60 mm |

# **Visionline CF650 & CF1250.** Optical measuring systems for micro structures and profiles

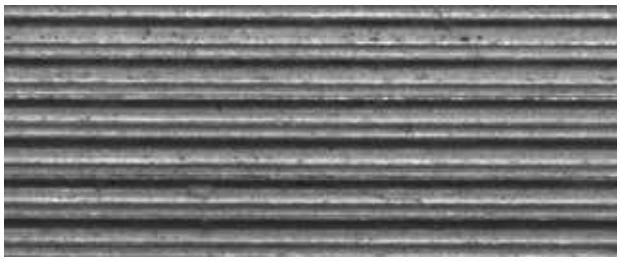


Measuring micro structures with CF650 system

Measuring a cylinder bore with CF1250 system



3D topography measurement



Measurement of grooved surfaces

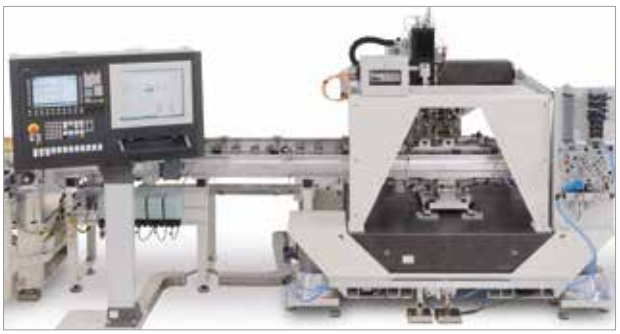
**The CF650 & CF1250 optical measuring systems feature chromatic-confocal point sensors and thus allow a high-precision surface measurement and highly accurate determination of micro profiles in cylinder bores. Thanks to the modular concept, the measuring systems can be used both offline with manual loading and inline with automated workpiece handling. The use of several sensors is possible as well as a combination with other sensors, such as B100.**

### System features CF650

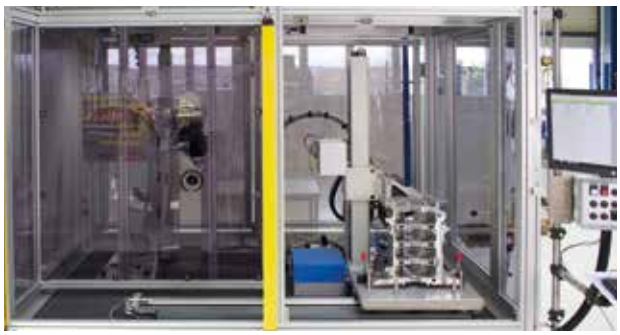
- Automatically measures micro structures in cylinder bores
- Can be integrated into fully automated systems
- Possibility to carry out 3D topography measurements

### System features CF1250

- Automatic measurement runs
- Automatically composes and evaluates the profile that has been measured
- Measures profile at four peripheral positions
- Measures the groove geometry across the entire length of the bore



Overall view of the CF650 measuring system

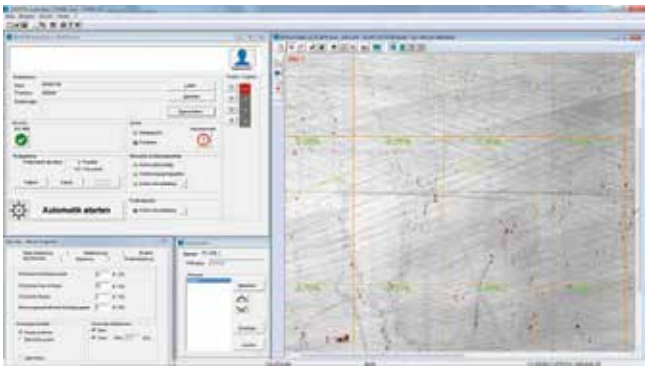


Combined cylinder inspection with CF1250 and B100 sensors

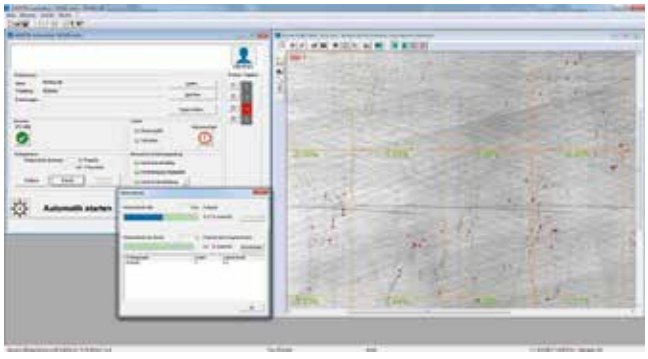
# **Evovis Vision.** Software with clear user guidance for reliable inspection results

**The graphical, function-oriented user interface of the Evovis Vision inspection and analysis software guarantees that you can operate the systems for bores or plane surfaces simply and accurately. Numerous functions and wizards simplify the use of the software. It takes just a few simple steps to tailor the inspection system to a specific workpiece. This means that Evovis Vision ensures full quality control of each workpiece in accordance with the specified cycle time of the production line.**

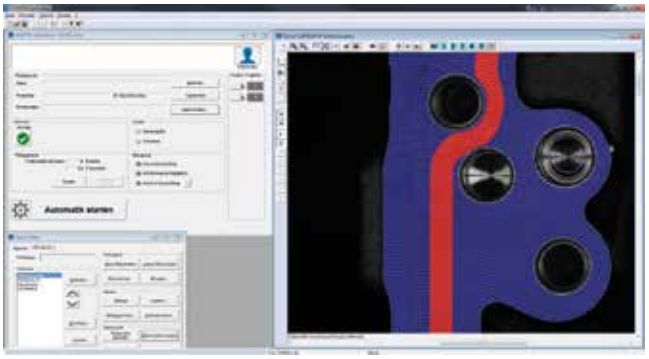
Defining inspection criteria and inspection zones



Automatic surface analysis



Statistical analysis using qs-STAT®



Adaptive, dynamic masking

## System features

- Clear user interface and easy-to-understand icons
- Numerous wizards make it easy to create inspection plans
- Full evaluation and analysis functions for full quality control of manufactured parts
- Can be used for semi-automatic or fully automatic systems
- Interface to the line control system for integration in the production process control system
- Records and evaluates surface defects such as pores, scratches, cavities, etc.
- Evaluates regular and irregular structures
- Dimensions of cross bores, and chamfers
- Determines relevant inspection zones with individual classification
- Measures surfaces in the image plane, e.g. edges or bore diameters
- Clearly documented results and detailed representations
- Robust detection of defects through adaptive, dynamic masking

HOMMEL ETAMIC

## Worldwide availability

Our expert teams are available to assist you wherever you are located. We have subsidiaries and distribution partners in key national nations, in order to assist our customers as a reliable production partner.



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