Precision is our business.

HOMMEL FORMLINE
The fast and accurate crankshaft and camshaft measurement

HOMMEL CFM
All round ability for crankshaft and camshaft measurement

ADVANTAGES IN DETAIL

Correct
The measuring slide has an air bearing and is therefore wear-free. The frictionless bearing with no reverse tension means that mechanical forces have no influence on the measurement result. There are therefore no measuring errors which need to be compensated at considerable expense.

Precise
High resolution measurement systems give the machine an excellent basic accuracy.

Robust
The extremely robust construction and a dual vibration damping between the measurement system and the installation surface enable it to be used both in the measuring room and in the production environment.

Fast
The possibility of programming any measurement sequences produces optimum CNC runs. High measurement and travel speeds combined with short evaluation times provides decisive advantage in speed.

Cost-effective
The use of wear-free components keeps operating costs low. The calibration procedure for straightness compensation of the rotating measuring blade can easily be performed by the operator.

Flexible
All shafts of the specified sizes can be measured.

Variants
• Measuring room or production version
• 1250 or 1500 mm tip width
Measurement scope HOMMEL CFM 3010

- Roundness
- Cylindrical shape
- Radial run-out to a specified reference
- Total run-out
- Coaxiality to a specified reference
- Conicity
- Stroke radius of the con rod bearing to a specified axis
- Rotational position of the con rod bearing, in relation to reference
- Diameter
- Axis parallelism related to reference bearing
- Straightness envelope line
- Slope envelope line in relation to bearing axis
- Parallelism envelope line in relation to bearing axis
- Convexity envelope line
- Squareness (optional)
- Lengths / widths (optional)
- Axial run-out (optional)
- Total axial run-out (optional)
- Flatness (optional)
- Chatter marks (optional)
- Certified qs-STAT® interface (optional)
- ASCII export (optional)

The measuring accuracy of the system satisfies all the standard criteria of the gauging component capability. Repetitive accuracies of up to 0.3 µm are achieved.

The measurement of cams is described in detail on the next double page. The features listed there also apply to the HOMMEL CFM 3010.
Specialist for cam measurements

ADVANTAGES IN DETAIL

Universal
All cam forms can be measured:
• Injection cams
• Pump cams
• Hollow cams
• Polygons
• Negative cam profiles

Fitting
Suitable rectification methods are available for the various cam forms:
• Translatory rectification
• Rotational rectification
• Symmetrical rectification
• Asymmetrical rectification
• Best fit rectification

Productive
The CFM 2020 model operates with two measuring heads with parallel engagement. The cycle time is reduced by 30% as a result.

Versatile
• Measurement of unknown cams without nominal profile
• Wear evaluations
• Envelope line measurement over the whole cam or bearing width
• Grinding over measure test

Ergonomic
The horizontal structure guarantees optimum part handling.

Comfortable
Depending on the application in the measuring room or in the production area an adapted operating concept is available.

Professional
Decades of experience in the field of form measurement coupled with continuous know-how exchange between users and manufacturers offer you a mature product which sets standards in quality assurance.

Variants
• Measuring room or production version
• CFM 2010 with one measuring head
• CFM 2020 with two measuring heads

Accessories
Hommelwerke offers a wide range of accessories for easy handling. Universal workpiece drivers and tools allow measurement of all common workpiece types. Hommelwerke’s decades of experience in the field of crankshaft and camshaft measurement ensure that you will find the perfect solution even for complex measurement tasks. Groove or bore drivers adapted specially for the application can be used for example as addition to universal rotational drivers.
Measurement scope  
HOMMEL CFM 2010 / 2020

- Cam form profile over 360°
- Cam form profile deviation
- Cam angle to reference element or reference cams
- Maximum cam lift and deviation
- Maximum form deviation growth (form jump)
- Speed derivation
- Acceleration derivation
- Roundness
- Cylindrical shape
- Radial run-out to a specified reference
- Total run-out
- Conicity
- Diameter
- Axis parallelism related to the reference bearing
- Straightness envelope line
- Slope envelope line in relation to bearing axis
- Parallelism envelope line in relation to bearing axis
- Convexity envelope line
- Lengths / widths (optional)
- Axial run-out (optional)
- Total axial run-out (optional)
- Flatness (optional)
- Chatter marks (optional)
- Certified qs-STAT® interface (optional)
- ASCII export (optional)

The measuring accuracy of the system satisfies all the standard criteria of the gauging component capability. Repetitive accuracies of up to 0.3 µm are achieved.
Evaluation software

The Windows software TURBO CFM sets new standards in terms of operating comfort and functionality. The program can be created easily and quickly using standard input aids for crankshafts and camshafts.

The consistent use of well known standard Windows functions minimises training time.

Programming

Recurring characteristics, tolerances and nominal values are duplicated quickly by "copy and paste". Wizards support the user. All the necessary steps are processed in dialog boxes.

In the positioning dialog box you can move to positions and enter them directly using "teach-in mode". All measurement positions can be defined by entering a constant bearing and measurement track distance. The calculation functions between the individual cells have a similar structure to MS-Excel.

Grouping functions support the clarity in complex CNC programs. With previously entered data a CNC program is created automatically which can then be adapted manually if required.
ADVANTAGES IN DETAIL

- The CNC run is visible during the measurement
- Results can be printed during the next measurement run
- Fast and simple creation of measurement reports
- Online language switching
- Output of results in several languages
- Data export in ASCII format
- Certified qs-STAT® interface
- Save and export source data, result data and reports
- Offline programming

Measurement in the main dialog box

In the main dialog box a measuring program is selected and an automatic measurement cycle is started. The clamping configuration can be stored and displayed in a photographic form. All measured values are buffered and can be displayed in a large format during the CNC run. Individual measurement positions can therefore be evaluated directly and re-measured as required.

Evaluation

Characteristic evaluations are introduced and executed automatically. The evaluated characteristics can then be displayed on screen and/or printed. Screen, single and print views are available.

Printout forms

You can document your results with informative screen and printout forms. NIO characteristics are marked. The measurement results can be sorted and displayed according to characteristics of the measurement positions.
Evaluation of special measurement tasks

Cam form profile over 360°
All cam types can be shown in relation to a specified reference. Possible equidistant measuring point distances are: 0.1°, 0.2°, 0.5° and 1°.

Cam form profile deviation can be detected in the area of the pre-cams, main cams, post-cams and on the base circle. The deviation of the maximum positive value, the maximum negative value and the respective position are indicated in all areas.

Chatter marks
Higher demands on noise reduced engines require the capability for detecting and avoiding chatter marks. A high measurement recording rate of 3600 data points over 360° is a prerequisite for detecting chatter marks. These form errors can only be recorded with a frictionless measurement system with no reverse tension. As the measured values are also recorded in the regular cam form measurement, no time is lost to evaluate chatter marks as well. Data is displayed on a screen page or by page printout.

Axis parallelism of crankshaft shaft pin bearings
The main bearings and pin bearings for a reference axis are shown in a 3D-display. The direction and amount of the axis parallelism are shown by vectors for each bearing.

Wear evaluation for camshafts
A material wear is determined between two measurements. The new shaft is measured before installation in the engine and after running the engine (installation measurement). The form deviation difference is determined as a maximum wear with amount and angle position. Any measurements can be compared with each other.
Certified qs-STAT® Interface
Certified Q-DAS ASCII transfer format for local or central storage of results is available in .DFQ or .DFX format. Statistical data can be provided in both process and measurement systems analyses (MSA) formats. Standard R&R formats type 1 to 3 are directly supported.

Convexity evaluation
Convexity can be determined from either three polar measurements or one linear measurement. Polar measurements are evaluated according to mean radii. Linear measurements can be calculated from 3x five percent of the traverse length or over the complete contour by an LSP parabola.
All our activities are centred on the customer. Our modern measuring systems are developed according to your requirements and specific needs. As a supplier for both contact and non-contact measurement technology we offer the right solution for any type of component. Our experience and technical expertise make us one of the most qualified service providers of innovative measuring systems.

Our aim is to give our customers extensive support: already in the planning phase, during project handling and of course also after commissioning of our measuring systems. This means you have a competent partner at your side to support you in all questions relating to metrology.

Consultation / Engineering
We offer detailed advise on solving difficult measuring tasks. Our engineers are available to advise on all aspects of modern metrology and can devise solutions to meet your individual need.

Training / Installation
Our products are renown for their simplicity of operation and training requirements. Nevertheless all our representatives actively support our customers during the installation of their measuring equipment. Training courses can be carried out on site or at Hommelwerke and are designed to ensure the system operates to its maximum potential.

Service / Maintenance
Hommelwerke has an accredited DKD calibration laboratory and carries out demanding customer and DKD calibration measurements. We offer long-term maintenance contracts to guarantee reliability of the measuring components. Numerous service branches enable us to respond quickly.

Product
At Hommelwerke we are flexible enough to ensure that we offer individual yet economic solutions. This is because we invest in research and product development which enables us to keep you one step ahead at all times.

All from one provider

Good advice and strong support
To provide high precision crankshaft measurements it is important to ensure the accuracy of angular and radial measurement systems along with precision assembly of the headstock bearing and measurement blade.

By using a high-precision, air bearing linear traverse unit in combination with a vibration-free cable drive, the HOMMEL CFM offers a clearance and tension free measurement system. This design ensures no transverse mechanical forces influence the measurement result. Due to the high accuracy of the mechanical components used in this design, the Hommel CFM requires no expensive optical system bearing compensation. This innovative development is maintenance-free and requires no special machine environmental conditions.

### TECHNICAL DATA

#### HOMMEL CFM

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CFM 3010</th>
<th>CFM 2010 / 2020</th>
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<tbody>
<tr>
<td>Measuring range</td>
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</tr>
<tr>
<td>Max. workpiece length (mm)</td>
<td>1250 / 1500</td>
<td>1100 / 1000</td>
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<tr>
<td>Max. radial travel (mm)</td>
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<tr>
<td>Test diameter (mm)</td>
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<td>Max. load* (N)</td>
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<td>Speeds</td>
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<tr>
<td>Travel speed vertical (mm/s)</td>
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<tr>
<td>Rotation speed (r/min.)</td>
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<td>2 – 40</td>
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<tr>
<td>Resolution</td>
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<td>Resolution radial (µm)</td>
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<td>Resolution axial (µm)</td>
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<td>Resolution angle measuring system (°)</td>
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<td>Width (mm)</td>
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<tr>
<td>Height (mm)</td>
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</tr>
<tr>
<td>Weight (approx.) (kg)</td>
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<td>1500</td>
</tr>
</tbody>
</table>

* heavier workpiece weights on request
Precision is our business.

Product Programme

ROUGHNESS MEASURING
CONTOUR MEASURING
OPTICAL SHAFT MEASURING
FORM MEASURING
GEAR MEASURING
CRANKSHAFT AND CAMSHAFT MEASURING
OPTICAL SURFACE INSPECTION
DIMENSIONAL MEASURING MACHINES
STANDARD COMPONENTS
MEASURING SOLUTIONS
DKD CALIBRATION SERVICE
CONSULTATION, TRAINING AND SERVICE

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