

koob

Measurement Engineering

**Magnetic Field Measurement
And Testing Services**

Portfolio
2025



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About Koob Testsystems

Koob Testsystems is a German mechanical engineering and technology company that has set itself the task of measuring and evaluating electrotechnical products, development steps and processes. We offer customers decision-making aids and the opportunity to optimize their processes.

Our range is divided into 3 basic segments:

Special machine construction and service

We offer complete test benches for various stages of development and rack units for line integration that are tailored to your specific requirements.

Test bench setup for magnetic field and component testing

We also offer our individual manufacturing processes as separate services, separate from the all-encompassing test bench construction.

Contract measurement

We offer short-term testing of your products, process steps or purchased parts.



Test bench construction



Aluminum profile



PCB layout



CNC milling



Electronics development



Construction



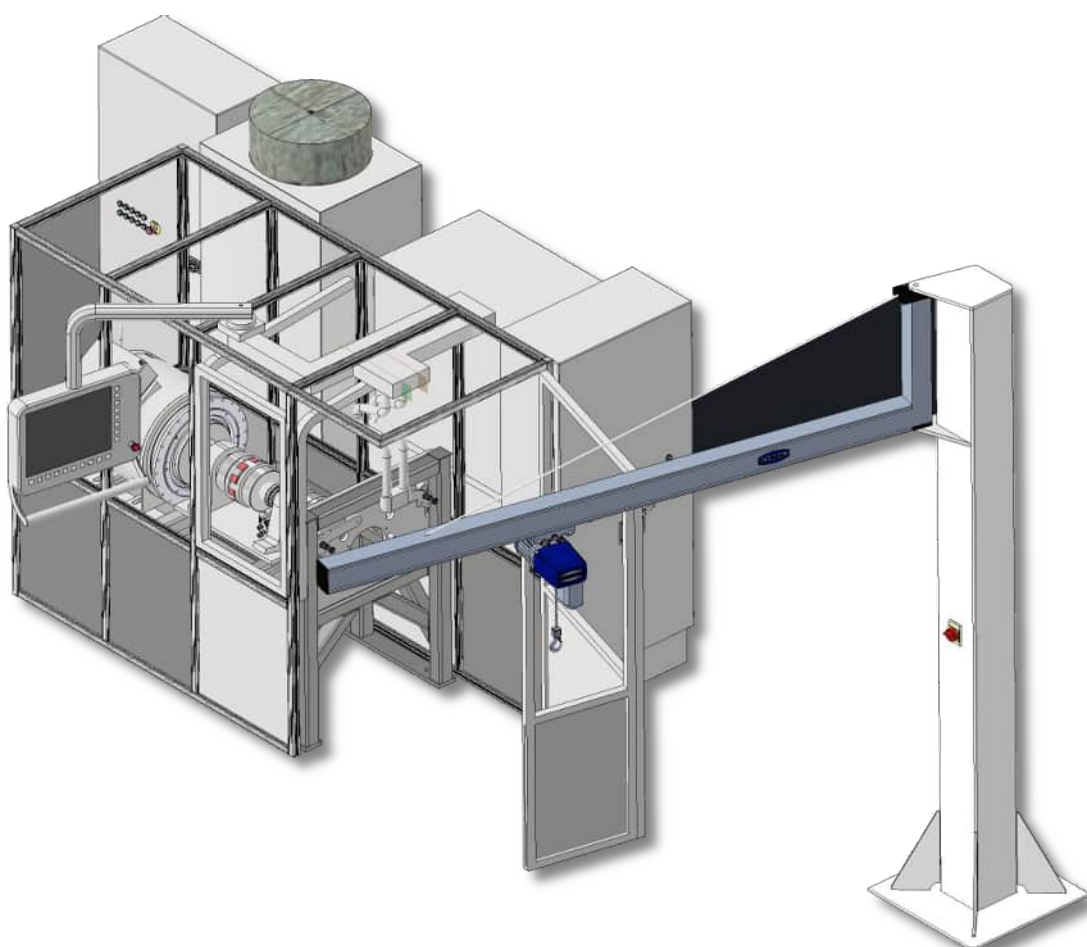
Programming / Software development

Special Machine Construction and Service

As a comprehensive full-service provider, Koob Testsystems specializes in custom machine construction, innovative design, and advanced development. Utilizing cutting-edge manufacturing facilities, we deliver high-quality, state-of-the-art products while actively sharing our expertise and extensive experience with our customers.

Our customers have relied on us for over 5 years in the following areas:

- Industrial electronics
- Automation
- Power electronics
- Environmental technology
- Communication technology
- Component tests
- Magnetic measurement and testing
- Measurement technology
- Construction
- Building electronics
- Automobile
- End-of-line test
- Inline tests



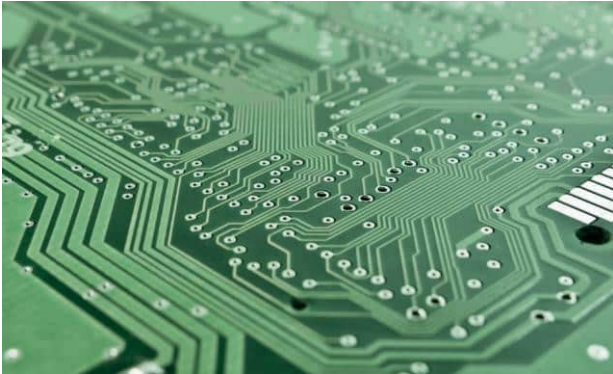
```

78 ... trim(preg_replace('/\\\\\\\\/','/', $image_src), '/');
79
80 $SESSION['CAPTCHA']['config'] = serialize($captcha_config);
81
82 return array(
83     'code' => $captcha_config['code'],
84     'image_src' => $image_src
85 );
86
87
88
89
90
91 function_exists('hex2rgb') {
92     $hex_str = preg_replace('/[0-9A-Fa-f]/', '', $hex_str); // Gets a proper hex string
93     $rgb_array = array();
94     if (strlen($hex_str) == 6) {
95         $color_val = hexdec($hex_str);
96         $rgb_array['r'] = 0xFF & ($color_val >> 0x10);
97         $rgb_array['g'] = 0xFF & ($color_val >> 0x08);
98         $rgb_array['b'] = 0xFF & ($color_val >> 0x00);
99     } else {
100         $rgb_array['r'] = hexdec(substr($hex_str, 0, 2));
101         $rgb_array['g'] = hexdec(substr($hex_str, 2, 2));
102         $rgb_array['b'] = hexdec(substr($hex_str, 4, 2));
103     }
104     return $rgb_array;
105 }
106

```

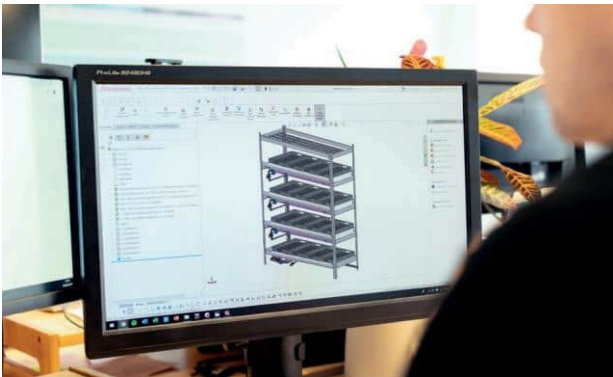
Software development

- Machine communication
- Programming
- Windows and database programming
- Web and special applications
- Data analysis
- Automation
- Control programming
- Concept development



Electronics

- CNC layout
- Product development
- Electronic prototypes
- Quality control
- Electronic assemblies



Construction

- Test bench development
- Assembly design
- Technical drawings
- CAD/CAM
- 3D rendering



Manufacturing

- CNC milling
- Individual to series production
- Production



Electric Motor

Magnetic imbalance / NVH abnormalities

The industry is increasingly turning towards e-mobility, paving the way for a future of transportation free from dependency on fossil fuels. Rising political, environmental, and economic demands for higher production quality and volume compel manufacturers worldwide to adopt advanced technologies in their production processes. Navigating these rapid changes presents unique challenges and opportunities that demand attention.

For those manufacturing or utilizing electric motors, preventing magnetic imbalances and NVH (Noise, Vibration, and Harshness) anomalies is critical. Undetected issues early in the production process—often invisible as mechanical defects—can lead to significant costs in efficiency, time, money, product safety risks, and field returns.

Since its inception, Koob Testsystems has encountered diverse challenges such as magnetization errors, substandard purchased components, inefficient magnetic designs, and other complex problems. In response, we have developed innovative solutions capable of accurately measuring and evaluating the magnetic fields of rotors and stators within seconds. Our technology allows customers to swiftly identify and address anomalies, drastically reducing downtime and enhancing productivity.

Koob Testsystems' test benches rapidly scan the magnetic fields of various rotor types, pinpointing the exact location of defects. Our solutions are optimized for short cycle times, enabling comprehensive, 100% inspection rates. As a full-service provider, Koob Testsystems manages every step—from development and design to in-house manufacturing—offering unparalleled flexibility and exceptional service quality.

Our highly integrable systems deliver versatile solutions, perfectly suited for a broad range of applications.

Typical use cases

- Design/product validation
- Prototyping diagnosis
- Product comparison
- Random samples
- Quality management
- Incoming goods inspection

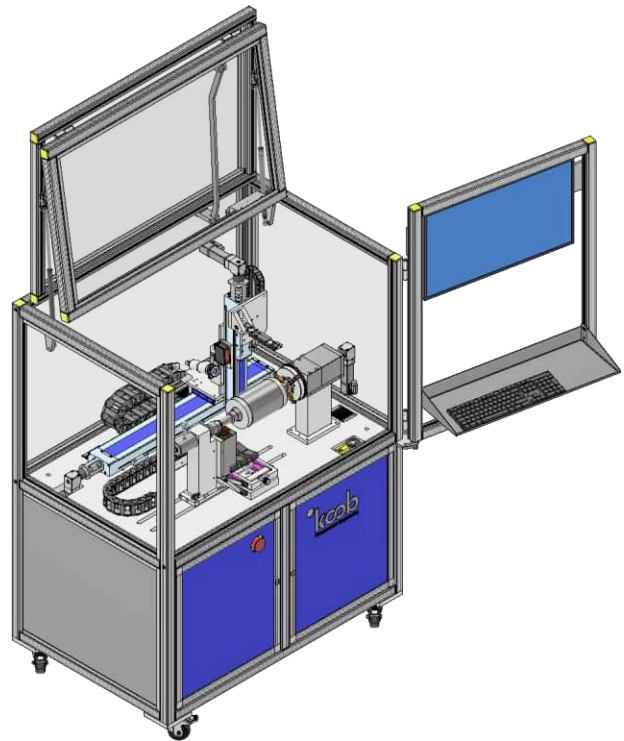
Whether you require a stand-alone workstation, the testing of individual rotors, or the seamless integration of a measurement system into your production line, Koob Testsystems delivers customized solutions tailored to your specific needs. Our systems enhance efficiency by accelerating processes, such as implementing automated golden sample comparisons, optimizing magnetic designs, and effectively evaluating various stages of product development.

Single Sensor

For development and prototype construction

Application

- fastest single sensor system on the market: between 30 seconds and 5 minutes at the lowest or highest resolution
- Automatic good/bad rating
- Magnetic unbalance analysis for each individual pole
- Fault localization even with multi-layered buried magnet constructions
- Use in prototype construction, development and sample measurements
- Mobile individual workstation
- easy to operate / no programming required / minimum set-up time / variable test specimen holder



Technical details

- 3D magnetic field sensor for detecting Bx, By, Bz
- Measuring range: $\pm 0.5/1/2$ T
- Vertical resolution: 24-bit quantization interval
- Rotor axis resolution: 5.5 arc s
- Linear measurement resolution: 50 nm
- Resolution of the laser distance measurement: 1.4 μm
- Linear speed: 250 mm/s
- Rotation speed: 10 variable speed settings: 30°/s - 500°/s
- Rotor temperature range: 20°C - 250°C
- 3D visualization of the magnetic field
- Automatic generation of measurement reports
- Automatic test plan selection by serial number scan
- Connection to database possible
- Trend analysis over several measurements
- Save an infinite number of rotor contours
- Measurement of rotor shaft magnetization / influence on resolver
- Variable air gap
- All individual measurement components are DAkkS - verifiable
- Concentricity and temperature monitoring
- Sensor collision monitoring
- Automatic data archiving
- Optimized for crane loading and industrial handling

Optional functions

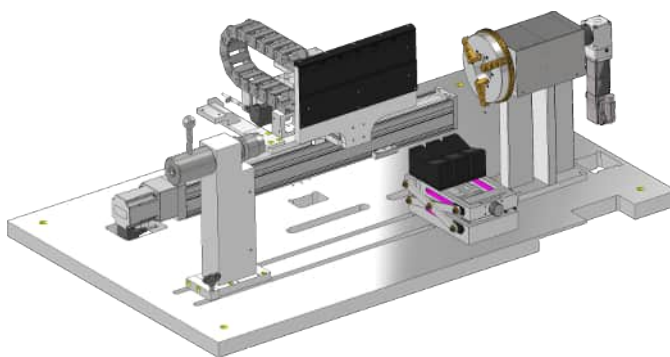
- Programmable external excitation in various current and voltage modes
- Automatic and interchangeable slip ring contacts for different rotor variants
- Recording of current/voltage/temperature curve
- Four-wire resistance measurement

Sensor Array

For sample construction, prototyping small series

Application

- Fastest magnetic field scan on the market:
Cycle time: 8s - 15s
- Automatic PASS/FAIL evaluation
- Magnetic imbalance analysis for each individual pole
- Fault localization even with multi-layered buried magnet constructions
- Use in prototype construction, development and sample measurements
- Mobile individual workstation
- Multi-rotor design measurement (array length= max. part length)
- Very easy to operate / no programming knowledge required / minimum set-up time / variable test specimen holder



Technical details

- | | |
|---|---|
| <ul style="list-style-type: none"> • Individual sensor array with up to 60 sensors • Variable active part length • Automatic deactivation of unused sensors • Measuring range: $\pm 0.5/1/2$ T • Vertical resolution: 24-bit quantization interval • Rotor axis resolution: 5.5 arc s • Linear measurement resolution: 50 nm • Rotation speed: 10 variable
Speed settings: 30°/s - 500°/s • Rotor temperature range: 20°C - 250°C | <ul style="list-style-type: none"> • 3D visualization of the magnetic field • Automatic generation of measurement reports • Automatic test plan selection by serial number scan • Connection to database possible • Trend analysis over several measurements • Save an infinite number of rotor contours • Measurement of rotor shaft magnetization / influence on resolver • Variable air gap • Automatic data archiving • Optimized for crane loading and industrial handling |
|---|---|

Optional functions

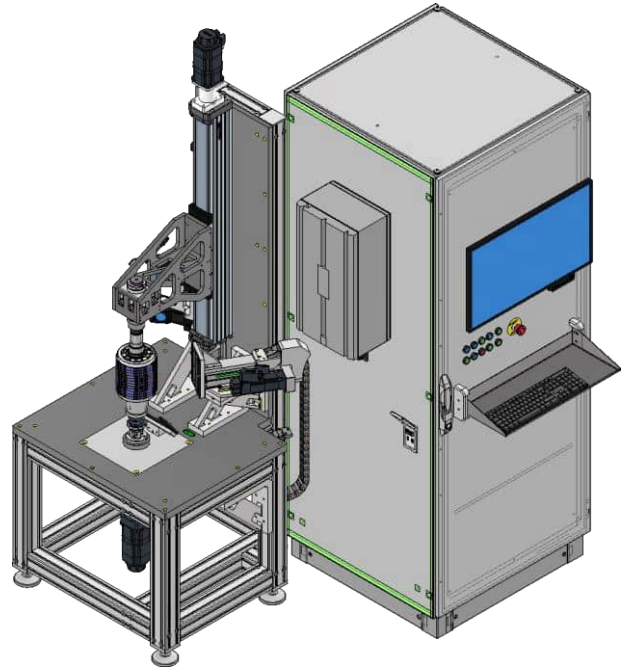
- Programmable external excitation in various current and voltage modes
- Automatic and interchangeable slip ring contacts for different rotor variants
- Recording of current/voltage/temperature curve
- Four-wire resistance measurement
- Laser contour measurement 2D/3D of the package
- Concentricity and temperature monitoring
- Fully automatic test bench for inline measurement

Series Test Bench

For machine integration / 100% inline measurement

Application

- Fastest magnetic field scan on the market:
cycle time: 8s - 15s
- Automatic PASS/FAIL evaluation
- Magnetic unbalance analysis for each individual pole
- Fault localization even with multi-layered buried magnet constructions
- Use in production lines
- Software setup and machine interface PROFINET®
- Multi rotor design measurement
(array length= max. part length)



Technical details

- Individual sensor array with up to 60 sensors
- Variable active part length
- Automatic deactivation of unused sensors
- Measuring range: $\pm 0.5/1/2$ T
- Vertical resolution: 24-bit quantization interval
- Rotor axis resolution: 5.5 arc s
- Linear measurement resolution: 50 nm
- Rotation speed: 10 variable speed settings:
30°/s - 500°/s
- Rotor temperature range: 20°C - 250°C
- 3D visualization of the magnetic field
- Automatic generation of measurement reports
- Automatic test plan selection by serial number scan
- Connection to database possible
- Trend analysis over several measurements
- Saving an infinite number of rotor contours
- Measurement of rotor shaft magnetization / influence on resolver
- Variable air gap
- Automatic data archiving
- Optimized for crane loading and industrial applications Handling

Optional functions

- Programmable external excitation in various current and voltage modes
- Automatic and interchangeable slip ring contacts for different rotor variants
- Recording of current/voltage/temperature curve
- Four-wire resistance measurement
- Laser contour measurement 2D/3D of the package
- Concentricity and temperature monitoring
- Fully automatic test bench for inline measurement

Rack Unit

For machine integration / 100% inline measurement

Application

- Fastest magnetic field scan on the market:
Cycle time: 8s - 15s
- Automatic PASS/FAIL evaluation
- Magnetic unbalance analysis for each individual pole
- Fault localization even with multi-layered buried magnet constructions
- Use in production lines
- 19" rack unit
- Software setup and PROFINET® machine interface
- Multi rotor design measurement
(Array length= max. part length)



Technical details

- Individual sensor array with up to 60 sensors
- Variable active part length
- Automatic deactivation of unused sensors
- Measuring range: $\pm 0.5/1/2$ T
- Vertical resolution: 24-bit quantization interval
- Rotor axis resolution: 5.5 arc s
- Linear measurement resolution: 50 nm
- Rotation speed: 10 variable
Speed settings: 30°/s - 500°/s
- Rotor temperature range: 20°C - 250°C
- 3D visualization of the magnetic field
- Automatic generation of measurement reports
- Automatic test plan selection by serial number scan
- Connection to database possible
- Trend analysis over several measurements
- Save an infinite number of rotor contours
- Measurement of rotor shaft magnetization / influence on resolver
- Variable air gap
- Automatic data archiving

Optional functions

- Programmable external excitation in various current and voltage modes
- Automatic and interchangeable slip ring contacts for different rotor variants
- Recording of current/voltage/temperature curve
- Four-wire resistance measurement
- Temperature monitoring

Software and Data Analysis

Our continuously expanding expertise, coupled with evolving testing and analysis requirements, drives constant innovation within our product portfolio. All Koob Testsystems solutions are designed for flexibility, allowing easy adaptation and modification to precisely meet changing customer demands and industry standards.

MEASUREMENT PROTOCOL

Report no. Example

Delivery date

Customer

Quantity

koob

Measurement Engineering

SAMPLE DESCRIPTION

Type Rotor with shaft- Traction Motor

Grade na

Dimension na

Identification na

Set no. example

Order no.

Lot no.

Carton no.

SURFACE FLUX DENSITY MAP

pieces in total 1

magnetization 8p

DEVICES

KOOB [3D Rotor Scan]

RESULTS

example.csv

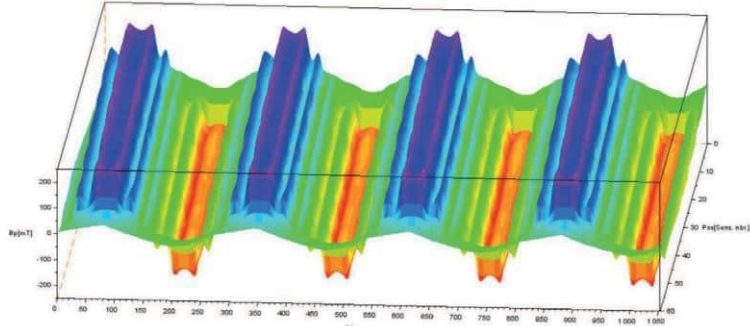
rotation angle step 0,34°

air gap 1 mm

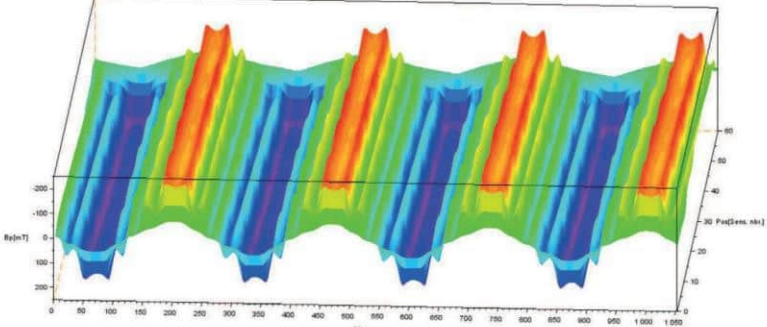
points measured 63720

duration 03,30 sec.

OVERALL VIEW NORTH POLE



OVERALL VIEW SOUTH POLE



Created by example

Date

Approved by

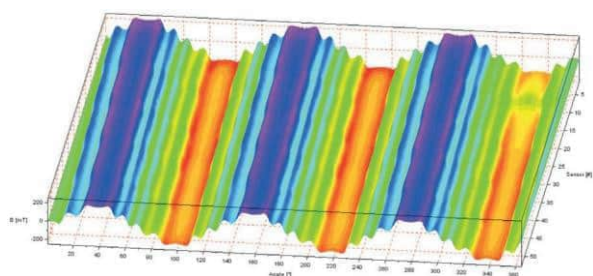
Date

Example measurement protocol

11

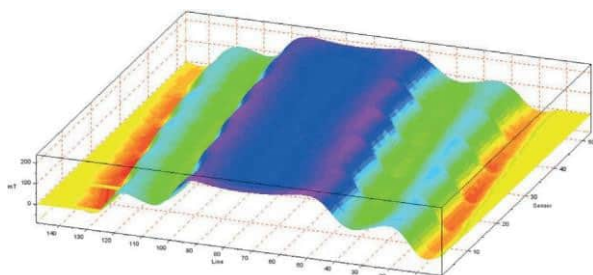
3D magnetic field analysis

We measure the magnetic field of your rotor over the entire circumference, which results in a magnetic mountain range in which the faults can be precisely localized using the map display.



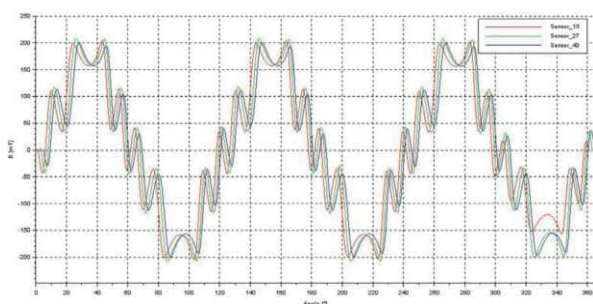
Single pole analysis

In order to further advance the depth of detail and evaluation possibilities of our magnetic field analysis, it is now possible to view the individual poles of the rotor separately - without influencing the neighboring poles. This creates previously unattainable methods of evaluating the quality of a rotor.



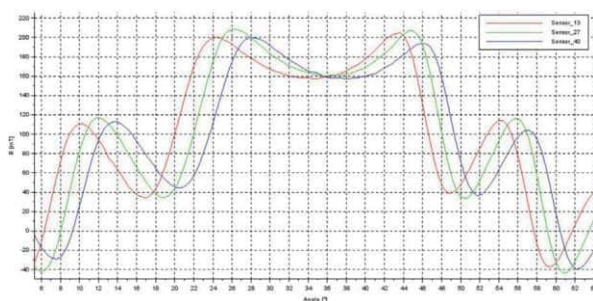
Rotor segment view

The sectional view makes it possible to view the segments in relation to each other and the magnetization quality.



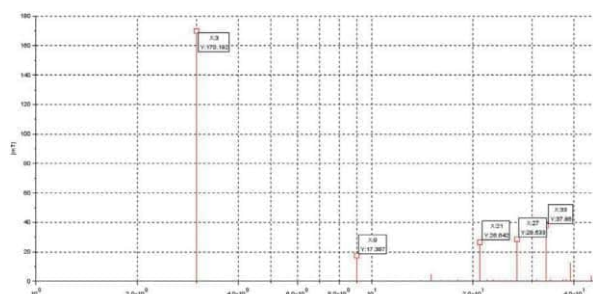
Determine helix angle

The more complex the magnet arrangement, the more difficult it is to subsequently determine the helix angle. However, this is an aspect that should not be ignored, especially with purchased parts. We measure the magnetic helix angle.



Magnetic field FFT

As root cause analysis is now one of our key features, we now offer the option of order / NVH analysis of the magnetic field on. In the event of a fault, a magnetic imbalance is generated in the rotor due to manufacturing errors, which can lead to vibration abnormalities, performance losses and increased wear.



Contract measurement

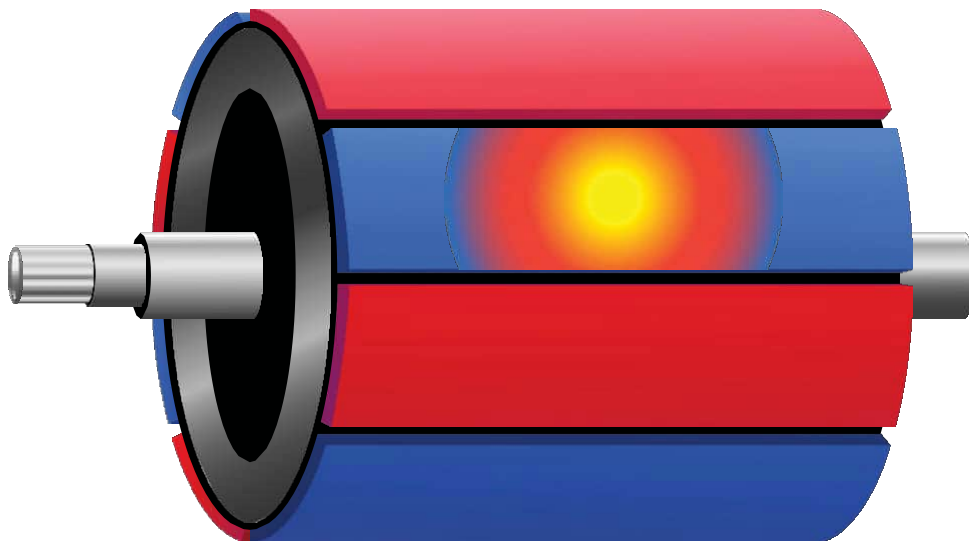
Interested in gaining deeper insights into your products' magnetic fields and significantly reducing your product development costs? Koob Testsystems quickly and easily measures and evaluates magnetic fields, providing accurate analyses directly at your location.

With the help of our services you can

- Detect magnetic imbalances
- Determine the magnetic helix angle
- Perform a magnetic field FFT/NVH analysis

Areas of application

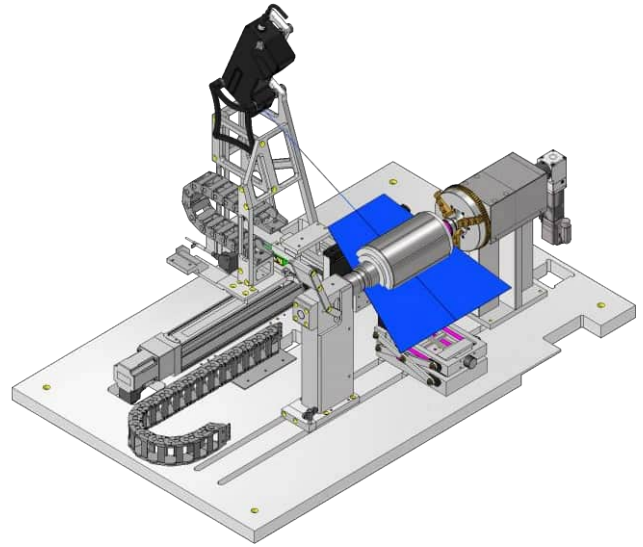
- Product/design validation
- Prototyping phase
- Line commissioning - detecting and avoiding process errors
- Sorting of defective, already manufactured components



Laser contour measurement

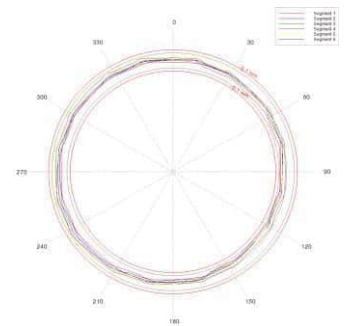
Application

- Geometry-oriented measurements
- Component presence
- Length control
- Position control
- Checking concentricity and axial run-out
- 2D/3D measurement
- Detection of position features
- Checking concentricity and axial run-out, e.g. resolver grooves



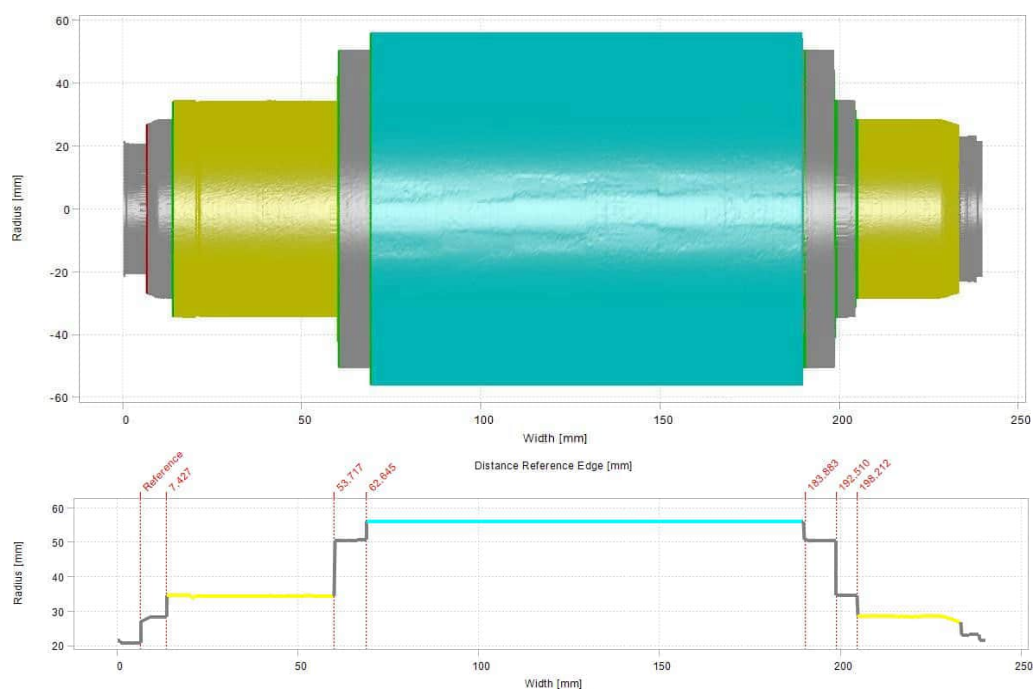
Technical details

- Integration in magnetic field test bench
- Carried out at the same time as the magnetic field measurement
- Position-accurate assignment of magnetic field and geometry data possible
- Various resolutions possible in X and Z direction



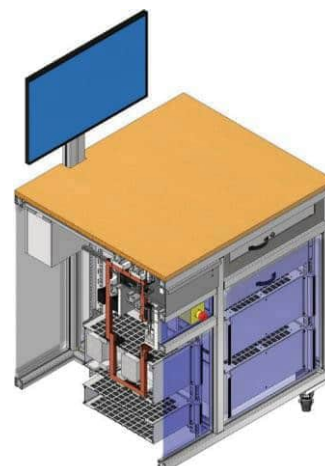
Optional functions

- Multiple scans can be combined with one sensor head to extend the X-range
- Multiple sensor heads can be combined to extend the reading range and avoid shadows
- Scan from different perspectives



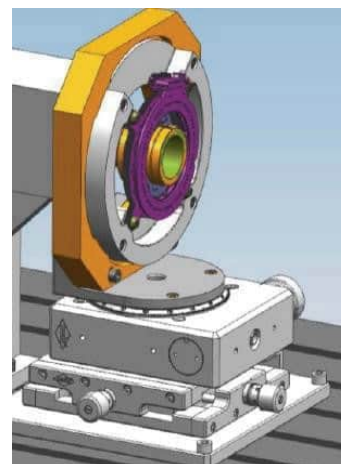
High-current test bench / high-current generator

- High-current testing / adjustment of power electronics / vehicle inverters
- Cable/plug contact test
- Incoming goods inspection
- Variable test current of up to 4000A AC over several seconds
- As a manual and fully automatic test bench
- Can be integrated into the line
- Cycle time approx. 4s



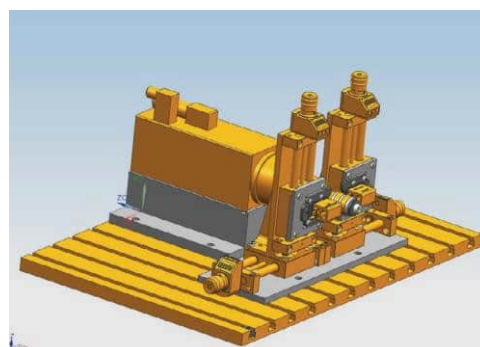
Resolver test bench

- Determination of limit values for shoring / installation
- Comparative measurements for component selection
- Incoming goods inspection
- Simulation of de-alignment faults (rotor & stator)
- Diagnosis of returns
- Exchangeable test specimen holder



Slip ring & carbon brushes

- Adjustable power supply, ambient temperature and brush pressure
- Detection of the "brush fire" and the Brush temperature
- Service life test
- High-speed and endurance tests up to 24,000 rpm





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