FOERSTER

CIRCOGRAPH PRODUCT FAMILY

Contactless eddy current inspection for reliable detection of longitudinal surface defects on bright products

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Contactless eddy current inspection for reliable detection of longitudinal surface defects on bright products

Maximum detection sensitivity for outstanding surface quality. The CIRCOGRAPH product family comprises high-performance eddy current inspection systems with rotating sensors for the non-destructive detection of longitudinal surface defects on bright products. The contactless inspection technology enables reliable and reproducible testing of tubes, bars, wire and profiles directly during production.

Rotating sensor systems scan the entire material surface in a spiral pattern without touching the test material. This allows even the smallest surface-breaking defects to be detected reliably and displayed over their full length.

Depending on the application, different system variants, rotating heads and rotating discs are available for the inspection of round, flat and profiled materials.

Thanks to their modular design, CIRCOGRAPH inspection systems can be adapted to a wide variety of inspection tasks and production environments. They integrate seamlessly into new and existing production lines while providing comprehensive options for visualization, documentation and evaluation of inspection results. Together with you, FOERSTER develops a testing solution tailored precisely to your application.

YOUR ADVANTAGES AT A GLANCE

Reliable eddy current inspection: Contactless detection of longitudinal surface defects on bright products.

Maximum detection sensitivity: Reliably detects even the smallest surface-breaking defects from approximately 30 µm.

Continuous full-surface inspection: Rotating sensor systems scan the entire material surface without contact.

Broad application range: Suitable for tubes, bars, wire, profiles and flat products using application-specific rotating heads and rotating discs.

Flexible system solutions: Modular system concept adapts to a wide variety of inspection tasks and production environments.

Easy production integration: Compact system design enables seamless integration into new and existing production lines.

Comprehensive quality documentation: Modern software solutions support visualization, evaluation and complete traceability of inspection results.

Proven FOERSTER technology: Decades of expertise in contactless eddy current inspection for long product manufacturing.

NORMS

DIN EN ISO 15549: Describes the general bases of eddy current testing.

CIRCOGRAPH DA

Contactless eddy current inspection for longitudinal surface defects on bright products

Maximum defect detection. Reliable quality at production speed. The CIRCOGRAPH DA is a high-performance eddy current inspection system for the non-destructive detection of longitudinal surface defects on bright products such as tubes, bars, wire and profiles. Using rotating sensors, it reliably detects even the smallest surface-breaking defects while maintaining high inspection performance at production speed.

State-of-the-art digital electronics, signal digitization directly at the sensor and a sophisticated system architecture ensure outstanding reproducibility and maximum sensitivity while minimizing susceptibility to external interference.

The intuitive DEFECTOTEST DA ECT software supports fast setup, safe operation and comprehensive visualization of inspection data, providing operators with all relevant information at a glance.

Its modular design allows the CIRCOGRAPH DA to grow with changing inspection requirements. Additional sensor systems such as DEFECTOMAT DA can be integrated to extend the inspection scope, while advanced C-Scan visualization displays both the longitudinal and circumferential position of defects. This not only simplifies defect evaluation but also helps identify process-related defect patterns and optimize production quality.

YOUR ADVANTAGES AT A GLANCE

Maximum detection sensitivity: Reliably detects even the smallest longitudinal surface defects on bright products.

Superior signal quality: Signal digitization directly at the sensor minimizes electromagnetic interference and delivers outstanding reproducibility.

Flexible multi-channel inspection: Up to 256 real-time measurement channels without multiplexing ensure maximum inspection performance.

Wide frequency range: Continuously adjustable frequencies from 30 kHz to 1 MHz enable application-specific optimization.

Dynamic speed compensation: The patented digital speed shift filter automatically adapts to changing production speeds.

Enhanced process transparency: C-Scan visualization displays defect position and propagation for faster evaluation and optimized production processes.

Industry 4.0 ready: Modular Ethernet-based architecture and configurable interfaces enable seamless integration into modern production environments.

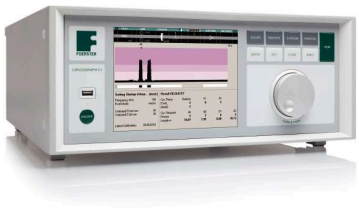
Future-proof modular design: Expand the system with additional FOERSTER sensor technologies such as DEFECTOMAT and replace modules quickly via plug-and-play for simplified service.

TECHNICAL INFORMATION

MEASUREMENT CHANNELS:	Up to 256 test channels in real time (without multiplexing)
EXCITATION FREQUENCIES:	30 kHz – 1 MHz (continuously adjustable in 100 Hz steps)
FILTERING PROCESS:	Digital speed shift filter: dynamic adjustment of the filter's position to the test speed
TESTING SPEED:	Up to 6 m/s
INTERFACES:	Industrial Ethernet and configurable I/O interfaces for production line integration
VISUALIZATION:	Test signal and C-Scan visualization
SENSOR MONITORING:	Broken wires, overload and automatic sensor recognition
PATENT:	The CIRCOGRAPH DA uses processes patented to Institut Dr. Foerster GmbH & Co. KG, including US 8907828 B2 "METHOD AND DEVICE FOR TESTING THE MATERIAL OF A TEST OBJECT IN A NONDESTRUCTIVE MANNER". Also protected in many other countries worldwide.

CIRCOGRAPH CI

Compact inline eddy current inspection for longitudinal surface defects on bright products



Compact, intuitive and reliable surface inspection. The CIRCOGRAPH CI is a compact eddy current inspection system for the non-destructive detection of longitudinal surface defects on bright products such as tubes, bars and wire. Designed for production lines with moderate inspection speeds, it combines reliable defect detection with intuitive operation in a compact, space-saving system.

Equipped with two inspection channels, continuously adjustable test frequencies from 30 kHz to 1 MHz and a wide range of rotating sensor heads, the CIRCOGRAPH CI can be adapted to a variety of applications and product dimensions.

Surface-breaking defects from approximately 30 µm can be detected reliably and contactlessly.

The integrated operator interface with Turn & Push control enables fast setup and simple operation directly at the instrument. Ethernet connectivity and configurable I/O interfaces allow seamless integration into existing production lines while supporting quality documentation and data exchange with higher-level systems.

YOUR ADVANTAGES AT A GLANCE

Reliable longitudinal defect detection: Detect surface-breaking longitudinal defects from approximately 30 µm without contacting the material.

Compact stand-alone solution: Integrated operator interface with Turn & Push control for intuitive setup and operation directly at the instrument.

Flexible inspection performance: Two inspection channels, adjustable frequencies from 30 kHz to 1 MHz and a wide selection of rotating heads adapt to different applications.

Continuous inline inspection: Reliable testing at production speeds of up to 3 m/s without interrupting material flow.

Optimized signal processing: Distance compensation and optimized digital filters ensure stable inspection results.

Easy production integration: Ethernet connectivity and configurable I/O interfaces simplify integration into existing production lines.

Ready for Industry 4.0: Exchange inspection data with higher-level production and quality management systems.

Comprehensive quality documentation: Generate inspection reports and archive test results for complete traceability.

TECHNICAL INFORMATION

TEST MATERIAL:	Ferromagnetic, austenitic, and non-ferromagnetic material
SENSOR SYSTEM:	Rotating sensor system with a maximum of two (Ro 20 and Ro 35) opposite test heads
EXCITATION FREQUENCIES:	30 kHz – 1 MHz
MAX. THROUGHPUT:	3 m/s during continuous testing
DEFECT DISPLAY:	from 30 µm at Ro 20 / Ro 35

CIRCOGRAPH DI

Compact inline eddy current inspection with centralized control for longitudinal surface defects

Reliable surface inspection with maximum flexibility. The CIRCOGRAPH DI is a compact eddy current inspection system for the non-destructive detection of longitudinal surface defects on bright products such as tubes, bars and wire. Designed for production lines with moderate inspection speeds, it delivers the same reliable inspection performance as the CIRCOGRAPH CI while enabling centralized operation through an external control computer.

Operation, parameter configuration, result visualization and data archiving are performed via an Ethernet-connected PC. This separation of inspection and operation allows the testing electronics to be installed close to the production line while providing convenient control and quality monitoring from a central workstation.

Equipped with two inspection channels, continuously adjustable test frequencies from 30 kHz to 1 MHz and a wide range of rotating sensor heads, the CIRCOGRAPH DI adapts to a variety of applications and product dimensions. Surface-breaking longitudinal defects from approximately 30 µm are detected reliably and contactlessly, while the compact design enables seamless integration into existing production environments.

YOUR ADVANTAGES AT A GLANCE

Reliable longitudinal defect detection: Detect surface-breaking longitudinal defects from approximately 30 µm without contacting the material.

Centralized operation: Configure inspections, visualize results and archive data conveniently via an external Ethernet-connected PC.

Flexible inspection performance: Two inspection channels, adjustable frequencies from 30 kHz to 1 MHz and a wide range of rotating heads adapt to different inspection tasks.

Continuous inline inspection: Reliable testing at production speeds of up to 3 m/s without interrupting material flow.

Optimized signal processing: Distance compensation and optimized filters ensure stable and reproducible inspection results.

Easy production integration: Compact design, Ethernet connectivity and configurable I/O interfaces simplify integration into existing production lines.

Ready for Industry 4.0: Exchange inspection data with higher-level production and quality management systems.

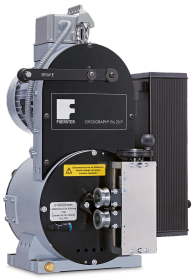
Comprehensive quality documentation: Inspection reports and archived test data provide complete traceability.

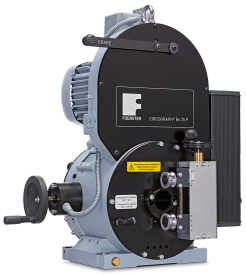
TECHNICAL INFORMATION

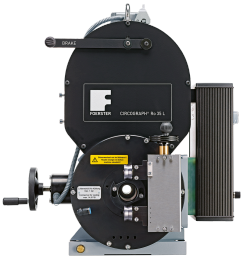
TEST MATERIAL:	ferromagnetic, austenitic, and non-ferromagnetic materials
SENSOR SYSTEM:	Rotating sensor system with a maximum of two opposite test heads (Ro 20 and Ro 35)
EXCITATION FREQUENCIES:	30 kHz – 1 MHz
MAX. THROUGHPUT:	3 m/s during continuous testing
DEFECT DISPLAY:	from 30 µm at Ro 20 / Ro 35

CIRCOGRAPH SENSOR SYSTEMS

Rotating sensor systems for maximum detection sensitivity







The right rotating head for every inspection task. The CIRCOGRAPH rotating sensor systems are designed for the reliable detection of longitudinal surface defects on bright products. Available in different sizes and configurations, they provide optimum inspection performance for tubes, bars and wire with diameters ranging from 2 to 130 mm.

During inspection, the probes rotate around the test material at high speed and scan the entire surface in a continuous spiral without contact. This enables reliable detection of even the smallest surface-breaking defects while maintaining high throughput rates and complete surface coverage.

Highly dynamic lift-off compensation ensures stable inspection results even on materials with varying geometries or eccentric guidance. Depending on the application, pin and levered versions are available to provide optimum sensor protection and maximum process reliability in demanding production environments.

YOUR ADVANTAGES AT A GLANCE

Maximum detection sensitivity: Reliably detects even the smallest longitudinal surface defects from approximately 30 µm.

Wide diameter range: Rotating heads for materials from 2 to 130 mm in diameter.

Continuous full-surface inspection: Spiral scanning ensures complete surface coverage without contact.

Reliable inspection under changing conditions: Dynamic lift-off compensation maintains stable signal evaluation even with varying material geometries.

Application-specific configurations: Different rotating head sizes, track widths and probe arrangements for optimum inspection performance.

Enhanced sensor protection: Optional levered versions protect probes from uncontrolled material ends during production.

High throughput: Inspection speeds of up to 3 m/s support efficient inline production.

Designed for industrial use: Robust construction for reliable long-term operation in demanding production environments.

TECHNICAL INFORMATION

DIAMETER RANGES:	— 2 – 20 mm (Ro 20 P) — 2 – 38.5 mm (Ro 35 P) — 5 – 35 mm (Ro 35 L) — 5 – 65 mm (Ro 65), — 10 – 130 mm (Ro 130)
MAXIMUM ROTATIONAL SPEED:	— stepless up to 18,000 rpm (Ro 20 P) — 4,500 / 9,000 rpm (Ro 35 P & Ro 35 L) — 3,000 / 6,000 rpm (Ro 65) — 1,500 / 3,000 (Ro 130)
PROBES:	— 2 at 180° angles, 1 sensor each (Ro 20 P) — 4 at 90° angles, 1 sensor each (Ro 35 P & Ro 35 L) — 2 at 180° angles, 2 sensor each (Ro 65) — 2 at 180° angles, 2 sensor each (Ro 130)
TRACK WIDTH	— 1.5, 2.5 or 5 mm (Ro 20 P, Ro 35 P) — 2.5 or 5 mm (Ro 35 L) — 2.5, 5 or 10 mm (Ro 65) — 2.5, 5 or 10 mm (Ro 130)
MAX. TEST SPEED (AT 100 % COVERAGE):	— 3 m/s (Ro 20 P, Ro 35 P, Ro 35 L) — 2 m/s (Ro 65) — 1 m/s (Ro 130)

CIRCOGRAPH HIGH-SPEED ROTATING HEADS

High-throughput rotating sensor systems for contactless eddy current inspection

Maximum throughput without compromising detection sensitivity. The CIRCOGRAPH Ro 20 F high-speed rotating head has been developed for applications requiring maximum throughput without compromising inspection quality. Designed for the contactless inspection of tubes, bars and wire with diameters from 2 to 20 mm, it reliably detects longitudinal surface defects directly during production.

Four probes arranged at 90° around the test material enable inspection speeds of up to 6 m/s while maintaining complete surface coverage.

Even the smallest longitudinal defects from approximately 30 µm can be detected reliably and displayed over their full length with high resolution.

Thanks to its modular design and identical center height to the standard Ro 20 rotating head, the Ro 20 F can be integrated easily into existing production lines or used as a direct replacement to increase production capacity.

YOUR ADVANTAGES AT A GLANCE

Maximum throughput: Inspection speeds of up to 6 m/s significantly increase production output.

High detection sensitivity: Reliably detects longitudinal surface defects from approximately 30 µm.

Four-probe configuration: Four probes positioned at 90° ensure complete surface coverage at high speeds.

Wide material compatibility: Suitable for ferromagnetic, austenitic and non-ferromagnetic tubes, bars and wire.

Application-specific track widths: Available with 1.5 mm, 2.5 mm and 5 mm track widths.

Easy system upgrade: Modular design with identical center height enables quick replacement of standard rotating heads in existing production lines.

TECHNICAL INFORMATION

MATERIAL DIAMETER:	2 – 20 mm
SUITABLE MATERIALS:	Ferromagnetic, austenitic and non-ferromagnetic tubes, bars and wire
MAXIMUM INSPECTION SPEED:	Up to 6 m/s (5 mm track width)
NUMBER OF PROBES:	4
PROBE ARRANGEMENT:	Four probes positioned at 90°
TRACK WIDTHS:	1.5 mm, 2.5 mm or 5 mm

FOERSTER

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The FOERSTER Group is represented by subsidiaries and representatives in over 60 countries worldwide. You can find a complete overview on our website.

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