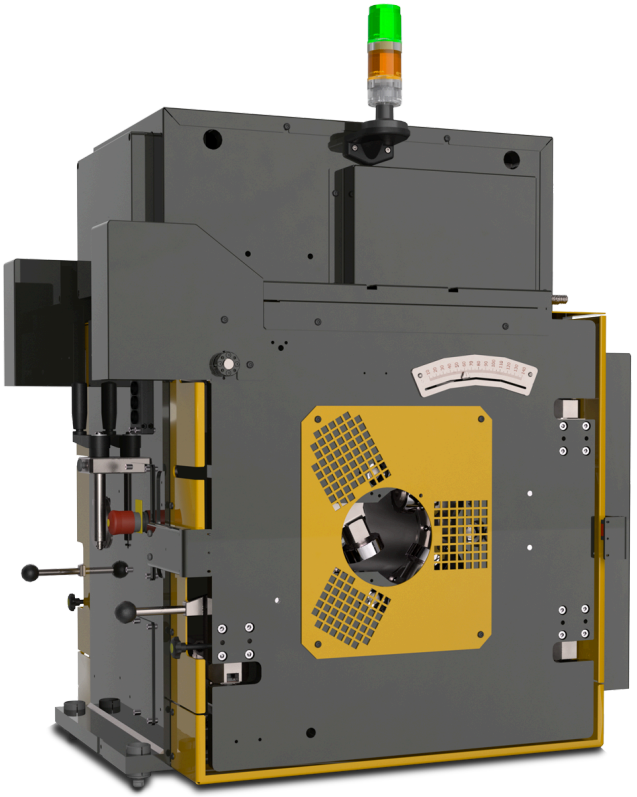
FOERSTER

CIRCOFLUX DA

AC flux leakage test of ferromagnetic steel bars



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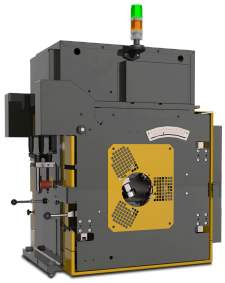


Automated surface inspection for maximum bar quality. CIRCOFLUX DA sensor systems reliably inspect hot-rolled ferromagnetic bars for longitudinal surface defects from a depth of 0.10 mm in accordance with DIN EN ISO 9443.

The AC magnetic flux leakage method (MFL) with rotating sensor probes provides reproducible and fully documented inspection results, replacing subjective inspection methods such as magnetic particle testing or visual inspection. Since no residual magnetism remains in the material, additional demagnetization is not required – making the system ideal for automated inspection lines with high throughput requirements.

With three sensor systems covering diameter ranges from 10 mm to 220 mm, CIRCOFLUX DA supports a wide range of applications in rolling mills and in quality assurance of bars in forging quality. Feed speeds of up to 4 m/s enable cost-efficient inline inspection while maintaining high detection sensitivity.

All sensor systems are based on a common rotating head platform with diameter-optimized probe configurations, ensuring consistently high inspection quality across all sizes. Features such as high-resolution C-scan visualization, reduced untested bar ends, and powerful evaluation electronics with automatic calibration routines support stable and reliable integration into existing production lines.

As part of the FOERSTER DA platform, CIRCOFLUX DA is also AI-ready: standardized inspection data, open interfaces, and a consistent operating architecture provide the foundation for future AI-based analysis and assistance functions in quality assurance.

The inspection principle is based on rotating sensor probes and contactless AC magnetization. Surface-breaking defects generate stray flux that is detected by highly sensitive Hall sensors, enabling complete surface coverage of the bar – even at high inspection speeds.

YOUR ADVANTAGES AT A GLANCE

Reliable defect detection: Reliable detection of longitudinal surface defects from depths of 0.10 mm

Standards compliance: Standards-compliant inspection of hot-rolled bars according to DIN EN ISO 9443

Inline inspection: Inline-capable inspection at feed speeds up to 4 m/s

Process efficiency: No additional demagnetization required

Detailed result visualization: High-resolution C-scan visualization of inspection results

Maximum usable length: Reduced untested bar ends for maximum usable inspection length

High reproducibility: Reproducible inspection results through automatic calibration routines

Unified user interface: Unified FOERSTER DA platform for easy operation and integration

Digital Integration: Standardized inspection data and open interfaces for digital production environments

Future-proof technology: AI-ready for future AI-based analysis and assistance functions

TECHNICAL INFORMATION

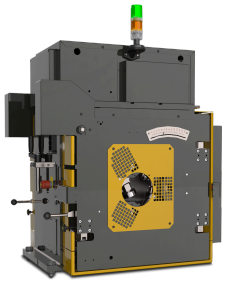
SENSOR SYSTEM:	Rotating sensor system with two opposite test heads
NUMBER OF TEST HEADS	2
MINIMUM DEFECT SIZE:	length 4 mm × depth 0,1mm × width 0,15 mm
DIAMETER RANGES:	— 10 – 75 mm (Ro 75) — 10 – 140 mm (Ro 140) — 20 – 220 mm (Ro 220)
MAX. NUMBER OF TESTING CHANNELS:	— 2 × 30 (Ro 75) — 2 × 40 (Ro 140) — 2 × 40 (Ro 220)
MAX. ROTATIONAL SPEEDS:	— 1700 U/min (Ro 75) — 1500 U/min (Ro 140) — 960 U/min (Ro 220)
MAX. THROUGHPUT SPEED:	up to 4 m/s depending on the sensor system
MAGNETIZING CURRENT FREQUENCY:	7,5 kHz

NORMS

DIN EN ISO 9443: Describes the technical delivery conditions for hot-rolled steel bars and wire rod. The magnetic leakage flux method with probes is recommended.

CIRCOFLUX DA SENSOR SYSTEM RO 140

High-precision flux leakage testing for diameters up to 140 mm



Optimized for precise flux leakage testing of common bar diameters. The Ro 140 sensor system is designed for diameter ranges from 10 mm to 140 mm within the CIRCOFLUX DA product family and is particularly suited for reliable surface inspection of hot-rolled ferromagnetic bars in rolling mills and in quality assurance of bars in forging quality.

The system operates using the AC magnetic flux leakage method (AC-MFL) in accordance with DIN EN ISO 9443 and enables reproducible detection of longitudinal, crack-like surface defects from depths of 0.10 mm. Subjective inspection methods such as magnetic particle testing or visual inspection can therefore be reliably replaced.

With an inspection range from 10 mm to 140 mm, the Ro 140 sensor system covers a wide spectrum of typical production applications. The optional automatic size adjustment allows fast and reliable adaptation to different material diameters.

Maintenance-free inductive signal transmission ensures high system availability while reducing wear. In combination with the FOERSTER DA platform electronics, the system provides reproducible inspection results, integrated diagnostic functions, and intuitive operation.

The Ro 140 sensor system can also be combined with the FOERSTER BARPROOF 140 ultrasonic testing system, enabling reliable detection of internal defects in addition to surface inspection.

YOUR ADVANTAGES AT A GLANCE

Reliable defect detection: High-precision detection of longitudinal surface defects from depths of 0.10 mm

Standards compliance: Standards-compliant inspection of hot-rolled bars according to DIN EN ISO 9443

Wide inspection range: Inspection range from 10 mm to 140 mm for typical rolling-mill applications

High resolution: 2 × 40 inspection channels for high resolution and reproducibility

Automated changeover: Automatic size adjustment reduces changeover time and minimizes setup errors

Inline inspection: Inline-capable inspection at feed speeds up to 4 m/s

Detailed result visualization: High-resolution C-scan visualization of inspection results

Maximum usable length: Reduced untested bar ends for maximum usable inspection length

High reproducibility: Reproducible inspection results through automatic calibration routines

Unified user interface: Unified FOERSTER DA platform for easy operation and integration

Digital integration: Standardized inspection data and open interfaces for digital production environments

Future-proof technology: AI-ready for future AI-based analysis and assistance functions

TECHNICAL INFORMATION

DIAMETER RANGE:	10 – 140 mm Ø
MAXIMUM NOISE LEVEL:	70 dB (A)
DRIVE MOTOR POWER:	4,1 kW
VARIABLE ROTATIONAL SPEED:	0 – 1500 U/min
SLOW-DOWN TIME WITH BREAKING (DEPENT ON ROTATIONAL SPEED):	approx. 60 seconds at maximum rotational speed
SCANNING TRACK WIDTH:	160 mm
MAX. TRANSPORTATION SPEED (DEPENDENT ON TEST MATERIAL DIAMETER):	4 m/s
SET-UP TIME WITH ROLLER GUIDE:	approx. 3 minutes (with automatic dimension adjustment approx. 1.5 minutes)
ADDITIONAL SET-UP TIME FOR INNER ROLLER GUIDE:	approx. 5 minutes
WEIGHT WITHOUT ROLLER GUIDE:	approx. 850 kg
NUMBER OF TEST HEADS:	2
MAX. NUMBER OF TESTING CHANNELS	2 × 40
SIGNAL TRANSMISSION:	inductive transmitter
FREQUENCY OF MAGNETIZING CURRENT:	7,5 kHz
TRANSMISSION OF THE MAGNETIZING CURRENT:	inductive transmitter
POWER CONSUMPTION:	4,2 kVA (230 V) and 7,5 kVA (400 V)
CONNECTION TO ELECTRICITY NETWORK:	TN system
WITH AUTOMATIC DIMENSION ADJUSTMENT ROTATING DISC:	no compressed air required, adjustment via electric cylinder and positioning unit
SPECIFICATION OF TEST MATERIAL:	Ferromagnetic bars and tubes with a round surface (bright, peeled, or hot-rolled), free of loose scale, chips, and protruding burrs. Test piece ends must be burr-free, cut square to the bar axis, and free of cross-sectional deformation. Liquids and grease are not permitted.
SPECIFICATION OF TEST MATERIAL – AMBIENT TEMPERATURE:	5 °C bis 45 °C
SPECIFICATION OF TEST MATERIAL – MAXIMUM RELATIVE HUMIDITY:	85 %
SPECIFICATION OF TEST MATERIAL – TEMPERATURE OF TEST MATERIAL:	5 °C to 80 °C

CIRCOFLUX DA SENSOR SYSTEM RO 220

High-precision flux leakage testing for large-diameter bars

Maximum precision for large bar diameters. The Ro 220 sensor system extends the application range of the CIRCOFLUX DA product family specifically for large material diameters and demanding rolling mill environments. It enables reliable surface inspection of hot-rolled ferromagnetic bars even with large cross-sections and high process requirements.

Based on the AC magnetic flux leakage method (AC-MFL) in accordance with DIN EN ISO 9443, the system enables reproducible detection of longitudinal, crack-like surface defects from depths of 0.10 mm. Visual inspection methods and magnetic particle testing can therefore be replaced by an automated and fully documented inspection solution.

With an inspection range from 20 mm to 220 mm, the sensor system is particularly suitable for applications where large bar diameters must be inspected during or after production.

The robust design of the sensor system, together with maintenance-free inductive signal transmission, supports stable continuous operation under industrial conditions. In combination with the FOERSTER DA platform electronics, the system provides automatic calibration routines, integrated diagnostic tools, and intuitive operation via the FOERSTER touchscreen interface.

YOUR ADVANTAGES AT A GLANCE

Reliable defect detection: Reliable detection of longitudinal surface defects from depths of 0.10 mm

Wide diameter range: Designed for large diameter ranges from 20 mm to 220 mm

High process stability: High process stability when inspecting large material cross-sections

High throughput: Feed speeds up to 2,5 m/s

Future-proof technology: AI-ready for future AI-based analysis and assistance functions

Maintenance-free signal transmission: Maintenance-free inductive signal transmission

Reproducible results: Automatic calibration routines for reproducible inspection results

Unified user interface: Intuitive operation via the FOERSTER DA user interface

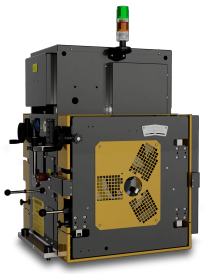
Seamless integration: Easy integration into existing production systems

TECHNICAL INFORMATION

DIAMETER RANGE:	20 – 220 mm Ø
MAXIMUM NOISE LEVEL:	70 dB (A)
DRIVE MOTOR POWER:	4,1 kW
VARIABLE ROTATIONAL SPEED:	0 – 960 U/min
SLOW-DOWN TIME WITH BREAKING (DEPENT ON ROTATIONAL SPEED):	approx. 60 seconds at maximum rotational speed
SCANNING TRACK WIDTH:	160 mm
MAX. TRANSPORTATION SPEED (DEPENDENT ON TEST MATERIAL DIAMETER):	2.5 m/s
SET-UP TIME WITH ROLLER GUIDE:	approx. 5 minutes
ADDITIONAL SET-UP TIME FOR INNER ROLLER GUIDE:	approx. 5 minutes
WEIGHT WITHOUT ROLLER GUIDE:	approx. 910 kg
NUMBER OF TEST HEADS:	2
MAX. NUMBER OF TESTING CHANNELS	2 × 40
SIGNAL TRANSMISSION:	inductive transmitter
FREQUENCY OF MAGNETIZING CURRENT:	7,5 kHz
TRANSMISSION OF THE MAGNETIZING CURRENT:	inductive transmitter
POWER CONSUMPTION:	4,2 kVA (230 V) and 7,5 kVA (400 V)
CONNECTION TO ELECTRICITY NETWORK:	TN system
SPECIFICATION OF TEST MATERIAL:	Ferromagnetic bars and tubes with a round surface (bright, peeled, or hot-rolled), free of loose scale, chips, and protruding burrs. Test piece ends must be burr-free, cut square to the bar axis, and free of cross-sectional deformation. Liquids and grease are not permitted.
SPECIFICATION OF TEST MATERIAL – AMBIENT TEMPERATURE:	5 °C bis 45 °C
SPECIFICATION OF TEST MATERIAL – MAXIMUM RELATIVE HUMIDITY:	85 %
SPECIFICATION OF TEST MATERIAL – TEMPERATURE OF TEST MATERIAL:	5 °C to 80 °C

CIRCOFLUX DA SENSOR SYSTEM RO 75

High-precision flux leakage testing for small diameter ranges



Maximum precision for small bar diameters. Within the CIRCOFLUX DA product family, the Ro 75 sensor system is specifically designed for high-precision surface inspection of small diameter ranges. It is particularly suited for applications in rolling mills and for quality assurance of hot-rolled ferromagnetic bars in forging quality.

The system operates using the AC magnetic flux leakage method (AC-MFL) in accordance with DIN EN ISO 9443 and enables reliable detection of longitudinal, crack-like surface defects from depths of 0.10 mm. Subjective inspection methods such as magnetic particle testing or visual inspection can therefore be replaced with reproducible results.

With an inspection range from 10 mm to 75 mm, the Ro 75 sensor system is ideally suited for smaller material diameters. The high rotational speed supports stable and uniform surface inspection even at high feed speeds.

For small diameters, an optional internal roller guide can be used to reduce vibration of the test material and ensure precise material guidance within the sensor system.

Maintenance-free inductive signal transmission ensures high system availability while reducing wear. In combination with the FOERSTER DA platform electronics, the system provides reproducible inspection results, integrated diagnostic functions and intuitive operation.

YOUR ADVANTAGES AT A GLANCE

Reliable defect detection: High-precision detection of longitudinal surface defects from depths of 0.10 mm

Application-specific use: Optimized for diameter ranges from 10 mm to 75 mm

High rotational speed: Maximum rotational speed up to 1700 rpm

High throughput: Feed speeds up to 3,5 m/s

Flexible material guidance: Optional internal roller guide for small diameters (protective nozzles available as an alternative)

Low wear design: Maintenance-free inductive signal transmission reduces wear parts

Robust configuration: Optional extraction tray available for harsh operating environments

Seamless integration: Easy integration into existing production systems

Future-proof technology: AI-ready for future AI-based analysis and assistance functions

TECHNICAL INFORMATION

DIAMETER RANGE:	10 – 75 mm Ø
MAXIMUM NOISE LEVEL:	70 dB (A)
DRIVE MOTOR POWER:	4,1 kW
VARIABLE ROTATIONAL SPEED:	0 – 1700 U/min
SLOW-DOWN TIME WITH BREAKING (DEPENT ON ROTATIONAL SPEED):	approx. 60 seconds at maximum rotational speed
SCANNING TRACK WIDTH:	120 mm
MAX. TRANSPORTATION SPEED (DEPENDENT ON TEST MATERIAL DIAMETER):	3.5 m/s
SET-UP TIME WITH ROLLER GUIDE:	approx. 3 minutes
ADDITIONAL SET-UP TIME FOR INNER ROLLER GUIDE:	approx. 5 minutes
WEIGHT WITHOUT ROLLER GUIDE:	approx. 500 kg
NUMBER OF TEST HEADS:	2
MAX. NUMBER OF TESTING CHANNELS	2 × 30
SIGNAL TRANSMISSION:	inductive transmitter
FREQUENCY OF MAGNETIZING CURRENT:	7,5 kHz
TRANSMISSION OF THE MAGNETIZING CURRENT:	inductive transmitter
POWER CONSUMPTION:	4,2 kVA (230 V) and 7,5 kVA (400 V)
CONNECTION TO ELECTRICITY NETWORK:	TN system
SPECIFICATION OF TEST MATERIAL:	Ferromagnetic bars and tubes with a round surface (bright, peeled, or hot-rolled), free of loose scale, chips, and protruding burrs. Test piece ends must be burr-free, cut square to the bar axis, and free of cross-sectional deformation. Liquids and grease are not permitted.
SPECIFICATION OF TEST MATERIAL – AMBIENT TEMPERATURE:	5 °C bis 45 °C
SPECIFICATION OF TEST MATERIAL – MAXIMUM RELATIVE HUMIDITY:	85 %
SPECIFICATION OF TEST MATERIAL – TEMPERATURE OF TEST MATERIAL:	5 °C to 80 °C

FOERSTER

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Headquarters
Institut Dr. Foerster GmbH & Co. KG

In Laisen 70
72766 Reutlingen
Germany

+49 7121 140 0
info@foerstergroup.com

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