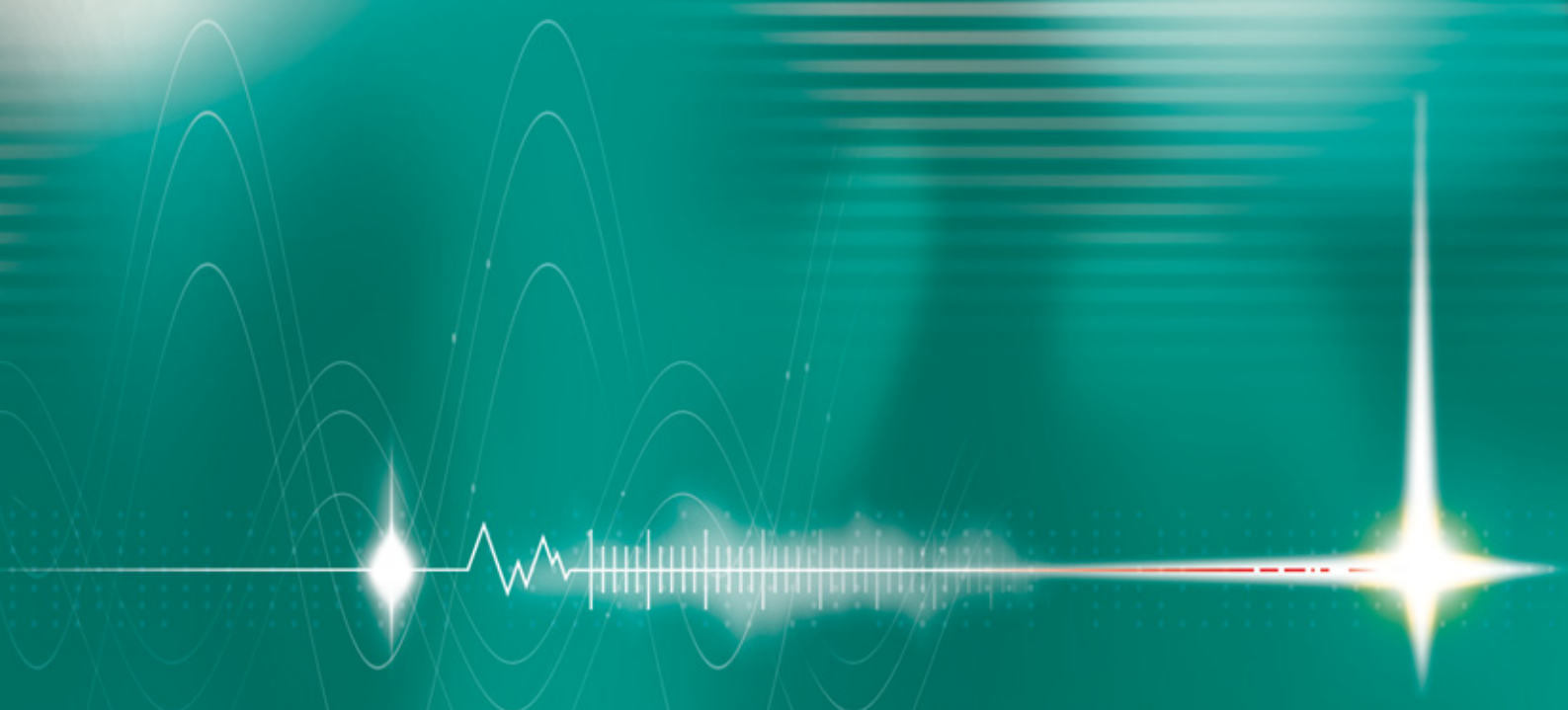


Inspection Systems

Measurement of geometrical quantities

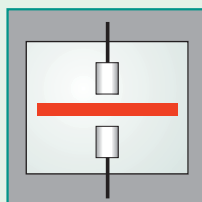


Non-contact thickness and profile measurement of web material

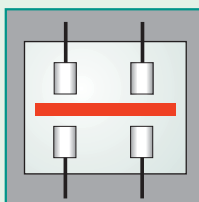


Sensor alignment in fixed-track systems

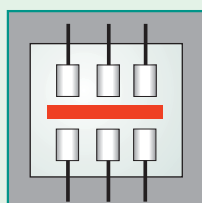
The frames of the fixed-track systems can be adapted to customer specifications. No matter whether a C or O frame is involved, they ensure a precise measurement.



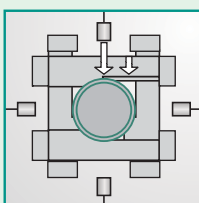
Series 8301



Series 8302



Series 8303



Series 8305

THICKNESSCONTROL is a measurement system for non-contact thickness and profile measurement. It is designed for web and plate materials produced on endless processes. A unique system, incorporating a revolutionary sensor concept, it has been realized with a combination of the highest precision and robustness. THICKNESSCONTROL can be equipped either with a traversing or a fixed track measurement device.

| | THICKNESSCONTROL | | | | | | | |
|--------------------|------------------|------|------|------|------|------|------|------|
| | 8301 | 8302 | 8303 | 8305 | 8310 | 8311 | 8312 | 8313 |
| Fixed-track system | • | • | • | • | | | | |
| Traversing system | | | | | • | • | • | • |
| Number of tracks | 1 | 2 | 3 | 4 | 1 | 1 | 1 | 1 |
| Technology | CC | • | • | • | | • | • | • |
| | EE | • | • | • | | • | • | • |
| | LL | • | • | • | | • | • | • |
| | EO | | | | • | | | |
| | E | | | • | | | | |
| Frame | C | • | • | | | • | | • |
| | O | • | • | • | | • | • | |
| Width in mm | | | | | 100 | 100 | 3000 | 3000 |

THICKNESSCONTROL

Series 8305

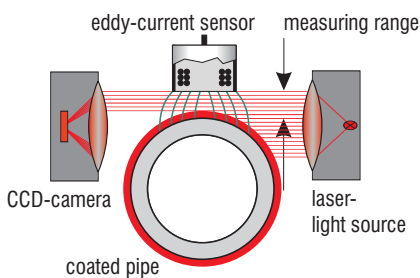
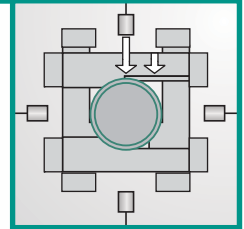
The Series 8305 is a fixed track system in O-frame construction. Four measurement tracks carry out non-contact thickness measurements on tubular materials such as air springs, coated metal pipes or plastic pipes. The system communicates directly with the customer's SPC network.

The combination sensor system EO 8 acquires the top of the target with a laser micrometer while at the same time the eddy current sensor measures through the non-metallic and electrically non-conducting layer with respect to the metal pipe and therefore implicitly acquires the bottom of the material. The thickness of the material layer is determined by taking the difference between the signals.

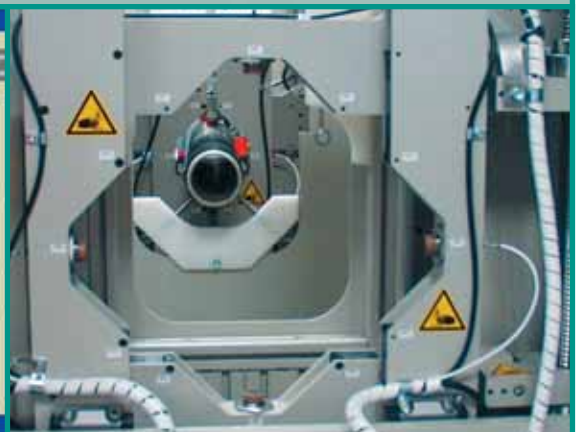
Furthermore, the external diameter and the pipe diameter can also be found.

Properties:

- Pipe diameter from 70 up to 130 mm
- Combined linearity < 10 μm
- Dynamic repeatability < 2 μm
- Resolution in the measurement direction < 2 μm
- Measuring rate up to 2 kHz
- Measurement range < 7 mm



Dual sensor systems with eddy current and laser ThruBeam: The eddy current sensor supplies a reference signal with respect to the roller which goes into the calculation of the actual thickness signal from the laser micrometer.



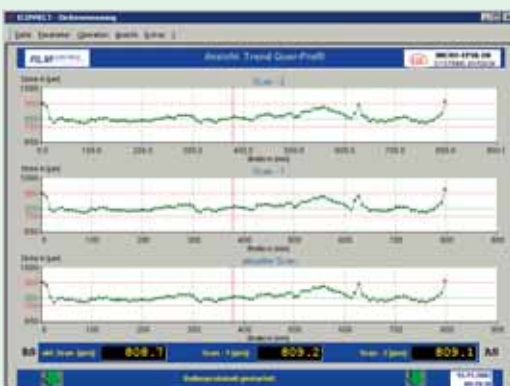
THICKNESSCONTROL

Series 8310/8312

Non-contact thickness and profile measurement

Software

The realization of complex measurement tasks is one of MICRO-EPSILON's core capabilities. Apart from the measurement transducers, the sensor system plays a decisive role. The patented software, which is used in the overall system, ensures easy, clearly understood operation without any programming knowledge. Calibrations, setups and evaluations can be carried out by drag & drop. The integrated statistic function is used for gathering production-related data such as order, throughput, rejects, etc.



THICKNESSCONTROL Series 8310 and 8310 are traversing C-frame systems for non-contact thickness and profile measurement. The system was conceived for materials produced in endless processes, such as battery separators, conveyor belts, toothed belts and extruded seal profiles in in-line quality assurance and process control. A unique system, incorporating a revolutionary concept, it has been realized with a combination of the highest precision and robustness.

Features:

- Repeatability: $< 1 \mu\text{m}$
- Resolution: $< 1 \mu\text{m}$
- Measuring rate: Up to 10 kHz
- Scalable traversing width: Up to 2,000 mm
- Traversing speed: Up to 0.2 m/s
- Vibration-free traversing

System advantages

- Dynamic measurement with high accuracy and high spatial resolution
- Temperature stability through online calibration
- Environmentally friendly measurement techniques, no use of isotope or X-ray radiation
- Extensive analysis software for running under Windows
- Rugged mechanical measurement system designed for harsh industrial environment

Mechanical systems

In traversing operation the high resolution triangulation sensors need the C-frame to move with low vibration and this is achieved by employing the latest air-bearing technology. The C-frame is supported on a 4-point air bearing against the running surfaces. With an operating pressure of 5 bar a bearing air gap of $6 \mu\text{m}$ is obtained. The supposed conflict of air bearings and harsh industrial environments is countered by the application of specially developed cleaning mechanisms. The use of this technology ensures precise measurement with a very high dynamic response.



C-frame with air bearing

- Air pressure $> 5 \text{ bar}$
- Air consumption $> 600 \text{ NL/min}$
- Air gap = $6 \mu\text{m}$

Classification of different thicknesses

The use of adaptive algorithms and fuzzy sets in the analysis of the measurement data leads to extraordinary system reproducibility. It also enables the classification of different profile sections having varying thicknesses. The system learns during the first traversing movement and continually modifies the class limits for sorting the measurements.

Analysis software

The measurement data acquisition and analysis software was developed with ICONNECT. Due to the high performance and modularity of this development environment, customized requirements can be considered in terms of visualization, archiving and system parameterization without the software core being modified. Remote maintenance via ISDN or modem ensures high availability and an efficient service round the clock.

THICKNESSCONTROL Series 8311/8313

THICKNESSCONTROL 8311 and 8313 was conceived for dynamic measurements on flat, conducting materials such as, for example, metal webs, fuel cells, circuit boards and other coated materials. These systems are used directly in the production line for quality assurance and process inspection.

Capacitive sensors are used for the Series 8311 and 8313. The capacitive sensors from MICRO-EPSILON have a specially high resolution and stability and therefore provide constant measurement results. A compressed air blower device ensures that the sensors operate reliably even under industrial ambient conditions.

A specially developed compensation frame provides measurement operation almost completely unaffected by temperature variations. Patented software algorithms with integrated temperature characteristics of the sensor and mechanical systems compensate thermal variations.

An integral, temperature-invariant compensation frame in the Series 8313 forms the basis for monitoring the measuring gap with additional sensors. By applying efficient algorithms a virtual, but constant gap is established which enables a highly accurate and temperature-stable measurement to be made.

System advantages:

- Measurement range up to 40 mm
- Combined linearity
- Dynamic repeatability $< 1 \mu\text{m}$
- Resolution in the measurement direction $< 1 \mu\text{m}$
- High measuring rate up to 10 kHz
- Scalable traversing width of up to 3,000 mm
- High traversing speed up to max. 0.2 m/s

Fields of application:

- Metal webs
- Circuit boards
- Foils
- Fuel cell material



THICKNESSCONTROL Series 8315

THICKNESSCONTROL 8315 is a measurement system for in-line thickness measurement of non-transparent plates and webs (e.g. chipboards, mineral plates, etc.). These systems are employed directly in the production line for quality assurance and process inspection.

In the Series 8315 a laser-based optical sensor is used with a very large base distance in order to achieve as large an opening for the material web as possible and to therefore ensure high process safety. The measurement is carried out from one side by means of a reference surface which is measured before the start of production and is saved as a calibration.

An integral, temperature-invariant compensation frame in the Series 8315 forms the basis for monitoring the measuring gap with additional sensors. By applying efficient algorithms a virtual, but constant gap is established which enables a highly accurate and temperature-stable measurement to be made.

System advantages:

- Measurement range up to 50 mm
- Combined linearity
- Dynamic repeatability $< 5 \mu\text{m}$
- Resolution in the measurement direction $< 1 \mu\text{m}$
- High measuring rate up to 5 kHz
- Scalable traversing width of up to 6,000 mm
- High traversing speed up to max. 0.2 m/s

Fields of application:

- Chip boards
- Mineral boards
- Foam material webs





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