

Thickness measurement of battery separators

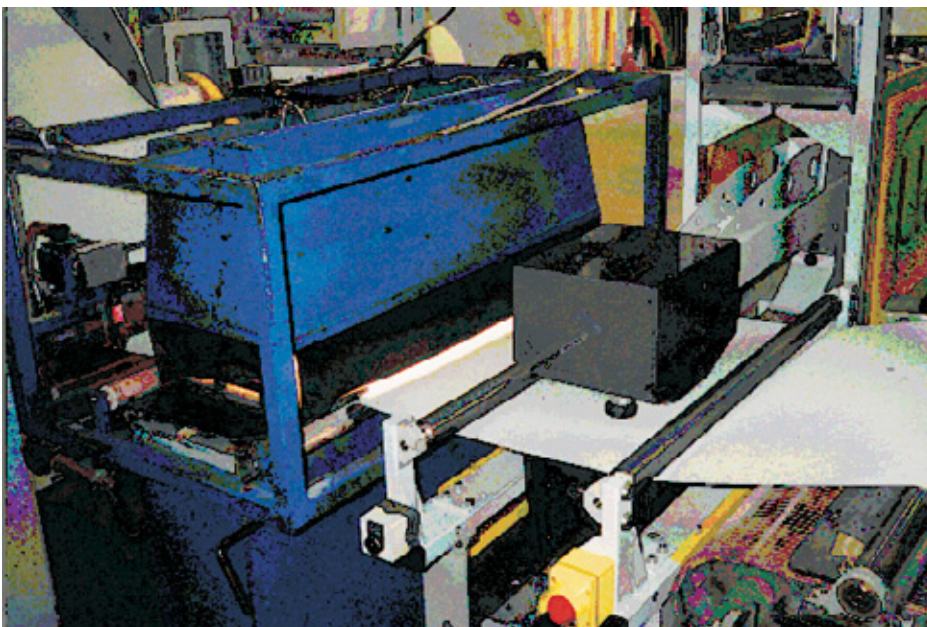
In the production of battery separators the in-line monitoring of the profile thickness is an important measurement task within the framework of quality assurance. A measurement system with high spatial resolution and a high sampling rate is needed for the determination of the profile structure. This task represents one of the classical fields of application for the laser-based triangulation sensor in the Series ILD 2000. The battery separator is manufactured in an extrusion process. For the thickness measurement the optical sensors are mounted on a welded C-frame. This traverses on air bearings without making physical contact on a hard rock base. In this way the vibration of the top belt is minimized and a precise measurement facilitated. The thermal changes of the frame are monitored with eddy current sensors and compensated by computation. Special cleaning mechanisms ensure the ruggedness of the system in a harsh industrial environment. PC software processes and analyses the measurement data and computes the thickness values.

Measurement system structure, mechanical

- Welded C-frame, supported on air bearings on a hard rock base, dimensions approx. 2434 x 2000 x 632 mm, weight approx. 1500 kg.
- 4-point air bearing with individual pressure monitoring (flight height 6 μm) max. travel 1040 mm.

Measurement system structure, sensors

- 2 pcs. ILD 2000-10.15 Laser-based optical displacement sensor.
- 2 pcs. U15 Eddy-current displacement sensor with DT 110 single-channel electronics.
- 1 pc. WDS 1500-P60 CR-E Draw-wire displacement sensor.



In-line quality monitoring in a direct production line.

Application

Measurement system structure, software

- Application produced with graphical development environment ICONNECT.
- Extent, approx. 500 modules structured with macros.
- 3 concurrent signal graphs.
- Win NT 4.0 operating system.

Measurement system requirements

Software:

Routine measurement:

- Measurement data acquisition and visual display (see Fig. 1).
- Display of trends of the individual zones.
- Traversing control.
- Calculation of the measured quantity.
- Archiving of the measurement data.
- Data transfer to the parameter data base.
- Production of a measurement log.

Setup mode:

- Measurement data acquisition (see Fig. 2).
- Positioning of the C-frame.
- System calibration.

Parameter data base:

- Linking to a FoxPro data base: via a flexible SQL interface.

Sensors:

- Measurement range: 10 mm
- System accuracy: ± 0.025 mm
- Reproducibility : 0.4 μ m



Fig. 1 Visual display of lateral profile.

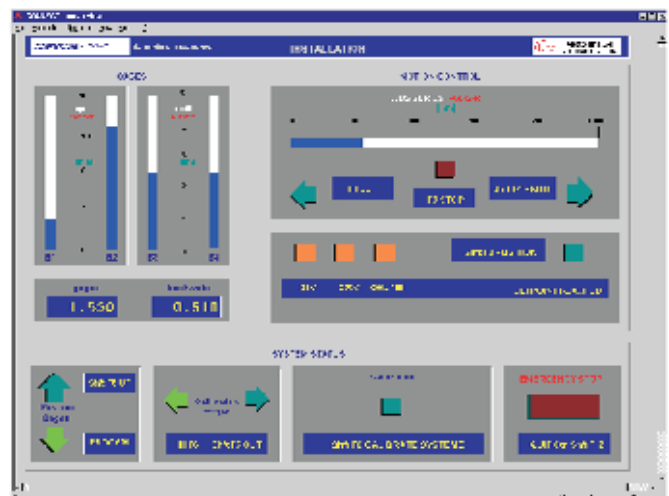


Fig. 2 Visual display in setup mode.