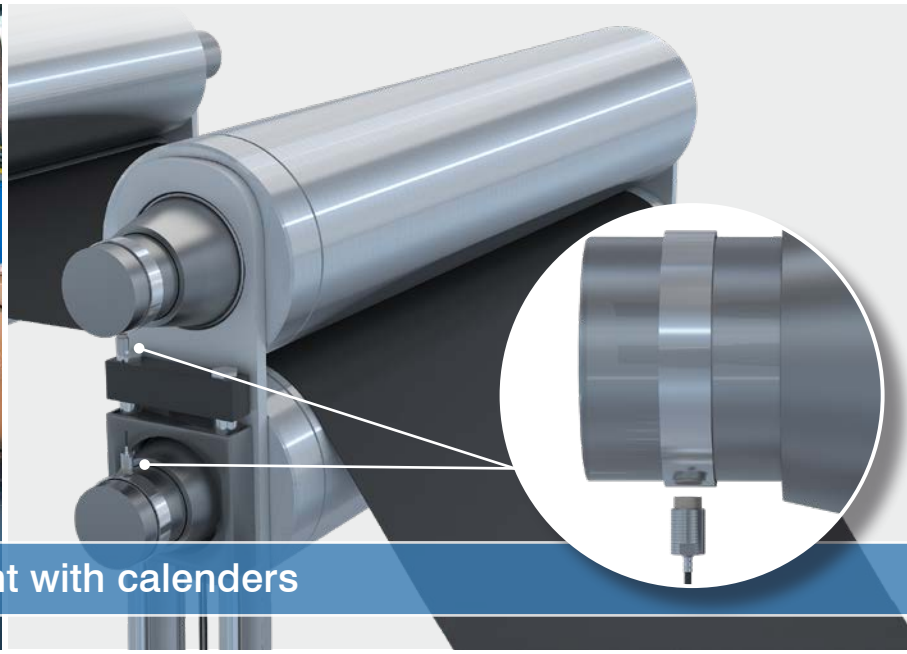
A080

Inductive sensors based on eddy currents
eddyNCDT



Special roller gap measurement with calenders

Plastic films, such as electrode films for lithium-ion batteries, are produced using calendering technology. The plastic is brought to the desired thickness between two adjustable rollers. For automatic gap control combined with integrated inline thickness measurement, the nip between the rollers is continuously measured. This task is performed by inductive sensors based on eddy current technology from Micro-Epsilon.

Calendering technology requires high and individually adjustable line loads on the calender, as well as high precision calibration to meet the required and extremely low tolerances. For the operator, it is crucial to be able to adjust the film thickness reliably, quickly and in a reproducible manner. Therefore, the distance between the rollers is precisely measured using four ES-U3 sensors with a DT3061 controller. The upper and lower rollers of the calender are each equipped with an aluminum ring, which acts as the measurement object. On each side, two sensors are mounted opposite one another. They measure the distance to the aluminum ring from a fixed reference point. By adding the two distances together, the roller gap can be determined. The controller has an A/D converter that digitally transmits the analog output signal from the sensor to a control system via Ethernet. The control system evaluates both measured values and then performs the automatic nip control via hydraulic cylinders.

The eddyNCDT eddy current sensors from Micro-Epsilon are particularly suitable for integration in machines and systems due to their high resolution and linearity, their extremely high temperature stability and their compact design. They provide precise results independent of the environment. The eddy current principle enables wear-free and non-contact measurements in harsh industrial environments with high temperatures, dust, dirt or pressure.

Requirements for the measurement system

- Measuring range: 3 mm
- Resolution: 0.06 µm
- Linearity: < ± 3 µm
- Temperature stability: < 0.45 µm / K

Ambient conditions

- Temperatures up to 120 °C
- Oil in the measuring gap
- Aggressive materials
- Bitumen/rubber vapors

System design

- Controller: 4 x DT3061
- Sensor: 4 x ES-U3

Advantages

- Reliable, non-contact and wear-free displacement measurements
- Very high measurement accuracy even with fluctuating temperatures
- Various interfaces
- Dirt and oil in the measuring gap do not influence the measurement result.

Schematic diagram