



Diameter measurement of coils

Paper coils and plastic coils are used in a variety of industries. Especially steel strip bundles are required mainly in the processing industry, such as the automotive industry. They are used to transport wide flat products made of metal or alloys. Even after decades of experience, large dimensions of around 1.8 m in diameter and the enormous weight of the coil are still challenging for manufacturers.

In order to be able to process the material further, the coils must be unwound. For this purpose, continuous detection of the diameter is necessary in order to monitor the uncoiling process precisely and to determine the changeover time of the coil at an early stage.

optoNCDT ILR3800-100 laser distance sensors from Micro-Epsilon measure the coils according to the phase comparison method. For this measurement task, a sensor is mounted at a distance of 0.2 to 10 m aligned to the radius of the coil. It continuously measures the distance to the coil. Unwinding the coil continuously reduces the diameter. Consequently, the distance between coil and sensor increases. The sensor reliably detects this change in distance and transmits it as a measurement value to the control system involved in the production process. Compared to conventional estimated calculations based on the rotation of the coiler or strip length measurements using mechanical wheels, this method allows precise and wear-free control of the production process.

The laser distance sensors from Micro-Epsilon enable direct, continuous and wear-free measurement of the coil diameter. Harsh ambient conditions as well as demanding surfaces of both polished and matt metals present no issues for the ILR3800-100 sensors.

In addition, models with IO-Link interface and extended temperature range for outdoor applications are available.

Requirements for the measurement system

- Measuring range: 0.2 ... 10 m
- Resolution: 0.1 mm
- Linearity: $< \pm 1$ mm
- Repeatability: $< 300 \mu\text{m}$
- Measuring rate: < 20 Hz

Ambient conditions

- Shiny and matt material
- Production plant / industrial environment
- Dust, dirt, ambient light, vibration, temperature

System design

- Sensor: optoNCDT ILR3800-100
- Cable: PC3800
- Protective glass: ILR-PG3800

Advantages

- Automated inline monitoring of the coil
- Wear-free and non-contact measurement
- Direct and precise diameter detection
- Changeover time of the coil can be planned early
- Ensures personal protection, as it is not necessary to enter the unwinding area
- Reduces the changeover time
- No tracking of the sensor necessary