

## Liquid level measurement during capacitor production

During the production process capacitor elements must be dipped in a defined manner into a bath of liquid. To ensure constantly high quality it is crucial that the capacitor elements are dipped exactly according to the specification. Therefore, it is of the utmost importance that the liquid level is maintained at a very accurately defined height.

For these measurements conventional laser triangulation sensors required a complicated system setup and their complex adjustment incurred costs. The wave motion of the liquid that occurred interrupted the measurement signal which could not then be used for further evaluation.

To compensate these shortcomings, a confocal sensor of the Series optoNCDT2400 was employed. By means of the confocal principle this system measures to the directly reflecting surface of the solvent. The explosive vapors are kept away from the sensor since it is inserted into a protection housing with a sealing ring and an O-ring seals the optical system. In addition the conduit is constantly heated externally to prevent condensation forming on the optical system.

This measurement arrangement ensures that due to an exactly defined dipping depth the individual components conform to the defined quality criteria, such as for example the shelf-life or safety under short-circuit conditions.

Measurement system requirements:

- Measurement range: 24 mm
- Required accuracy: 50  $\mu\text{m}$
- Accuracy obtained: 10  $\mu\text{m}$
- Measurement on: Reflecting surface
- Material: Solvent, reflecting
- Ambient conditions: Area subject to explosion hazards due to solvent vapors

Measurement system setup: optoNCDT 2400

- IFC2400 controller
- IFS2400-24(01) sensor for 24 mm measurement range and additional V4A sealing ring (Ex protection)
- C2400-10 sensor cable 10 m long

Reasons for the system selection

- Non-contact measurement
- Highly accurate against directly reflecting target
- Easy, precise sensor mounting

