



## Lift-height measurement in fork-lift trucks

Customised draw-wire sensor series P600



Logistics are important today and will be more so in the future. Increasing streams of goods must be shipped and transferred in ever shorter time periods. As a result, logistic service providers are trying to shorten the transfer times in the warehouse and to optimise warehouse movements. Here, a high level of potential optimisation can be exploited through the application of displacement sensors in fork-lift trucks. When raising and lowering the load, normally large safety margins have to be observed, so that when rounding a corner or braking and accelerating, the truck is not put into a dangerous tilted position. If the lift height of the load can be acquired, the optimum driving speed can be determined from it. In addition, the system is protected against erroneous operation, i.e. the operator cannot knowingly or unintentionally cause critical driving conditions. This then both optimises the speed and also improves safety for the operator. In addition, the sensor is also used to automatically bring the load to the right lift height to speed up the movement to the correct shelf height.

The manufacturer of these innovative fork-lift trucks, Still-Wagner in Reutlingen, employs a draw-wire displacement sensor from MICRO-EPSILON for this application. They are specially adapted to the requirements on the fork-lift truck. An especially flat construction was chosen so that the sensor could be used in the tight installation space. The sensor is designed redundantly for safety reasons. Two electrically independent signals ensure that a high level of safety is achieved. The high quality and measurement accuracy of the draw-wire sensors from MICRO-EPSILON enable the customer to achieve a competitive lead for the markets in the future.

### Requirements for the measurement system

- Potentiometer output:
  - Linearity:  $< \pm 0,1\%$  FSO
  - Repetitive accuracy  $< 0.05\%$  FSO
- Encoder output:
  - Linearity:  $< \pm 0.05\%$  FSO
  - Resolution:  $< 0.05\%$  FSO
- Temperature range:  $0... +50^{\circ}\text{C}$   
cold store version up to  $-20^{\circ}\text{C}$
- Interference fields: typical automotive ambient EMC

### Advantages

- Compact, customised sensor
- Two separate output signals (potentiometer, encoder)
- High accuracy
- Favourable price/performance ratio