

Real-Time Silo Level Monitoring

Industries: Process
Application type: Level measurement

Description



Fig 1: Silos filled with polypropylene pallet materials

A South Korean network cable micro-duct manufacturer previously relied on rotary paddle level switches for simple high and low-level detection of polypropylene pallet materials in silos. However, the lack of real-time monitoring made level management inconvenient and inefficient. To address these challenges, the company required a sensor capable of accurately measuring material levels in real-time.

Conventional sensors, such as ultrasonic sensors with wide beam widths and radar sensors, were unsuitable for this application due to frequent measurement errors. The weak reflection caused by the low dielectric constant of polypropylene pallet materials further complicated radar sensor performance. Dimetix Laser Distance Sensors emerged as the only reliable solution for this demanding application.

In June 2022, three Dimetix DAE-10-050 sensors were installed in the silos (Fig 1) to ensure precise measurements. These sensors were configured with a measuring range of 9 meters and equipped with optional heaters to enable operation in outdoor environments with temperatures as low as -40°C. The sensors' filter parameters were optimized to stabilize fluctuations in material levels within the silos.

A local control panel was included as part of the scope of supply, enabling real-time monitoring of material levels via a 4...20mA interface indicator. This allowed for seamless integration with the plant's systems and improved operational efficiency.

During material filling, significant dust was generated, which could adhere to the laser lenses and affect performance. To mitigate this, an air purging jacket was designed to automatically clean the lenses by activating air purging for 5 seconds every 90 seconds. This system ensured consistent sensor accuracy and maintenance-free operation.

By adopting Dimetix Laser Distance Sensors, the manufacturer improved its material level management, achieving higher accuracy and operational efficiency even in challenging conditions.



Fig 2: Precise measurements on several surfaces and colors

Customer advantage

- **Versatile Surface Measurement:** Precise measurement on a wide variety of surfaces regardless of color (Fig 2)
- **Wide Temperature Range:** Reliable operation in extreme conditions, from -40°C...+60°C
- **Real-Time Monitoring:** Continuous level tracking on a local panel via 4...20mA interface
- **Maintenance-Free Operation:** Automatic air purging system ensures lens cleanliness and long-term reliability.



DIMETIX APPLICATION EXAMPLE

AE-0118

Dimetix Sensors – the solution for applications with high precision requirements

Thanks to the clearly arranged product portfolio the evaluation of a suitable Dimetix Laser Distance Sensor is simple and uncomplicated.

Dimetix sensors offer numerous features, which are integrated in each and every device as standard, including, among others, various interfaces like SSI, RS-422/485, RS-232 and 2 digital outputs.

Optionally, the Industrial Ethernet interfaces PROFINET, EtherNET/IP and EtherCAT are also available. Furthermore, all devices are IP65-protected and impress with a weight of less than 500 grams!

Particularly noteworthy, however, is the accurate measurement of 1 millimeter over distances of up to 500 meters, even under the most extreme conditions. This is possible with the sensors of the types DPE, DEN and DEH.

No less interesting are sensors of types DAE, DAN and DBN. Preferably, they can be used for projects which do not require a range over 500 meters or are cost-sensitive.

	DPE-10-500	DPE-30-500	DEN-10-500	DEH-30-500
PARTNUMBER	500630	500636	500637	500638
SPECIFICATION				
Typical accuracy $\cong \pm 2\sigma$	± 1 mm	± 3 mm	± 1 mm	± 3 mm
Mensurierung range on natural surfaces	0.05...~100 m	0.05...~100 m	0.05...~100 m	0.05...~100 m
Measuring range on reflective foil	~0.5...500 m	~0.5...500 m	~0.5...500 m	~0.5...500 m
Max. measuring rate	250 Hz	250 Hz	100 Hz	100 Hz
Operating temperature	-40...+60°C	-40...+60°C	-10...+50°C	-10... +60°C

	DAE-10-050	DAN-10-150	DAN-30-150	DBN-50-050
PARTNUMBER	500633	500632	500634	500635
SPECIFICATION				
Typical accuracy $\cong \pm 2\sigma$	± 1 mm	± 1 mm	± 3 mm	± 5 mm
Mensurierung range on natural surfaces	0.05...~50 m	0.05...~100 m	0.05...~100 m	0.05...~50m
Measuring range on reflective foil	~40...50 m	~40...150 m	~40...150 m	
Max. measuring rate	100 Hz	100 Hz	100 Hz	10 Hz
Operating temperature	-40...+60°C	-10...+50°C	-10...+50°C	-10...+50°C

