Drilling Depth Measurement in Open-Pit Mining

Industries: Mining
Application type: Position Measurement

Description



Fig 1: ***Rotary drilling rig***

In open-pit mining, precise measurement of drilling depth is essential for a controlled and repeatable drilling process. On large drilling rigs, the movement of the feed carriage must be continuously monitored so that the feed position and current drilling depth are known reliably at all times.

In this application, a Dimetix Laser Distance Sensor **DAE-10-050** is mounted on the fixed frame of the feed system. The sensor continuously measures the distance to a moving target plate. The change in distance is used to determine the feed movement of the drill rod. The control system processes the measurement values and calculates the current total drilling depth, taking into account the length of the drill rods already inserted.

With a single measuring range of 9.4 m, the sensor covers the entire movement range with just one measuring system. The non-contact measurement eliminates mechanically stressed measuring components, reducing wear and maintenance requirements. The measurement values are transmitted to the control system and operator display via **4...20 mA** (analog) and **RS-485**. In addition, programmable digital outputs can be used for end-position and fault indications.



Fig 2: Laser Distance Sensor

Customer Benefits:

- **High precision:** Measurement accuracy of ±1 mm and repeatability of ±0.3 mm enable reliable and repeatable measurement of the drilling depth.
- **Full stroke with one sensor:** The DAE-10-050 covers the entire 9.4 m movement range with just one sensor.
- **Robust for open-pit mining:** IP65 protection, an operating temperature range of -40 °C to +60 °C, and suitable protection and vibration-damping measures enable reliable operation in dust, rain, snow and high-vibration environments.

- **Fast and continuous measurement:** Measurement rates of up to 100 Hz enable continuous monitoring of the feed movement and current drilling depth.
- **Flexible and reliable integration:** 4...20 mA, RS-485, programmable digital outputs and a fault output allow direct integration into the control system. The parallel use of the analog output and RS-485 provides additional redundancy for reliable data transmission.
- **Reduced wear and maintenance:** The non-contact measurement principle eliminates mechanical wear parts, reducing maintenance requirements and potential downtime.

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 and DEN.

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