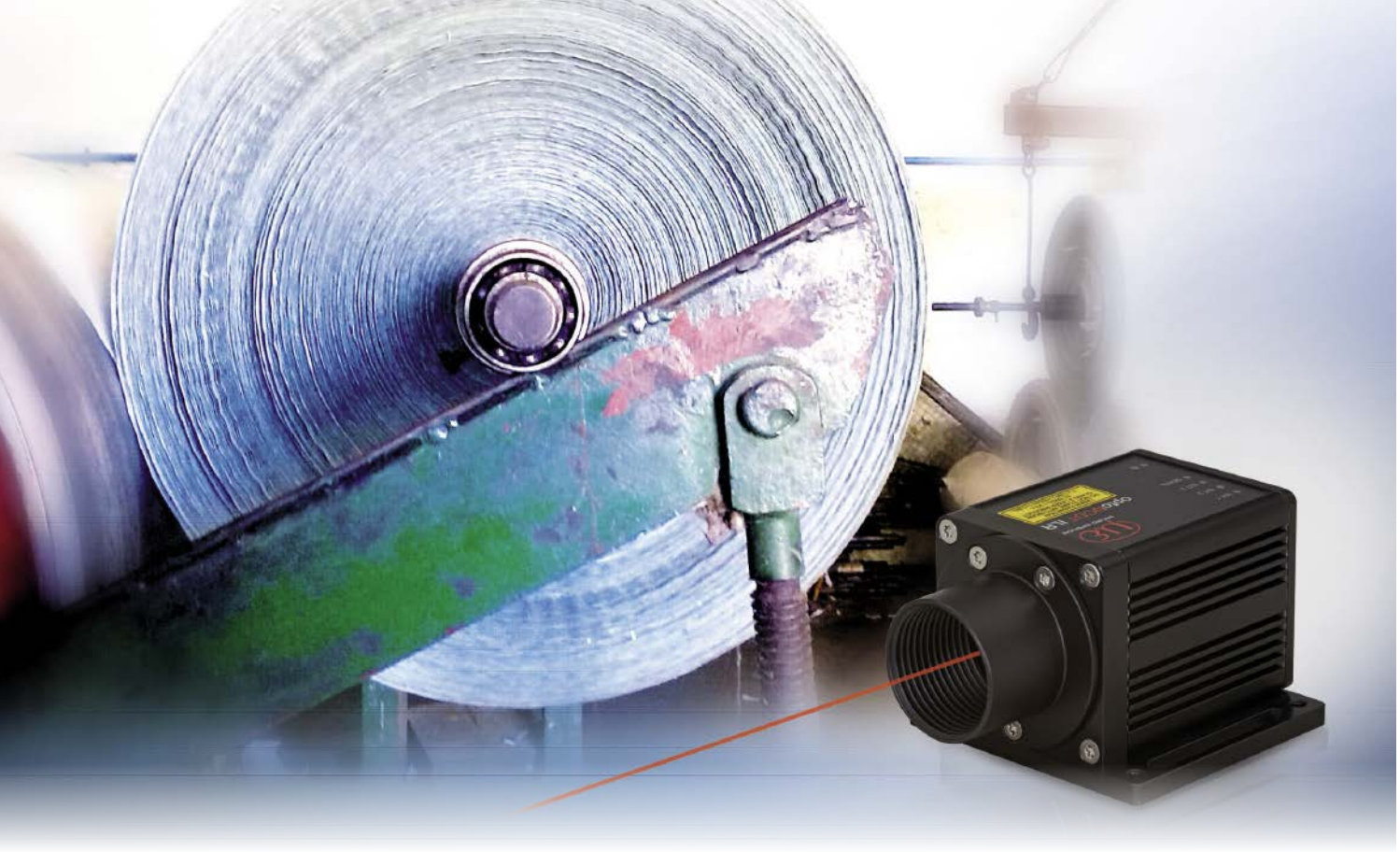


Keep Your Distance!

Laser Distance Sensors for Large Measuring Ranges

Robust laser distance sensors designed for large measuring ranges are used in industrial environments and offer different measuring modes for optimal exposure on demanding surfaces. The sensors provide precise measurement results with high signal quality independent of the surface, whether it is on metals, plastics, paper, or textiles.

In factory and plant automation, large distances between the sensor and the measuring object must be monitored. Micro-Epsilon has developed the OptoNCDT ILR2250 laser distance sensor for these measurement tasks. The sensor covers measuring ranges up to 100 m without a reflector. When using a reflector, the measuring range can be extended up to 150 m. Their robust aluminum die-cast housing protects the sensor against harsh environmental conditions. The integrated optical interference filters provide the ILR2250 sensor with very good ambient light suppression. Therefore, measurements are also possible in outdoor areas, such as for monitoring the travel paths of crane axes or drone-based distance measurements. Their innovative technology enables demanding measurements on different surfaces, such as paper or plastics, as well as metals and textiles.These advantages make the OptoNCDT ILR2250 ideally suited to many industries such as the steel industry, and transport, logistics and conveyor technology.

The Measuring Principle

TheOptoNCDT ILR2250 works with a red semiconductor laser of a wavelength of 655 nm and is assigned to laser class 2. Its measuring principle is based on the phase comparison measurement. The sensor emits high-frequency, modulated laser light. The light that is returned to the sensor is phase-shifted due to the reflection at the measuring target and is compared to the reference signal. The value of the phase displacement enables the determination of the distance with high accuracy. The measurement is triggered either by a control unit, a PC, a trigger signal or the auto start function.

Put in the Right Light

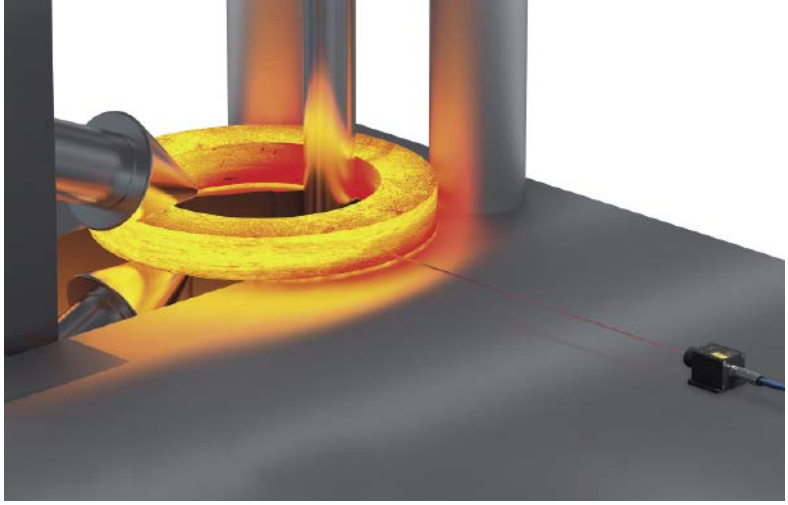
The laser distance sensor from Micro-Epsilon offers outstanding signal stability on numerous surfaces, which enables measurement results down to millimeter accuracy. This innovative sensor technology is almost independent of the material on objects with a reflectivity from 6 to 100 percent. Therefore, it's suitable for versatile applications on different surfaces.

Presets are available for various applications, providing a predefined configuration depending on the material or reflection. The Auto measurement mode is used for dark or weakly reflecting measuring objects. It provides fast, automatic exposure control even on dark, reflective, and distant objects. This measurement mode optimizes the measurement frequency of the sensor, depending on the signal quality, and therefore provides the best results even in difficult conditions. The "Fast" mode is suitable for dynamic measurements on moving objects and fast distance jumps with movements of up to 1.6 m/s. Furthermore, users can select the "Accurate" mode for high accuracy and tolerance with distance changes, or the "Precise" mode for highest accuracy on well reflecting measuring objects. The sensor then measures at 20 Hz.

Filling Level Measurement in Silos

For smooth production and logistics processes, precise quantity measurements at storage locations for bulk goods or plastic granulates, for example, is a decisive factor. In order to avoid production downtime due to missing material, the levels of the storage silos must be reliably and automatically detected. The OptoNCDT ILR2250 sensors are used for filling level measurement. They are mounted on the top of the silo and measure continuously to the bottom of the silo. These laser distance sensors thus detect the dis-

Continuous detection of the coil 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 ILR2250-100 laser distance sensors from Micro-Epsilon perform this task.



OptoNCDT ILR2250-100 laser distance sensors from Micro-Epsilon are used for measurements on seamless rolled rings. They operate on the phase comparison method, which provides reliable results even on red-hot glowing measuring objects.

tance to the bulk material or granulate. When the silo is emptied, the distance increases, allowing a conclusion to be drawn about the filling quantity, which in turn is output in real time via a level indicator. The generated measurement values are then output directly to the production control system in real time via digital or analog interfaces. The exact fill level, the residual quantity and the volume of the granulate to be filled can now be calculated automatically and passed on to the control room. Time-of-flight laser sensors from Micro-Epsilon ensure continuous production operation, optimum filling of the silos as well as an early warning if the filling level falls below a defined level. These sensors prevent production downtime due to missing material and reduce costs significantly. Simple retrofitting of the time-of-flight laser sensor on existing silos is possible at any time. An additional compressed air cleaning system for very dusty environments is available.

Precise Acquisition of Coil Diameters

Steel strip coils are mainly used in the processing industry, such as the automotive industry to transport wide flat products made of metal or alloys. 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 ILR2250-100 laser distance sensors from Micro-Epsilon measure the distance to the coil. For this measurement task, the sensor is mounted at a distance of 0.2 m 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.

Thanks to the innovative measurement modes, the sensor provides reliable measurement values even with different alloys and surfaces. With its large measuring ranges, the measurement can be carried out from a safe distance to the coil, which means that the sensor can also be used in harsh environments.

Diameter Monitoring on Seamless Rolled Rings

In ring rolling mills, metals such as stainless steel or titanium are rolled seamlessly into large rings for use at temperatures of up to 1,100°C. For this purpose the red-hot blank is placed in a ring rolling mill. The diameter of the ring increases continuously due to the rolling process. As only minimal tolerances are permitted, the rolling process must be continuously monitored and the diameter must be measured precisely. Conventional sensors that are mounted close to the measuring object cannot withstand the extremely high temperatures, flaking scale and steam. Therefore, measurements from a large distance are necessary.

OptoNCDT ILR2250-100 laser distance sensors from Micro-Epsilon are used for this measurement task. They operate on the phase comparison method, which provides reliable results even on red-hot glowing measuring objects. The sensor is mounted at a safe distance and precisely measures the distance to the rolled material during rolling. As the diameter of the ring increases steadily, the distance to the sensor decreases at the same time. The OptoNCDT ILR2250 sensor detects this difference reliably and with millimeter accuracy. The measurement values are transmitted directly to the production control system via the digital interface. Now the diameter can be calculated as well as the remaining rolling path, which is comprised of the actual volume and the resulting processing steps. The results are then transmitted to the control room for visualization.

Laser distance sensors from Micro-Epsilon enable automatic process monitoring with reliable detection of the diameter change during the production process. The excellent linearity in combination with the high resolution makes the sensor ideal for measurement tasks in rolling mills. In addition, its compact design enables simple and fast integration into existing systems.

Conclusion

The OptoNCDT ILR2250 laser distance sensors use the phase comparison method and detect measuring objects at distances of 0.05 m up to 150 m with maximum signal stability. This is achieved with a linearity of ±1 mm and a resolution of 0.1 mm. Thanks to their high accuracy and robustness, the laser distance sensors from Micro-Epsilon are designed for precise distance measurements in industrial environments. Models with integrated heating are available for outdoor use. The innovative sensors detect the distance to remote objects. Depending on the distance and accuracy requirements, the measurements can be carried out with or without reflector film. The integrated Auto measurement mode enables reliable measurements even on dark, partly reflecting and remote measuring objects. Therefore, the ILR2250 sensors can be used for distance measurements on numerous surfaces. Simple and fast alignment of the sensor is made possible by the integrated mounting plate with four threaded pins. Due to their properties, the sensors are used in logistics and automation technology, the metals industry and production monitoring. ■

AUTHOR
Jan Herrmann
Product Manager for Laser Distance Sensors

CONTACT
Micro-Epsilon Messtechnik GmbH & Co. KG,
Ortenburg, Germany
Tel.: +49 8542 168 0
www.micro-epsilon.com

All images: Micro-Epsilon