



Easy and profitable measurement solutions using smart laser triangulation sensors

Displacement, distance and position can be measured using laser triangulation sensors. The reasons are clear: easy installation, large measuring ranges and high accuracy. Enhanced functionality enables the optoNCDT 1420 laser sensors from Micro-Epsilon to perform measurement tasks even more quickly and efficiently.

Distance measurement with changing surfaces

Different materials and therefore different surfaces are challenging tasks for optical sensors. When measuring the distance from a printed circuit board, mat and shiny metallic surfaces have to be detected at high measuring rates. The pins consist of a shiny metal, whereas the circuit board presents a mat surface. Therefore, the receiver element in the sensor is alternately exposed to strong and then weak reflections at frequent intervals. The optoNCDT 1420 laser sensors are equipped with an Auto Target Compensation feature which enables fast control of different reflections. This ensures a smooth signal frequency of the distance signal.

These innovative laser sensors can be configured via a user-friendly web interface. It contains different presets which empower the user to optimize the signal quality when different targets are measured. For example, the "Changing surfaces" preset ensures a well-balanced signal and compensates for reflective and mat surfaces.

High measuring rates for high process speeds

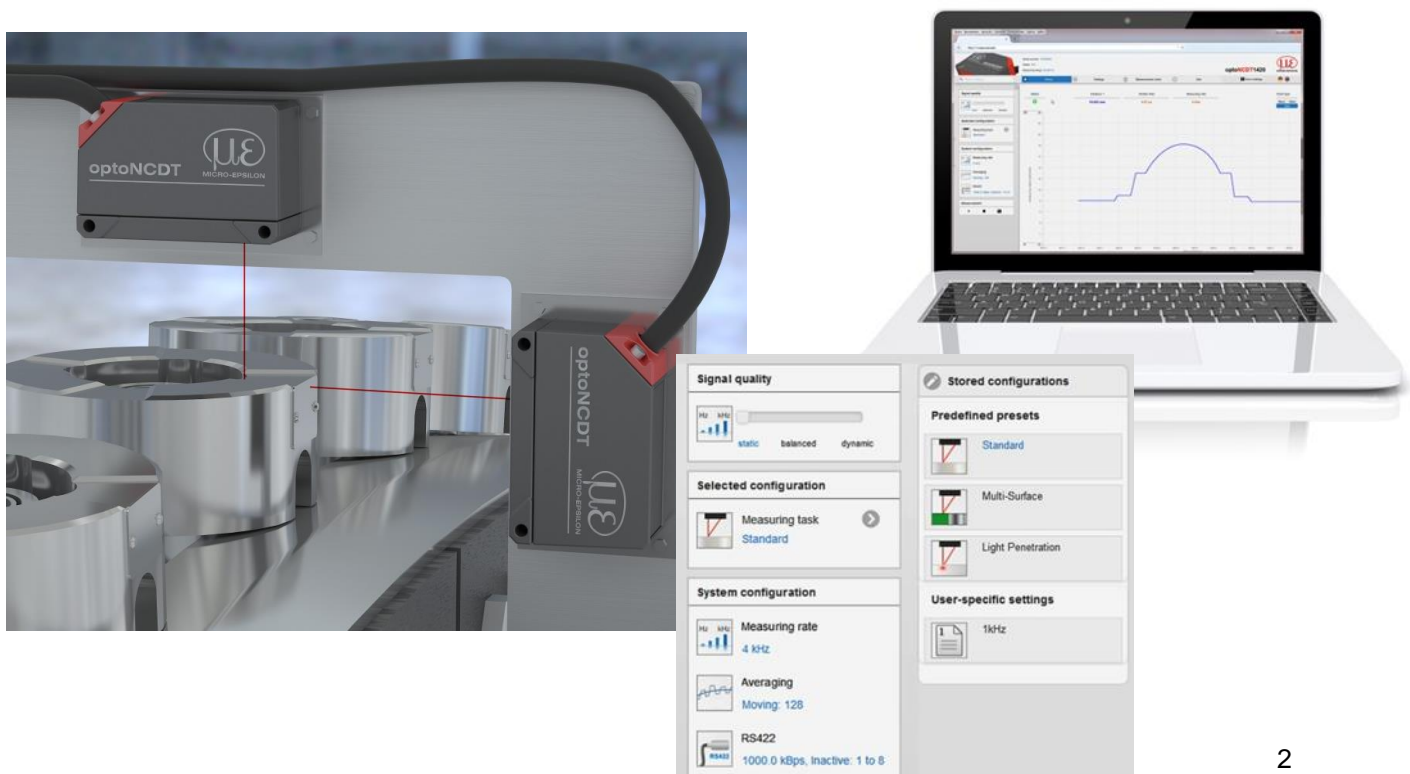
The measuring rate indicates the number of measurements per second. Use a high measuring rate for bright and mat measurement objects. Use a low measuring rate for dark or shiny measurement objects (e.g. black painted surfaces) to improve the measurement result. The lower the measuring rate, the longer the maximum exposure time. The optoNCDT 1420 provides a maximum measuring rate of 4 kHz. The CMOS element is then exposed 4000x per second.

Maximum Precision

Laser triangulation sensors provide high accuracy. In practice, repeatability and linearity are critical factors. The linearity value describes the deviation from the ideal characteristic curve. Repeatability describes the deviation of mutually independent measurements which are determined under the same conditions. The optoNCDT 1420 laser sensors are considered one of the most precise sensors in the compact class. With a repeatability of 0.5 μm and a linearity of $\leq 0.08\%$ FSO, measurement tasks can be solved with high precision.

Unique ease of use

All optoNCDT 1420 models are configured using an intuitive web interface. The settings for the measurement task can be quickly selected using predefined presets. Using the 'Standard', 'Changing surfaces' and 'Material with penetration' settings, precise measurement results are easily achieved without any complex optimization. The quality slider enables the sensor to be adapted to static and dynamic processes.



Up to eight user-specific sensor settings can be stored and exported in the setup management. Loading the user settings quickly configures the sensors. The video signal display, the signal peak selection and a freely adjustable signal averaging enable the experienced user to optimize the measurement task. The ROI function (region of interest) allows e.g. for interfering signals in the background to be filtered out. The remaining signal peak is optimally corrected.

Easy integration into confined spaces

With numerous measurement tasks, the installation space is limited. The optoNCDT 1420 is smaller than a matchbox. This is why the sensor can be easily installed into restricted spaces.

Conventional laser displacement sensors are often equipped with an external controller which is then housed in the switching cabinet. In contrast, the optoNCDT 1420 comes with an integrated controller, i.e. data processing and output are carried out directly in the sensor. This space-saving concept simplifies the installation process while reducing the wiring effort. Connection is possible either via an integrated cable or via a pigtail.



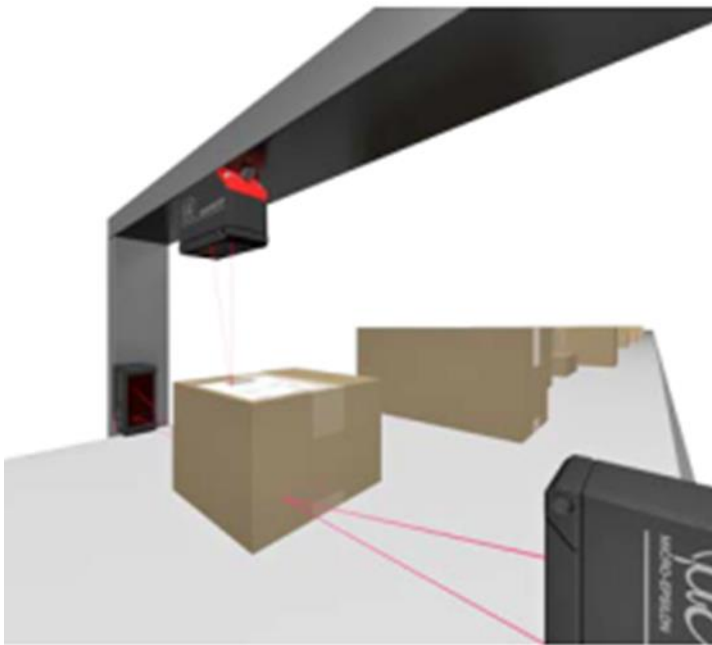
Distance and position measurements: Determining the exact distance value from the nozzle to the surface is a critical factor with dispensers for solder paste and adhesives.

Different output signals enable to integrate the sensor into plant or machine control systems. As well as analog voltage and current outputs, a digital RS422 interface provides distance information from the sensor. Due to the selectable setting and evaluation possibilities, the optoNCDT 1420 meets the requirements for use in high volume and OEM applications.

Measuring ranges

Laser triangulation sensors have a defined measuring range within which they can reliably detect distance changes. This range starts after a certain distance from the sensor and is often termed "offset". The measuring range of laser triangulation sensors starts with a few millimeters and ends at 1000mm.

The optoNCDT 1420 laser triangulation sensor is available with measuring ranges between 10mm and 500mm. It is therefore the smallest laser sensor in the market that offers such a large measuring range combined with high measurement accuracy. This large measuring range is used for measurement tasks in logistics, storage automation and robotics.

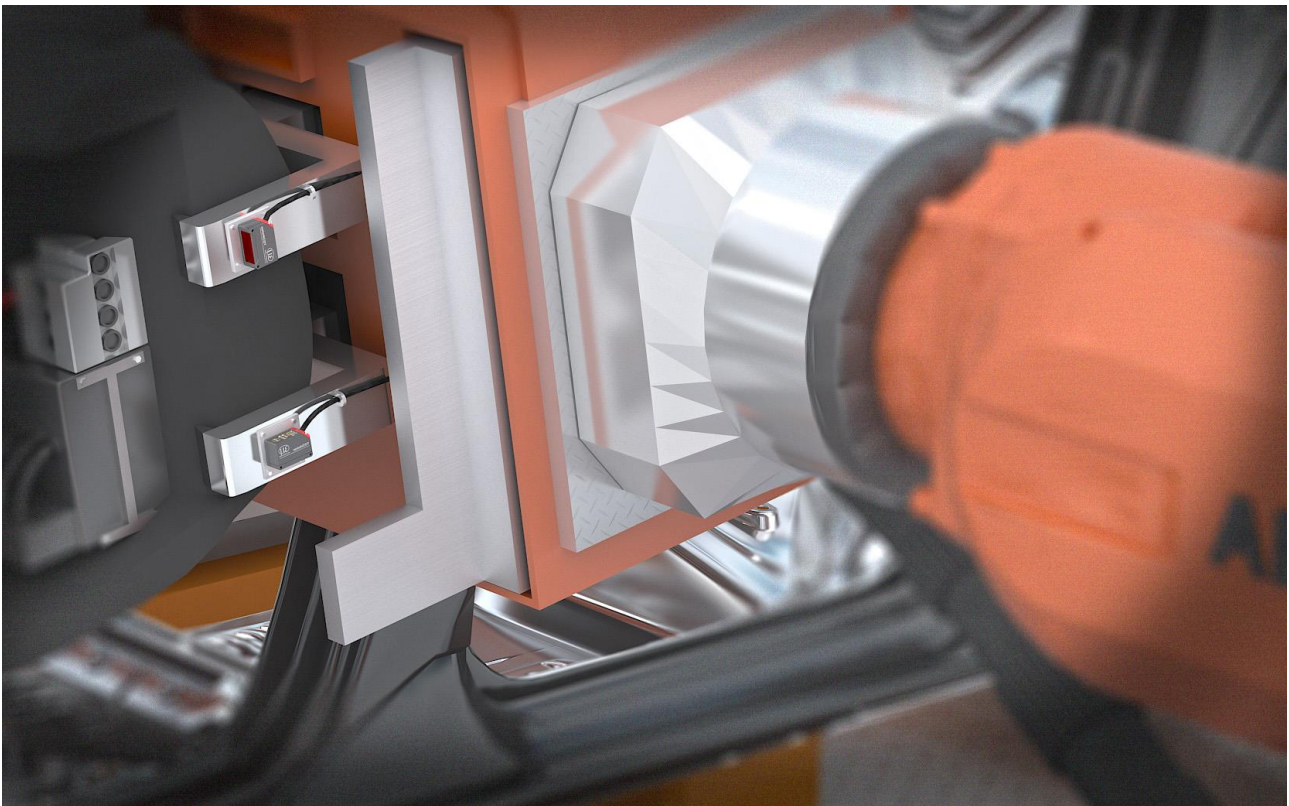


Dimensional inspection: In fully-automated logistics processes, the dimensions of packages are checked. Due to their large measuring range and their high measuring rate, compact laser sensors from Micro-Epsilon are used for automated, dimensional inspection.

Suitable for use with robots

Robotic applications are challenging tasks for sensors. Due to their technical conception, optoNCDT 1420 laser sensors are suitable for tasks where they have to perform distance measurements on the robot. Their compact design allows them to be easily integrated into tools and grippers. High shock loads, vibrations and oscillations are no match for these sensors. Therefore, they are suitable for dynamic movements of the robot arm. For wiring purposes, robot-suitable cables are available which are torsion resistant and flexible.

Laser displacement sensors are usually equipped with an external controller which is then housed in the switching cabinet. In contrast, the optoNCDT 1420 comes with an integrated controller, i.e. data processing and output are carried out directly in the sensor. Therefore, the sensor can be directly connected to the production control.

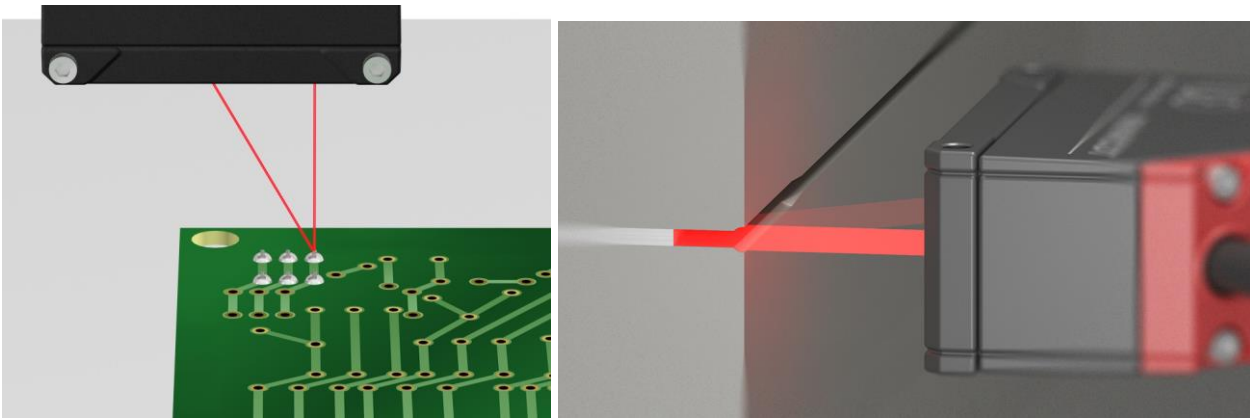


Car body positioning in the production line: For automated processing of car bodies or vehicles, e.g. for drilling, punching and subassemblies, an exact determination of the position relative to the processing tool is necessary.

Miniature measurement spot for detection of smallest details

Laser triangulation sensors usually generate a small light spot. This light spot is required for a high spatial resolution and ensures that the smallest of objects and details can be detected. The smaller the sensor's measuring range, the smaller the light spot.

optoNCDT 1420 laser sensors from Micro-Epsilon use a special lens arrangement in order to project an extremely small light spot onto the target surface. The smallest measurement spot which optoNCDT 1420 laser sensors from Micro-Epsilon can offer has a size of 45 x 40 μm and enables to detect the smallest of objects such as soldered joints on PCBs.



Small light spot for demanding applications: The extremely small light spot monitors even finest pin geometries reliably while measurements can be carried out in limited spaces.

"Price of a light barrier, performance of a triangulation sensor"

The optoNCDT1420 offers a unique combination of speed, size, performance and application versatility. The excellent price/performance ratio makes the optoNCDT 1420 now suitable for numerous applications where laser sensors had not been an option before. The selectable connector type, i.e. cable or pigtail, together with compact size reduce the sensor installation effort to a minimum. Just like all triangulation sensors from Micro-Epsilon, the optoNCDT 1420 provides an intelligent surface regulation. This is how the Auto Target Compensation ensures stable results regardless of changing colors or brightness of the target surface. The high-performance optical system projects the small light spot sharply onto the measurement object which enables to even detect smallest components and every little detail reliably.

[Watch Product Video](#)

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