



Nanoprecise measurement systems for high-end industrial applications

The IDS3010 from Munich-based attocube systems AG – a wholly owned subsidiary of WITTENSTEIN SE – opens up a completely new dimension in high performance engineering precision. Accurate to one billionth of a millimeter, a measured value every single microsecond, multi-channel measurements directly on the target from a distance of up to 30 meters – this interferometric sensor easily surpasses the performance of conventional glass scales and other presently available sensor technologies in terms of precision, speed and industrial fitness. The picometer resolution of the IDS3010 is additionally underlined by the 0.0 ppm systematic measurement uncertainty up to 3 m, which has been officially confirmed by the German National Metrology Institute (PTB).

For the first time, the IDS3010 unites exceptional interferometric precision with integration-friendly dimensions. The sensor is also compatible with different fieldbus worlds and – thanks to the integrated web server – ready to use in Industry 4.0 applications.

Measurement directly on the target: contactless and extremely precise

The IDS3010 is a contactless interferometric sensor which enables highly precise measurements of positions and motions. It provides 10^{-12} m position resolution – in other words, one picometer or one billionth of a millimeter – and achieves working distances of up to 5 meters! If suitable sensor heads are fitted, it can even perform measurements over a 30 meter distance. The IDS3010 measures directly on the target, for example a workpiece, a tool or a machine component. Inherent or mounting-related measurement errors due to backlash, wear, deformation, thermal expansion or other influences – which are intrinsic to indirect measuring glass scales as well as inductive

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High-tech products made by WITTENSTEIN fly into space and win Formula One races. Intelligent drive systems – from the world's smallest high-performance servo drive to the latest state of the art in medical technology – are developed, produced and marketed by a team of around 2000 employees. With a blend of dedication and enthusiasm, we set benchmarks – every day – worldwide.



The IDS3010 Industrial Displacement Sensor measures positions, motions and vibration in up to three axes fast and ultra-precisely.

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displacement sensing systems – are completely eliminated. Stationary or moving targets are sensed at velocities of up to 2 m/s with a data acquisition bandwidth of 10 MHz – one measurement containing all relevant information on the position or movement is generated every single microsecond.

Simultaneous measurement in up to three axes on all kinds of surfaces

The IDS3010 is designed as an optical, multi-channel measuring sensor. Up to three miniature sensor heads can be connected via glass fiber cables to the ultra-compact basic unit, which measures just 19.5 × 5 × 5 cm, in order to simultaneously measure positions and motions in up to three axes. The sensor heads can be supplied with optics of different types for measurements on all kinds of materials and surfaces such as glass, plastic, ceramic, aluminum, copper or steel. Customized sensor heads, for example made from tungsten or sapphire, are likewise possible for particularly complex measurement tasks.

Industrial grade, integration-friendly connectivity

The IDS3010 has an integrated web server. The sensor alignment, initialization and configuration can thus be controlled, adapted and monitored remotely from any location. The sensor can also be integrated in Industry 4.0 applications. At the same time, a broad spectrum of real-time interfaces and protocols allows position data to be transmitted easily to CNC controllers or RTOS computers. Fieldbus interfaces to standard industrial networks like CAN open, Profinet, Profinet RT or EtherCAT can be provided on request, allowing the IDS3010 to be integrated into bigger systems without any problems.

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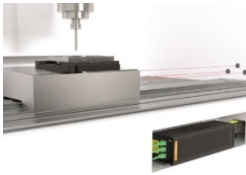
Industrial grade interferometry opens up innovative applications

Not only semiconductor manufacturing and productronics but increasingly also drive technology and precision machines demand sub-nanometer precision as a precondition of successful miniaturization and increased power density. The range of applications for the IDS3010 is accordingly very wide. As a pure displacement sensing system, it can be used among other things to calibrate machine tools and coordinate measuring machines. In adjustment units of the kind employed in the precision mechanics and optics industry or in high performance special-purpose machinery, the IDS3010 is ideal for position counting as an alternative to incremental encoders. In a multi-channel configuration, the sensor – together with suitable actuators – functions as a vibrometer to actively compensate vibration in real-time. Mechanical eccentricity shift due to wear or the application of forces can be determined on rotating targets. Runout of high speed shafts, for instance, can be measured and its exact angular position determined.

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Photos:**01_WITTENSTEIN_IDS3010_Einbausituation:**

The IDS3010 measure positions directly on the workpiece. The sensor rules out measurement errors due to elasticity or wear in guides and bearings, or to the influence of thermal expansion and machine deformation.

**02_WITTENSTEIN_IDS3010_Produktbild_ein_Sensorkopf:**

A central DFB laser diode and the electronic control form the compact basic unit (19.5 x 5 x 5 cm), to which the sensor heads are connected via glass fibers.

**03_WITTENSTEIN_IDS3010_Produktbild_drei_Sensorkoepfe:**

Up to three sensor heads can be connected to the IDS3010. It is thus possible to measure not only the linear movement of a target but also runout errors such as axial and radial offset, yaw, pitch and roll or out-of-roundness and eccentricity of rotationally symmetric parts.

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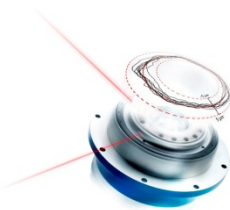
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04_WITTENSTEIN_IDS3010_Webserver:

05_WITTENSTEIN_IDS3010_Webserver_mit_Produkt:

An integrated web server is used to initialize and configure the sensor and to set up data communications.



06_WITTENSTEIN_IDS3010_Rundlaufmessung:

Runout measurement on a rotating object: the two sensor heads of the IDS3010 simultaneously measure the error motion of a shaft perpendicular to the rotating axis. The black lines show the runout of the rotating shaft.



07_WITTENSTEIN_IDS3010_Sensorkoepfe:

The IDS3010 can be operated with different sensor heads: ultra-compact heads for the most confined spaces or alternative designs where priority is given to easy alignment or to compatibility with a variety of target materials (glass, aluminum, ceramic, etc.).

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WITTENSTEIN SE – one with the future

With around 2100 employees worldwide and sales of approximately €337* million in 2016/17 (*provisional figure), WITTENSTEIN SE enjoys an impeccable reputation for innovation, precision and excellence in the field of mechatronic drive technology – not just in Germany but internationally. The group comprises seven pacesetting Business Units with separate subsidiaries for servo gearheads, servo actuator systems, medical technology, miniature servo units, innovative gearing technology, rotary and linear actuator systems, nano technology and electronic and software components for drive technologies. Through its 60 or so subsidiaries and agents in approximately 40 countries, WITTENSTEIN SE (www.wittenstein.de) is additionally represented in all the world's major technology and sales markets.

attocube systems AG – excellence in nanotechnology applications

attocube systems AG was founded in 2001 and is recognized internationally for innovation and excellence in the development, production and distribution of cutting-edge solutions for the most challenging nanotechnology applications in research and industry. The portfolio includes nano drives, used for highly accurate positioning tasks and surface analyses, as well as ultra-precise distance sensors and fully integrated microscope and cryostat systems, which work close to the limit of what is technically and physically feasible. All products are developed and manufactured at the company's headquarters in Munich. An international team of physicists, engineers, software developers and product designers cooperates closely from the initial concept to the final delivery. In addition to its premises in Munich, attocube also runs two sales offices in the U.S. Its products are distributed worldwide. A long list of accolades – including the Bavarian Innovation Award 2006, the German Startup Award 2008 and the TOP100 Innovation Award 2013 – further prove attocube's innovative company spirit.

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