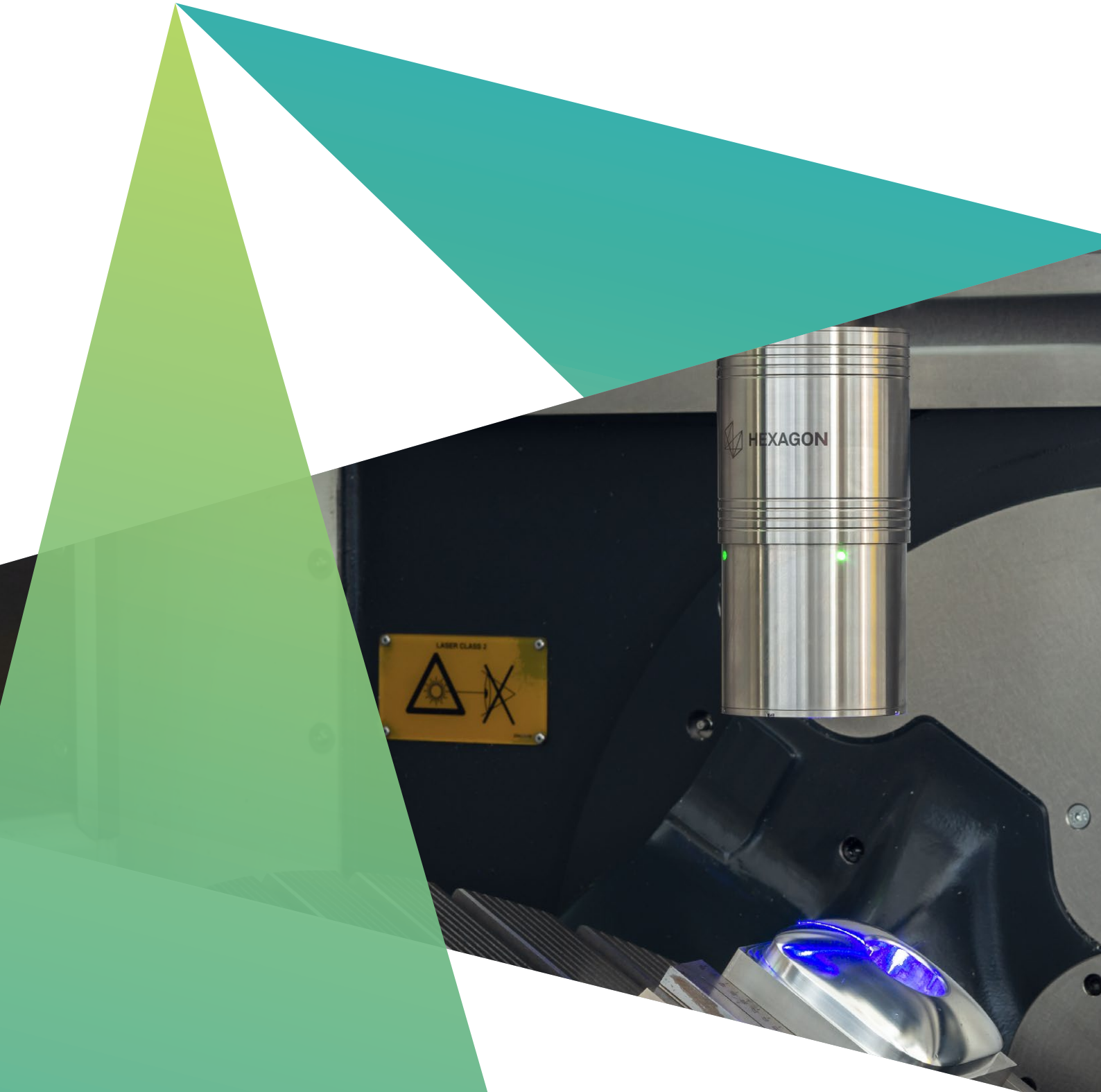
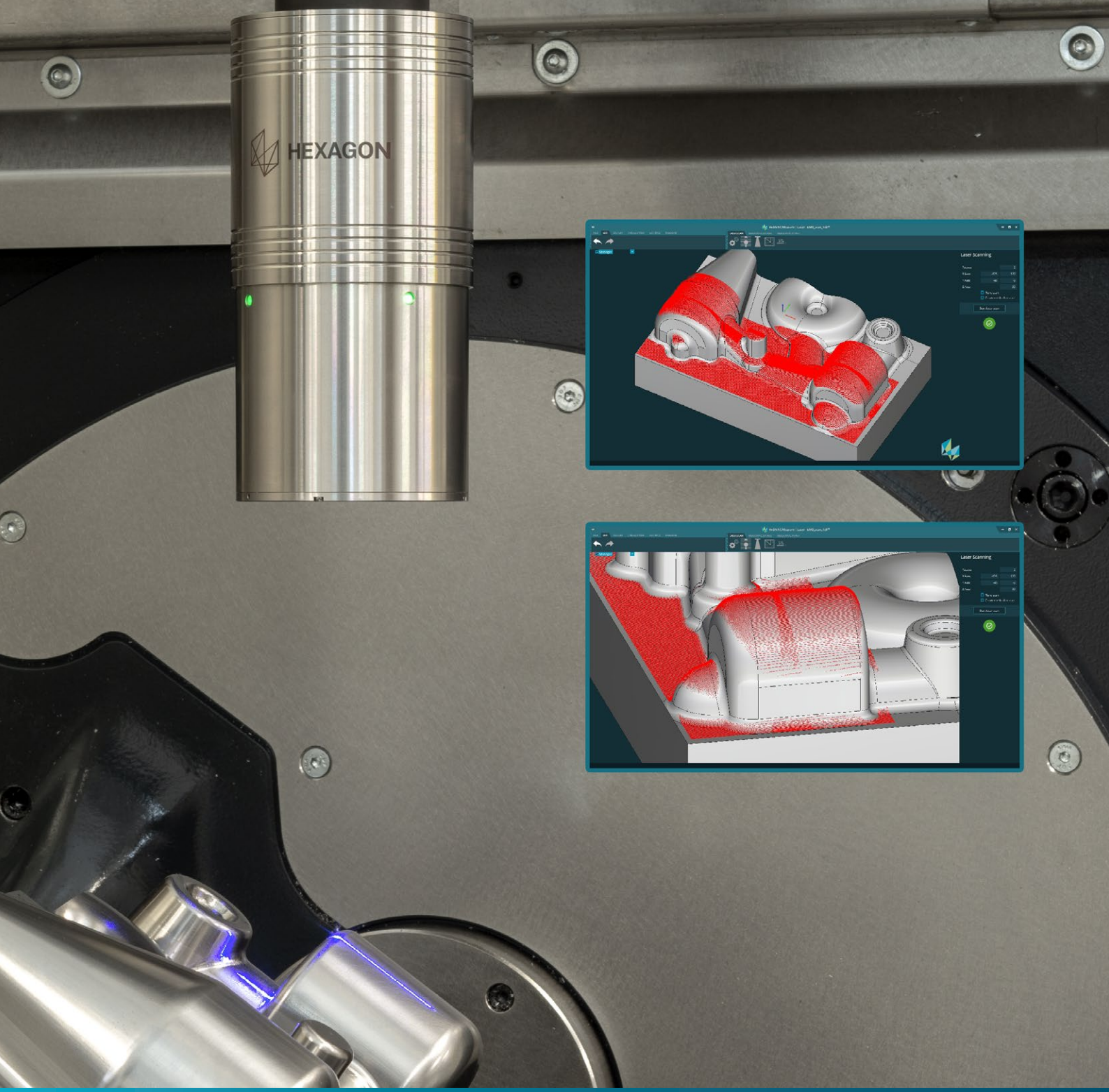
HEXAGON

Broschüre

Laser scanning solutions for machine tools

Get the big picture quickly





Get the big picture quickly

Being able to capture a complete and accurate picture of a part's quality directly on a machine tool gives manufacturers a competitive edge. And the faster a measurement system is able to flag up issues, the greater the advantage. But machine tool inspection typically involves capturing individual measurement data points and then filling in the bigger picture manually or with specialised software, all of which takes time.

Hexagon has drawn on its long-standing leadership in developing laser scanners for coordinate measuring machines and portable measuring arms to bring new levels of speed, precision and flexibility to machine tool inspection. Designed specifically for machine tool measurement, Hexagon's LS-C-5.8 and LS-R-4.8 laser scanner sytems rapidly capture and present dimensional data from the entire surface of a part, enabling users to take informed decisions that enhance production and quality.

Benefits of laser scanning on machine tools

Hexagon laser scanners for machine tools are designed for a huge variety of applications and surface types, and deliver precise results whether measuring shiny or very dark surfaces. They combine compact design with large field-of-view so that they can be used to create point clouds also on small machines and in environments where part accessibility is limited. Hexagon laser scanners can measure with use of up to five axes and are protected against vibrations, collisions and contamination, making it ideal for use in harsh industrial environments.

Creating and viewing colour maps of a clamped part

Hexagon laser scanners able to capture up to thousand measurement points per second and are supported by software that makes information easy to digest and use. With the laser scanners, users can visualise a part's surface data, assess whether it is in tolerance, and display the results as a colour map super-imposed on the digital CAD model of the part, all while it is clamped on the machine tool. The software also makes it simple to create measurement reports for further analysis.

Measuring freeform surfaces

The irregular or flowing nature of freeform surfaces means users have to capture several single measurement points to create an accurate dimensional picture. A laser scan is the fastest way to capture multiple data points and compare results for the physical part with the digital CAD model. With the ability to measure with up to five axes of the machine tool, almost every area of a part can be measured.

Mapping errors and aligning part for reworking

Flaws can arise on a part's surface during manufacturing for a number of reasons, including incorrect clamping or inadvertent bending. Tactile point measurement, which captures precise dimensional data in a limited number of places, may fail to pick up on localised surface deformation. In contrast, laser scanning quickly creates a complete map of an entire surface, making it easy to identify fluctuations in quality and correctly align a part for reworking.

Reverse engineering

Sometimes parts lack the 3-D digital models that facilitate replication or modification. Hexagon laser scanners are able to scan a part while it is on the machine tool, allowing the resulting data to be exported as an stl-file and integrated into a CAD-program.

Turn your machine tool into a multisensor device

Many parts have characteristics that require the use of different measurement techniques to build a complete picture of the the quality of the part. With a multisensor solution, operators can benefit from the strength of Hexagon's wide range of sensors, such as highly accurate point measurements or temperature checks of the part, while also capturing surface datawith a laser scanner.

Hexagon's multisensor approach for machine tools enables operators to use more than just one kind of measurement technology in the same machine clamping. Thanks to the unique RC-R-100 radio receiver, users can change in multiple sensors fully automatically. Beside the LS-R-4.8 laser scanner, operators can choose between various sensor options:

Dimensional measurement probes

Offset-setting, highly accurate single point measurements, standard in every machine tool, available in various versions, depending on the application.

Temperature measurement probe

Capture temperature before and after machining for best production quality

Ultrasonic measurement probes

Automated wall thickness measurements without external equipment, for dry and wet machining

m&h LS-R-4.8
Wireless Laser Scanner

Highest flexibility for multisensor applications

The LS-R-4.8 is Hexagon's wireless laser scanner for machine tools. It securely communicates via radio with the receiver RC-R-100 and can be stored in the tool magazine of the machine tool. Therefore, it can be inserted to the machine spindle automatically without manual interference, which also enables fully automated manufacturing processes. The laser scanner was specifically designed for the rough environment in the production, which is why coolant and chips fly pose no problem for this probe.

Wireless transmission

IP68 **Robust design**

Automation ready

m&h LS-C-5.8
Cable Laser Scanner

Cost-effective solution

The LS-C-5.8 is Hexagon's first laser scanner for machine tools and is capable to create laser scans with limited movement of the sensor. Due to the cabled connection, the transmission of data to the machine tool controller is always ensured. The sensor can be manually changed to the machine tool with only a couple of steps. The laser scanners proven construction was originally designed for coordinate measuring machines, but can also can handle vibrations and contamination inside the machine.

Low investment cost

Safest transmission

HxGN NC Measure | Laser scan software

The key to highly effective machine tool measurement

The NC Measure | Laser scan software is compatible with controls from Fanuc, Siemens and Heidenhain and combines market-leading functionality with an intuitive user interface. Scan paths can be programmed directly on the screen and clear colour maps or measurement reports can be created. HxGN NC Measure supports the use of 3-, 4- or 5-axis machine tools.

Intuitive, modern user interface

The software's modern and adaptive design makes it simple for users of all levels of experience to learn and deploy.

Adjustable tolerances

Immediately after measurement, the software user can display whether areas of the part are within tolerance, either by simply choosing standard tolerances or by setting their own parameters manually.

Best-fit on the machine

With captured surface data, the zero position of the part can be determined, corrected and handed over to the machine tool control.

Reporting and exporting

Depending on the requirements of users, measurement reports can be adjusted and exported in a range of data formats. Additionally, data can be exported as a 3D-model or for additional process steps in spreadsheets or statistic software.

Laser scans with use of up to five axes

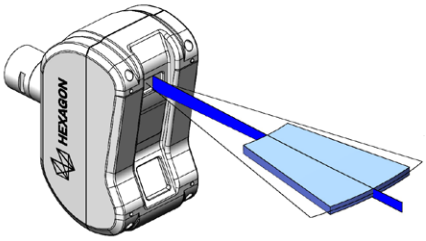
With HxGN NC Measure, users can perform measurements and laser scans with use of all five axes with only a couple of clicks. Especially when scanning a part with the laser scanners, this brings more valuable and detailed data in less time.

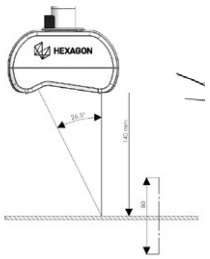
Laser triangulation

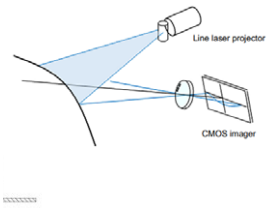
The technique behind precise laser measurement

LS-C-5.8 and LS-R-4.8 deploy laser triangulation, a tried and tested technique in metrology that delivers high levels of speed and accuracy. It involves a laser beam being projected onto the object. The reflection of the laser beam is passed through a lens and detected by an imager. With this information, the position measurement points can be determined.

All Hexagon laser scanners for coordinate measuring machines and machine tools conform to the latest ISO 10360-8:2013 standard. The measurements rely on traceable sphere and plane artefacts. Hexagon also supplies the necessary artefacts – certified by an accredited laboratory – for on-site verification of sensor results, to provide the highest confidence in optical probing.







Parameters	LS-C-5.8	LS-R-4.8
Laser class	2 (EN /IEC 60825-1: 2014)	2 (EN /IEC 60825-1: 2014)
Laser type	PL450B (laser diode)	PL450B (laser diode)
Emitted wavelength (blue)	450 nm	450 nm
Laser type	CW Laser (Continuous Wave)	CW Laser (Continuous Wave)
Data transmission	Cable	Wireless
Working distance and depth (Z) (outer housing edge to average working distance)	140 ±40 mm	115 ± 40 mm
Line width	47 mm	27,1 mm (minimum working distance) 39,2 mm (average working distance) 51,3 mm (maximum working distance)
Data rate	36,000 Pt/sec	30.000 to 36.000 Pt/sec
Sensor's insensitivity to extraneous light	5.000 lx (diffused, indirect artificial light)	5.000 lx (diffused, indirect artificial light)
Operating temperature	5 to 45 °C (41 to 113°F)	5 to 40 °C (41 to 104°F)
Temperature range for specified accuracy	15 to 40 °C (59 to 104°F)	15 to 40 °C (59 to 104°F)
Storage temperature	-25 to +70 °C (-13 to +158°F)	-25 to +70 °C (-13 to +158°F)
Weight	750g	1900 g (without batteries)
Power supply	DC 18 to 28 V, 170 to 200 mA, protected against the polarity reversal	4x 3.7V battery, 26650, Li-ion, 5000mAh
Battery lifetime	-	10 h
Protection against dust and water	IP64 (IEC 60529)	IP68 (IEC 60529)

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit hexagonmi.com.

Learn more about Hexagon (Nasdaq Stockholm: HEXA B) at hexagon.com and follow us @HexagonAB.