

LASER SCANNING SOLUTION FOR MACHINE TOOLS

GET THE BIG PICTURE QUICKLY





HEXAGON

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.

Now 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 laser scanner system rapidly captures and presents dimensional data from the entire surface of a part, enabling users to take informed decisions that enhance production and quality.

BENEFITS OF THE LS-C-5.8 SYSTEM

Creating and viewing colour maps of a clamped part

The LS-C-5.8 is able to capture up to thousand measurement points per second and is supported by software that makes information easy to digest and use. With the LS-C-5.8 solution 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.

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.

The LS-C-5.8 is 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.

CONTACTLESS MEASUREMENTS

CONTACTLESS METROLOGY PRECISION ON THE MACHINE TOOL

Increasingly manufacturers are deploying contactless sensors on CMMs and portable arms for high-speed, full data capture and to avoid damaging delicate surfaces. Now the LS-C-5.8 brings the benefits of contactless measurement to the machine tool. Based on the HP-L-5.8, which was developed for use on coordinate measuring machines, the LS-C-5.8 combines the speed of laser scanning with the precision of metrology.

Equipped with a fixed blue line sensor, the LS-C-5.8 is designed for a huge variety of applications and surface types, and delivers precise results whether measuring shiny or very dark surfaces. It combines a compact design with a large field-of-view so that it can be used to create point clouds on small machines and in environments where part accessibility is limited. And the LS-C-5.8's construction protects it against vibrations and collisions, making it ideal for use in harsh industrial environments.

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.



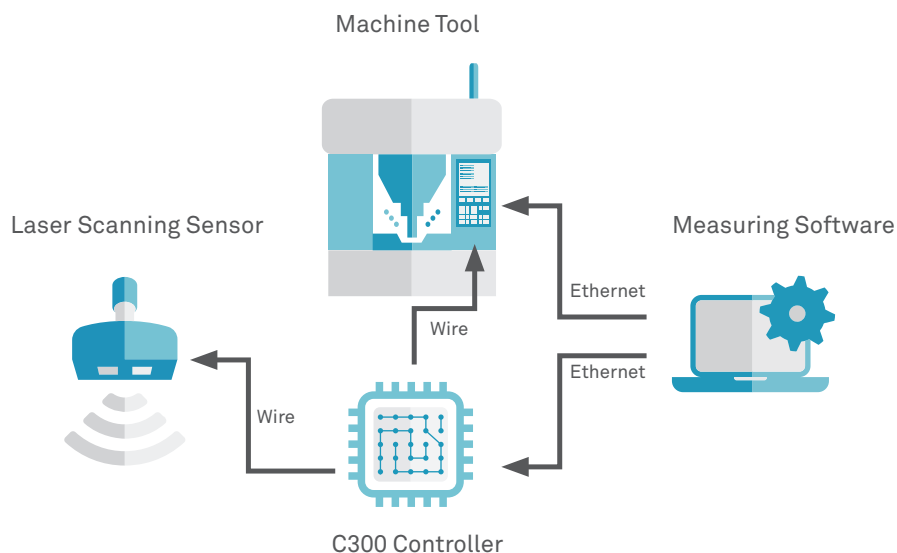
THE SUM OF GREAT PARTS

PERFECTLY MATCHED COMPONENTS

MAXIMISE PERFORMANCE

The combination of components in the LS-C-5.8 system ensure it is optimised to deliver accurate measurement results quickly.

- **Sensor**
The compact sensor was originally developed for coordinate measuring machines and its sturdy build makes it perfectly suited for use on the machine tool.
- **Tool Holder**
For maximum compatibility, Hexagon offers a wide range of standard and customised tool holders.
- **Controller**
The C300 controller provides monitoring and swift communication and coordination between software, the sensor and machines.
- **Software**
The NC Measure | Laser software is intuitive in design and functionality and addresses the specific challenges of laser measurement on a machine tool.
- **Accessories**
All necessary cables and calibration artefacts are delivered as part of the system to ensure smooth ongoing functioning from day one.

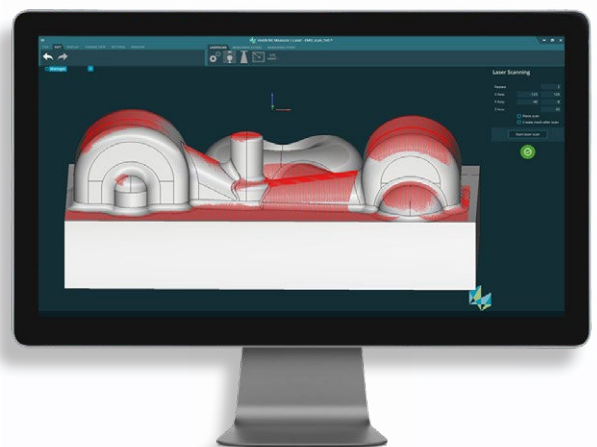


HXGN NC MEASURE | LASER SOFTWARE

THE KEY TO HIGHLY EFFECTIVE MACHINE TOOL MEASUREMENT

The NC Measure | Laser 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.

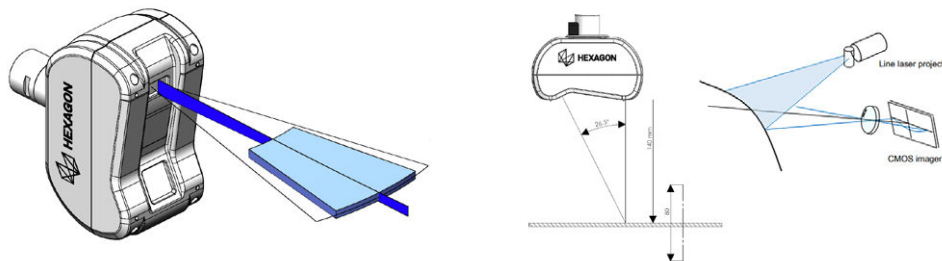
- **Intuitive, modern user interface**
The software's modern and adaptive design makes it simple for users of all levels of experience to learn and deploy.
- **Adjustable tolerances**
Immediately after measurement, the software user can display whether areas of the part are within tolerance, either by simply choosing standard tolerances or by setting their own parameters manually.
- **Best-fit on the machine**
The well-known and popular feature of Hexagon's measurement software, 3D Form Inspect, is now also available for laser scanning applications. With captured surface data, the zero position of the part can be determined, corrected and handed over to the machine tool.
- **Inherently compatible**
Hexagon offers the most flexible and modular software solutions on the market. The strength of Hexagon's software means HxGN NC Measure | Laser software forms the basis of many machine tool measurement software packages. As a result, we provide the most flexible and modular software solutions available for machine tool measurement, ensuring long term compatibility for both non-contact and tactile sensors.
- **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 TRIANGULATION

THE TECHNIQUE BEHIND PRECISE LASER MEASUREMENT

LS-C-5.8 deploys 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.



Parameters	LS-C-5.8
Laser class	2 (EN/IEC 60825-1: 2014)
Laser	Manufacturer: OSRAM Opto Semiconductors GmbH Product name: laser diode Model number: PL450B Emitted wavelength Visible blue - 450 nm Maximum average radiant power 1 mW Beam spread 24 deg CW radiation
Standoff and depth (Z)	140 ±40 mm
Lines per second	40 Hz
Daten rate	36,000 pts/sec
Ambient light a of the sensor	5.000 lx (diffused, indirect artificial light)
Operating temperature	5 to 45 °C (41 to 113°F)
Declared accuracy temperature range	15 to 40 °C (59 to 104°F)
Ambient humidity	90% non-condensing
Warm-up time for declared accuracy	30 minutes
Dimensions	116 mm × 62 mm × 128.5 mm (108.5 mm) (4.57" × 2.44" × 5.06" (4.27"))
Weight	750 g
Power supply	DC 18 to 28 V, 170 to 200 mA, protected against the polarity reversal
Protection against dust and water	IP64 (IEC 60529)
Storage temperature	-25 to +70 °C (-13 to +158°F)



LASER RADIATION
DO NOT LOOK INTO THE BEAM
CLASS 2 LASER PRODUCT
620-690 nm / 1 mW cw
applied standard: IEC 60825-1:2014



HEXAGON
MANUFACTURING INTELLIGENCE

Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting – the collection, analysis and active use of measurement data – gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality.

Through a network of local service centres, production facilities and commercial operations across five continents, we are shaping smart change in manufacturing to build a world where quality drives productivity. For more information, visit [HexagonMI.com](https://www.hexagonmi.com).

Hexagon Manufacturing Intelligence is part of Hexagon (Nasdaq Stockholm: HEXA B; [hexagon.com](https://www.hexagon.com)), a leading global provider of information technologies that drive quality and productivity across geospatial and industrial enterprise applications.



COORDINATE MEASURING MACHINES



3D LASER SCANNING



SENSORS



PORTABLE MEASURING ARMS



SERVICES



LASER TRACKERS & STATIONS



MULTISENSOR & OPTICAL SYSTEMS



WHITE LIGHT SCANNERS



METROLOGY SOFTWARE SOLUTIONS



CAD / CAM



STATISTICAL PROCESS CONTROL



AUTOMATED APPLICATIONS



MICROMETERS, CALIPERS AND GAUGES



DESIGN AND COSTING SOFTWARE