



CMM laser scanning



3D LASER SCANNER LC15Dx



LC15Dx laser scanner

Manufacturers gain a better appreciation of the dimensional quality of their products without compromising on cycle times. A wider variety of parts, geometry and materials can be measured more effectively, including many parts too small or fragile for a touch probe.

BENEFITS

Closing the accuracy gap

An LC15Dx is a viable alternative to a tactile probe for high precision CMM applications. The smallest part details can be captured with best-in-class accuracy. Thanks to solid state laser scanner technology and an innovative calibration method, the LC15Dx is closing the gap between laser scanning and tactile probing, achieving accuracies to within microns. Unlike a tactile probe, however, the scanner uses non-contact 3D laser triangulation to measure the surface directly and eliminate probe compensation errors. Full thermal compensation means the maximum accuracy is achieved as soon as the scanner is powered on.

Versatile scanning without the hassle

Nikon's unique ESP3 technology intelligently adapts the laser settings for each measured point in real time. A wider range and mix of surface materials, finishes, colors and transitions can be measured more efficiently without user interaction, manual tuning and part spraying, including small and fragile parts. Unwanted reflections are neutralized by an advanced software filter while changes in ambient light are absorbed by a high-grade daylight filter.

Better appreciation of product quality

The entire part is checked to the CAD model and any areas of concern can immediately be highlighted on a color map, thus providing a complete 3D visualization of dimensional quality. Further investigation and analysis is possible using fly-outs, sections and a library of Geometric Dimensioning and Tolerancing (GD&T). Inspection reports can be as simple or complex as required with follow-on reports fully automated.



Closing the gap with tactile probe accuracy



AUTOJOINT CONNECTION
Automatic and repeatable probe change

ESP3
Automatic laser settings

THERMAL STABILIZER
Zero warm-up

REFLECTION FILTER
Neutralizes unwanted reflections

DAYLIGHT FILTER
Absorbs ambient light

FULLY INTEGRATED
Laser signal routed via probe interface

STATUS LEDs
Laser diagnostics and status

RANGE FINDER
User guide for manual operation

HIGH QUALITY NIKON LENS
Improves accuracy and data quality

EYE SAFE LASER
Class 2 visible light laser

FEATURE INSPECTION
Feature measurement and GD&T analysis

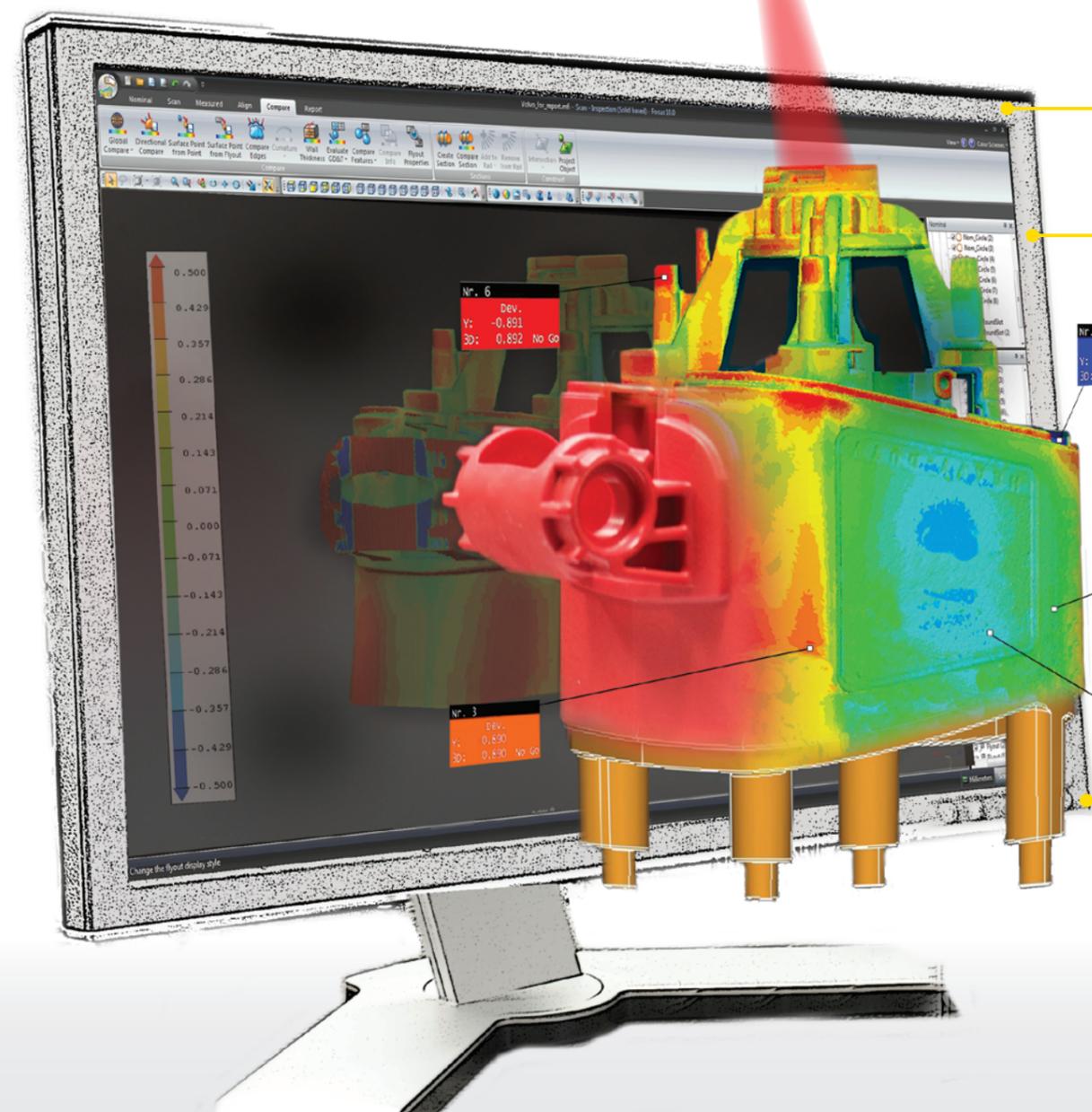
SECTIONS AND PROFILES
2D section and profile analysis

DIGITAL COPY
Inspection on digital copy of actual part

MULTI-SENSOR
Combine measurements from different sensor types

COLOR MAP
Easy interpretation of measurement results

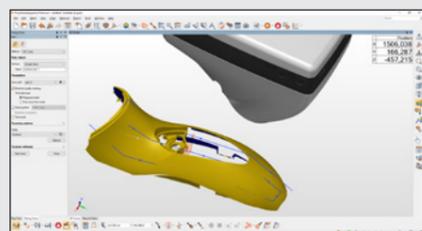
CAD PROGRAMMING
Simple programming of measurement and analysis routines



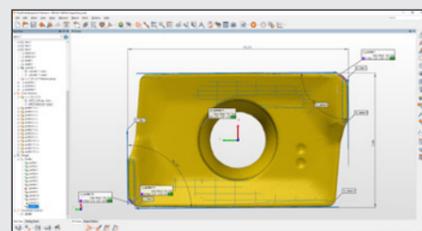
SOFTWARE

Intuitive software for every application

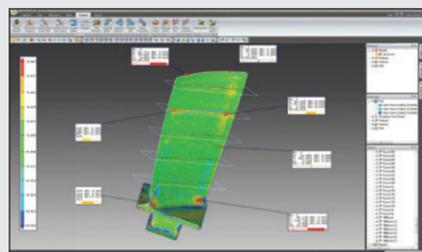
A selection of popular software packages for measurement, analysis and reporting is available for the LC15Dx, including Nikon Metrology's own FOCUS software.



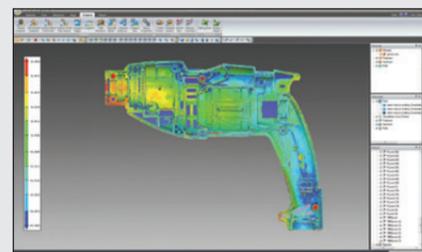
Intuitive programming and offline simulation reduce preparation time



Fast and easy inspection of geometric dimensions



Blade section analysis combined with full 3D comparison



3D visualization of dimensional quality

Multi-sensor applications

COMBINE LASER SCANNING WITH A TACTILE PROBE

In some cases a single sensor technology is insufficient for measuring all of the features. The LC15Dx can be combined with an optional tactile probe to create a versatile multi-sensor CMM.

Depending on the application both technologies can be used individually or sequentially in the same inspection program. Fully automatic sensor changing is possible with the addition of an optional change and storage rack mounted on the table of the CMM.



HIGH PRECISION PARTS AND SMALL GEOMETRY

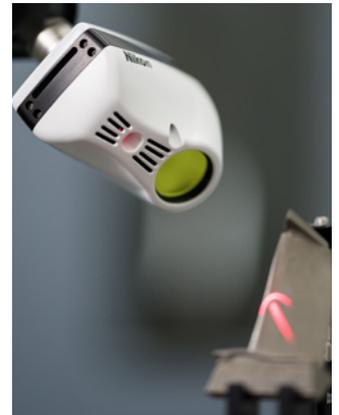
The LC15Dx provides significant benefits for a wide variety of high precision parts and geometry, including those with small details, semi-rigid parts and components made from demanding materials.



Precision molding
Measure small, soft and fragile parts



Medical implants
Inspect complex freeform geometry



Turbine blades
Eliminate probe tip compensation errors

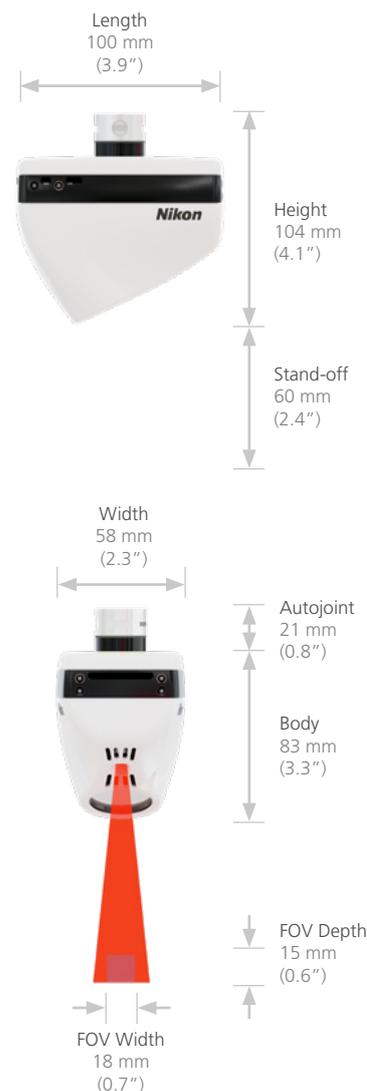
ENHANCE THE CAPABILITY OF YOUR CURRENT CMM

Retrofitting your current CMM with an LC15Dx is a cost-effective solution. The scanner integrates with the existing CMM controller hardware and compatible probe system to provide a versatile, multi-sensor CMM offering both non-contact and touch probe inspection.

LC15Dx retrofit kits are available for the most common CMM controller systems. Contact Nikon for details on exact versions of the controllers.

Specifications

Probing error (MPE_p)¹	1.9 µm (0.000075")
Ball bar length (MPE_E)²	A+4 µm +L/350 mm (A+0.00016 +L/13.78")
Multi-stylus test (MPE_{AL})³	3.9 µm (0.00015")
ISO Probing form error⁴	7 µm (0.00027")
ISO Probing size error all⁵	10 µm (0.000591")
ISO Probing dispersion value⁶	7.6 µm (0.000299")
ISO Cone angle⁷	125°
Scanning speed (approx.)	70,000 points/sec
Resolution (point spacing)	22 µm (0.00087")
Points per line (approx.)	900
Measuring temperature range	18-22°C (64.4-71.6° F)
Operating temperature range	10-40°C (50-104° F)
Weight	370 g (0.82 lbs)
Ingress protection	IP30
Laser safety	Class 2
Enhanced Scanner Performance	ESP3
Daylight filter	Yes
Connector type	Renishaw Autojoint



All accuracy specifications valid for a CMM with an accuracy of 2µm + L/350 or better using manufacturer supplied test sphere

¹ Nikon Metrology test comparable to EN/ISO 10360-2 MPE_p using 1σ sphere fit.

² Nikon Metrology test comparable to EN/ISO 10360-2 MPE_E where A is equal to the CMM MPEE first term value.

³ Nikon Metrology test comparable to EN/ISO 10360-5 MPE_{AL}

Accuracy specifications according to ISO 10360-8:2013:

⁴ P_{Form.Sph.1x25-Tr.ODS,MPE} : "Maximum probing form error" using 25 representative points in translatory scanning mode

⁵ P_{Size.Sph.All-Tr.ODS,MPE} : "Maximum probing size error using All" measured points in translatory scanning mode

⁶ P_{Form.Sph.D95%-Tr.ODS,MPL} : "Maximum probing dispersion value" using 95% of the measured points in translatory scanning mode

⁷ Cone angle : Region of sphere on which the measured points are selected

LC15Dx

Closing the gap with touch probe accuracy



LASER RADIATION
DO NOT STARE INTO THE BEAM
CLASS 2 LASER PRODUCT
Max output = 4.9 mW 660 nm
1.0 mW 635 nm
IEC 60825-1 Edition 3.0 2014
Read instruction manual before use

Complies with 21 CFR 1040.10 and 1040.11, Laser Notice No. 56 dated May 8, 2019

Due to the diverging beam, viewing the laser output with optical instruments (for example, eye loupes, magnifiers and microscopes) within a distance of 100 mm may pose an eye hazard.



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