



LC15Dx

High accuracy with high resolution



LC15Dx LASER SCANNER

The LC15Dx is a viable alternative to a tactile probe for an increasing number of high precision CMM applications. 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

Thanks to the latest laser scanner technology the LC15Dx is closing the gap between laser scanner and tactile probe accuracy. In tests comparable to ISO 10360-2 MPE_P and ISO 10360-5 MPE_{AL} the LC15Dx achieved the accuracy associated with using a CMM and tactile probe. However, unlike a tactile probe, the LC15Dx uses non-contact 3D laser triangulation to measure the surface directly and eliminate probe compensation errors. The uncertainty and delay caused when a laser scanner is used before it has reached operating temperature, has been eliminated by a thermal stabilizer mounted inside the scanner body.

Versatile scanning without the hassle

Nikons 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 neutralised by an advanced software filter while changes in ambient light are absorbed by a high grade daylight filter.

SOFTWARE

Intuitive software for every application

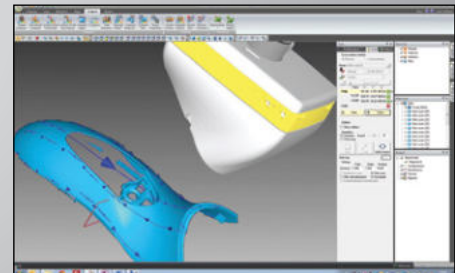
A selection of popular software packages for part-to-CAD and feature inspection are available for the LC15Dx, including FOCUS and CAMIO.

Key features include:

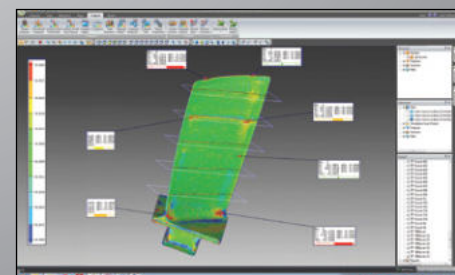
- CAD programming
- Best-fit alignment
- Part to CAD comparison
- Feature inspection
- Blade analysis
- Color reporting
- Multi-sensor CMM
- Offline programming
- Point cloud management
- GD&T library
- Teach & Learn programming
- Full simulation

Better appreciation of product quality

Global Compare provides a complete 3D visualization of dimensional quality. The entire part is checked to the CAD model and any areas of concern are immediately highlighted using Color Mapping. 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.



Intuitive programming and offline simulation reduces preparation time

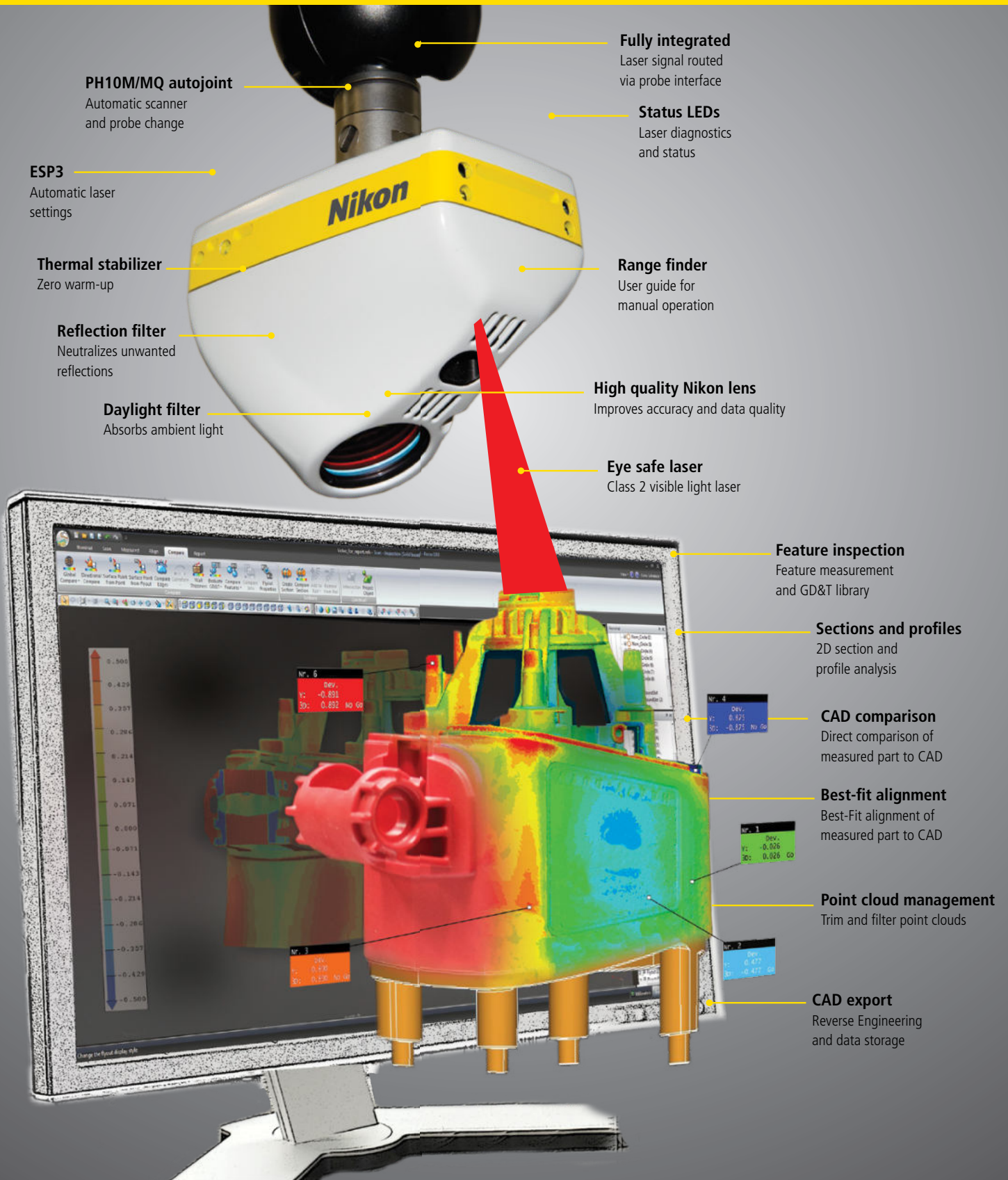


Blade section analysis combined with full 3D comparison



3D visualization of dimensional quality

CLOSING THE GAP WITH TACTILE PROBE ACCURACY



PH10M/MQ autojoint

Automatic scanner and probe change

Fully integrated

Laser signal routed via probe interface

Status LEDs

Laser diagnostics and status

ESP3

Automatic laser settings

Thermal stabilizer

Zero warm-up

Range finder

User guide for manual operation

Reflection filter

Neutralizes unwanted reflections

High quality Nikon lens

Improves accuracy and data quality

Daylight filter

Absorbs ambient light

Eye safe laser

Class 2 visible light laser

Feature inspection

Feature measurement and GD&T library

Sections and profiles

2D section and profile analysis

CAD comparison

Direct comparison of measured part to CAD

Best-fit alignment

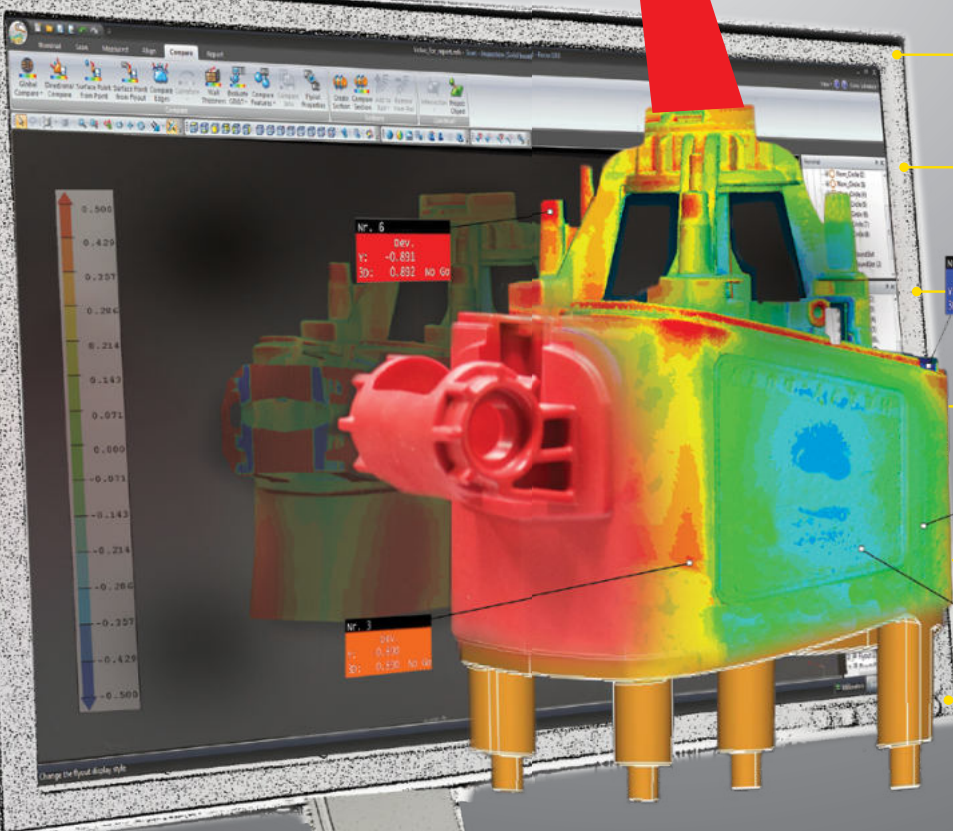
Best-Fit alignment of measured part to CAD

Point cloud management

Trim and filter point clouds

CAD export

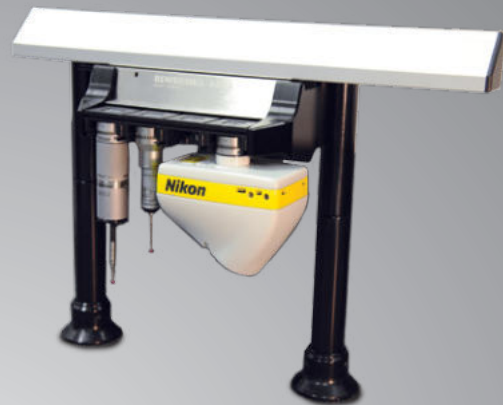
Reverse Engineering and data storage



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 independently or together in the same inspection program. Fully automatic sensor changing is possible with the addition of an optional change and storage rack which is 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 small details, semi-rigid parts and the more demanding materials:

PROCESS

PRODUCTION - R&D - REVERSE ENGINEERING

METHOD

MACHINED - MOULDED - STAMPED - CAST - FORGED

MATERIAL

METAL - PLASTIC - RUBBER - CLAY - CERAMIC - COMPOSITES

FINISH

MACHINE - POLISHED - PLATED - PAINT - MIXED COLORS

STRUCTURE

RIDGED - SOFT - FLEXIBLE - FRAGILE

FEATURE

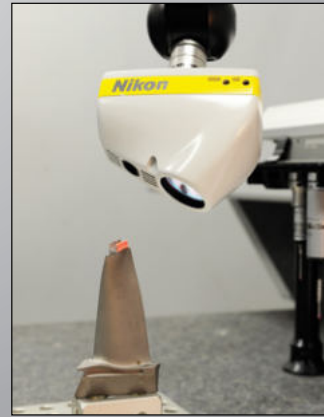
SURFACE - GEOMETRIC FEATURE - PROFILE - SECTION



Precision moulding
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 retrofit 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.

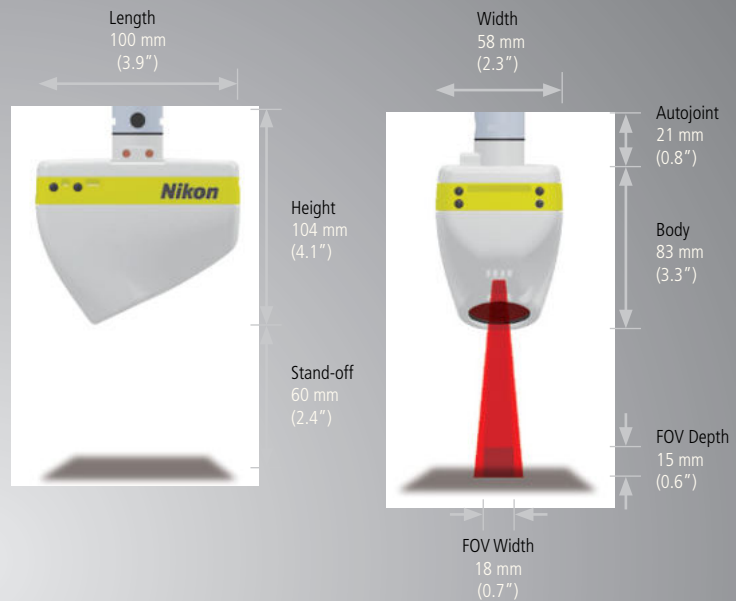
LC15Dx retrofit kits are available for the following CMM controller systems.

- Aberlink
- Deva
- Coord3
- Dukin
- LK
- Hexagon DEA
- Hexagon Brown & Sharpe
- Hexagon Sheffield
- Mitutoyo
- Mora
- Renishaw
- Wenzel
- Werth
- Zeiss

Contact Nikon for details on exact versions of the controllers

MULTI-SENSOR APPLICATIONS

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 error ⁴	7 µm (0.00027")
ISO Probing size error all ⁵	15 µm (0.000591")
ISO Probing dispersion value ⁶	7,6 µm (0.000299")
ISO Cone angle ⁷	100°
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
Probe head compatibility	PH10M, PH10MQ, CW43, PHS



LASER RADIATION
DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
CLASS 2 LASER PRODUCT
 Max output = 4.8 mW & 8.0 µJ
 660 & 635nm
 IEC 60825-1 Edition 2.0 2007-03
 Read instruction manual before use

Complies with 21 CFR 1040.10 and 1040.11,
 Laser Notice No. 50, dated June 24, 2007
 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.

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

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 measure points in translatory scanning mode

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

