NIKON METROLOGY SOLUTIONS

CMM LASER SCANNING

HANDHELD LASER SCANNING

ROBOTIZED LASER SCANNING

X-RAY AND CT INSPECTION

VISION MEASURING INSTRUMENTS

MEASURING/INDUSTRIAL MICROSCOPES

LARGE SCALE METROLOGY

CNC AND PORTABLE CMMS

METROLOGY SOFTWARE

METROLOGY SERVICES

NIKON HN-6060

Fast, non-contact inspection
of complex shapes
with tactile accuracy

NIKON METROLOGY SOLUTIONS

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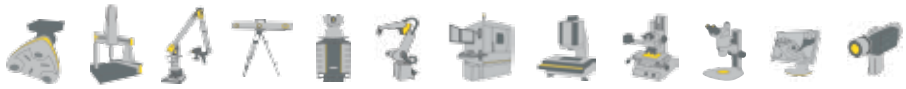


Revolutionizing dimensional quality control

Nikon Metrology uniquely blends the innovation of Metris' non-contact measuring technologies with the optical excellence of Nikon's industrial measurement solutions. As the combined product portfolio ensures fast (sub)micron measurement of the inner and outer geometry of parts, Nikon Metrology solutions are being adopted by world-class manufacturers active in automotive, aerospace, electronics, medical, shipbuilding, cosmetics, general manufacturing and other industries.

A digital inspection process reduces time to market and cuts development costs

Manufacturing companies implementing a digital development process are more successful in reducing time to market and cutting development costs. As dimensional quality control provides the touch with reality, it is a critical factor throughout the different stages of this digital process.

Nikon Metrology's innovations in laser scanning technology and point cloud software are key enablers of the **Digital Inspection Process.** Compared to inspecting directly on the physical part, "Digital Inspection" first digitizes the part and subsequently runs inspection on the acquired digital data. As a result, the Digital Inspection Process – from measurement preparation to final report – takes advantage of the typical automation capabilities and flexibility benefits of a digital approach, saving time and money at the end of the day. As the complete digital copy of the specimen remains available, full flexibility is offered to run other or more detailed analysis at any time and place.

Tracing tiny imperfections and hidden defects using cutting-edge optical and X-ray/CT technology

Gaining a deeper **Insight into the Inside** is crucial for small and complex components because many critical features cannot be accessed by touch probes or seen by optical sensors. For these challenging inspection tasks, Nikon Metrology offers a broad range of X-ray and Computed Tomography solutions that allow for non-destructive inspection of a wide range of products, including loaded printed circuit boards (PCBs), plastic components, castings, innovative materials, medical and consumer goods, and archeological findings.

Precision metrology instruments from Nikon ensure the finest **Quality Assurance** throughout production. Founded on Nikon's optical excellence, video measuring systems, measuring microscopes and optical comparators offer submicron accuracy for measuring even the smallest of work pieces. Supporting multi-sensor capability, submicron accuracy and inspection automation, Nikon Metrology instruments can measure an unbelievable variety of parts, including complex 3D pieces and IC packages, dies, moulds and wafer carriers as well as flat panels, shadow masks and etching sheets for lead frames.

Metrology Assisted Production for first-time-right manufacturing

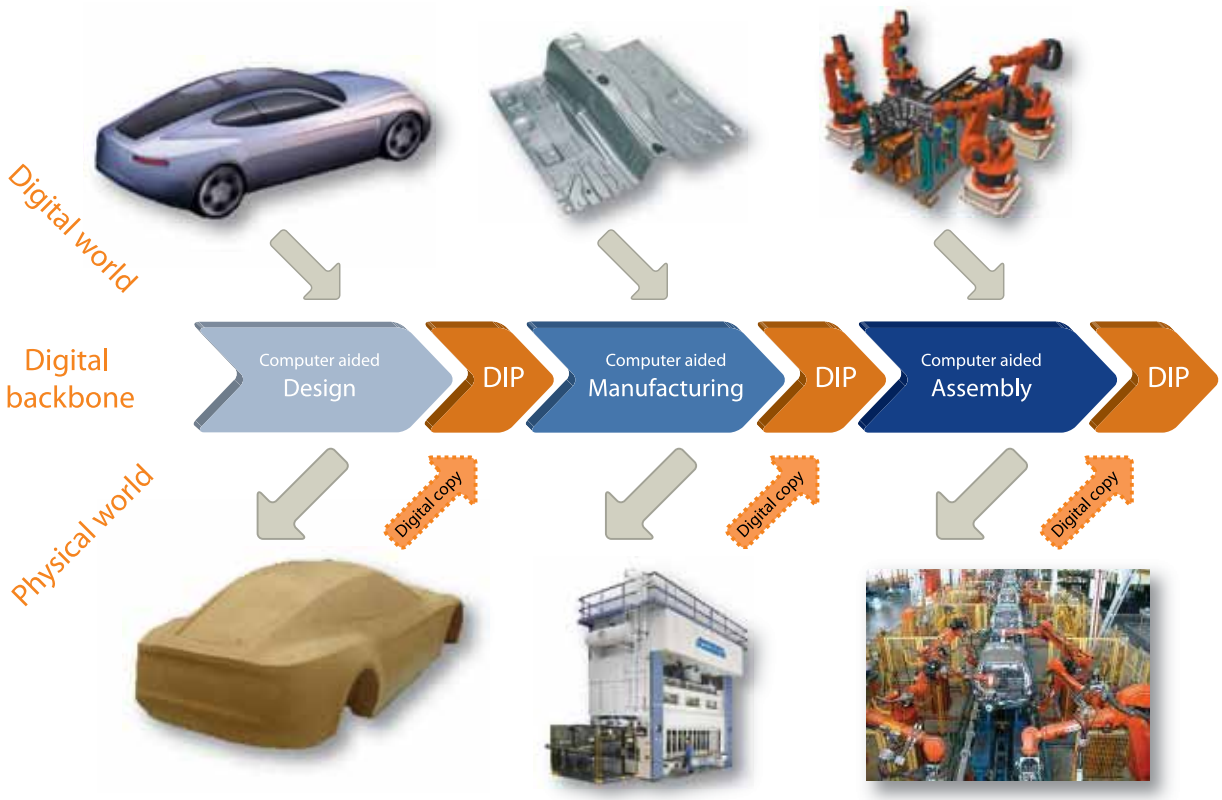
As large components are often very expensive because they are produced in small quantities, first-time-right production is the only valid approach. In a **Metrology Assisted Production** environment, accurate on-line geometry data is fed back into the process to consistently increase the precision and speed of manufacturing. Innovative large-scale metrology solutions position and track parts while they are being assembled. Alternatively, metrology data can be used to calibrate industrial robots, or drive a closed-loop feedback loop to firmly increase positional robot accuracy. Leading automotive, aerospace and other manufacturing companies rely on Metrology Assisted Production solutions from Nikon Metrology to produce higher-quality products and realize production cost and throughput time savings.

Uniquely positioned to deliver total metrology solutions

Next to the innovative non-contact metrology technologies, Nikon Metrology offers a broad range of **Traditional Metrology Solutions** such as CNC and portable CMM. With this complete product and service offering for the micro metrology market, Nikon Metrology is uniquely positioned to deliver total solutions. Its successful strategy turned this company into a leading metrology player and a one-stop-metrology-shop providing a broad range of fully integrated metrology solutions. In addition, Nikon Metrology customers benefit from a single after-sales services organization that delivers true economic value.

Metrology innovations, a complete solution portfolio and excellent service are what make Nikon Metrology unique in the worldwide micro metrology market.

DIGITAL INSPECTION PROCESS



Nikon Metrology laser scanning and point cloud solutions are key enablers of the Digital Inspection Process (DIP). Digital copies of prototypes, components and assemblies feed real-world information into today's digital design-through-manufacturing process.

POINT CLOUD PROCESSING

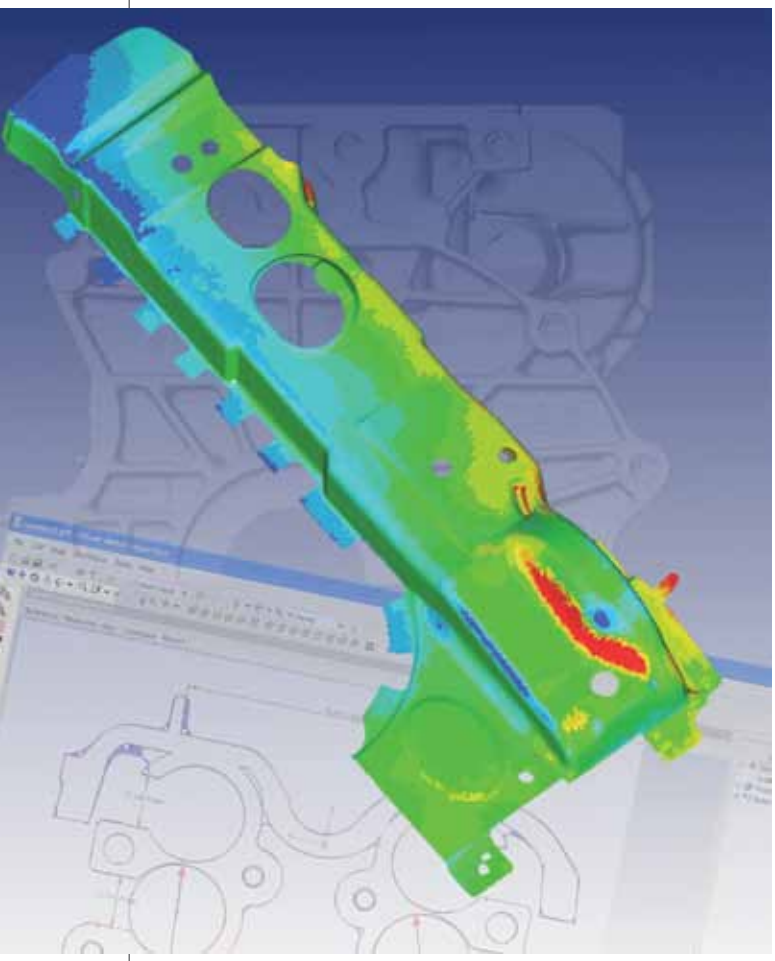
CMM LASER SCANNING

HANDHELD LASER SCANNING

ROBOTIZED LASER SCANNING

Focus point cloud software

Focus Inspection – The reference for point cloud processing



Focus Inspection is today's reference for point cloud inspection. The software offers stunning performance, an intuitive user-interface, and standard macro functionality to automate the entire inspection process.

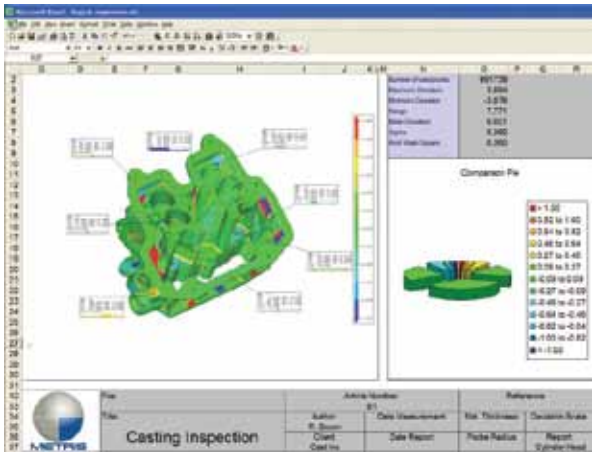
Focus Inspection provides feature and full part-to-CAD 3D inspection, starting from point cloud data or meshes from CMM scanners, handheld scanners or Computed Tomography (CT). Focus Inspection visualizes inspection results in easy-to-interpret, interactive graphics and reports.

Features

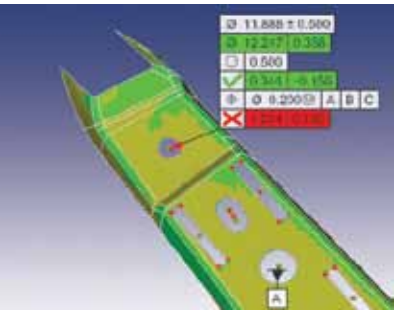
- Superior point clouding handling
  - Up to 100 million points
  - Powerful and automated feature detection algorithms
- Full inspection toolbox
  - Full part comparison to CAD or STL
  - Complete set of 2D and 3D features
  - GD&T (Geometric Dimensioning & Tolerancing)
  - Wall thickness, flush & gap, and directional comparison
- Flexible reporting and data sharing
- All inspection functions fully automatable
- Dedicated inspection modules (e.g. Turbine Blade Inspection)

Benefits

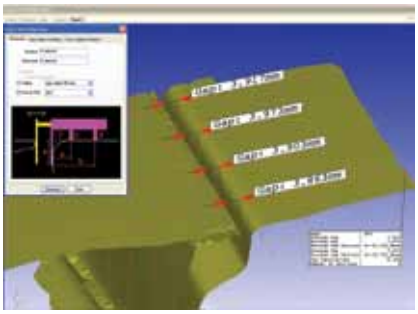
- High productivity and data processing consistency with minimum effort
- Operator-independent results with accurate feature detection algorithms
- Designed for industrial use by operators and engineers
- Inspection automation without requiring programming skills
- Easy-to-interpret and interactive reporting to facilitate decision making



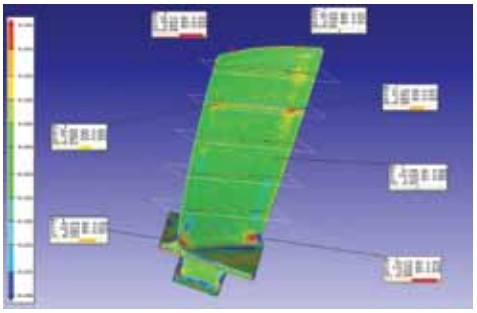
Color map reports clearly indicate local geometry deviations



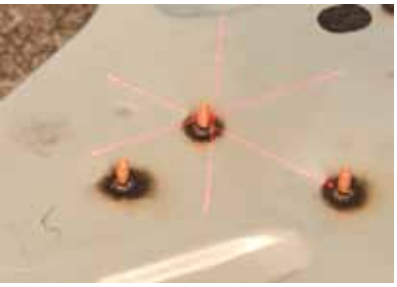
Geometric dimensioning & tolerancing (GD&T)



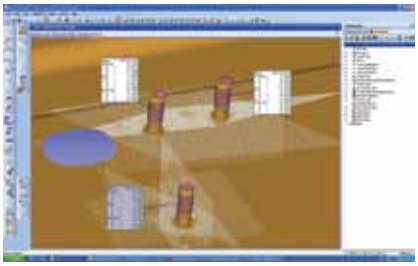
Gap & flush analysis



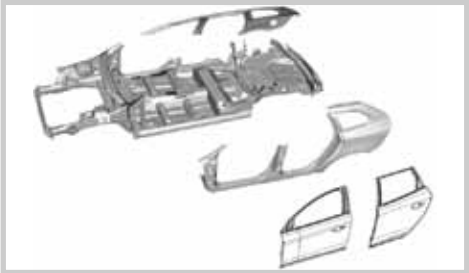
Turbine blade inspection



Inspection of features in automotive applications...



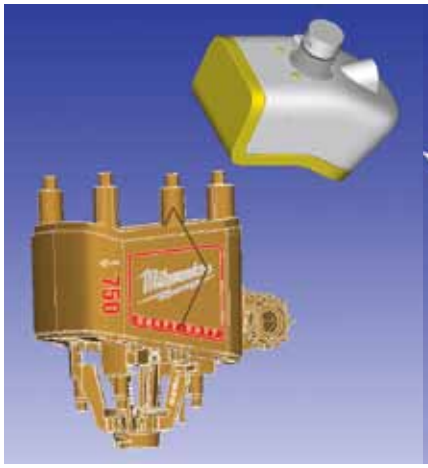
...are readily compared to CAD in Focus Inspection



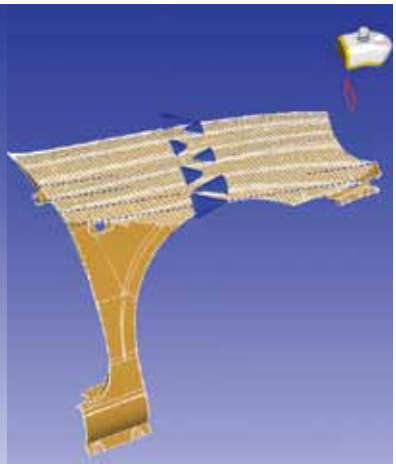
Virtual assembly allows measured and CAD models to be built together to predict mating conflicts

Focus Scan – Fast, easy and accurate data capture for CMM laser scanning

Focus Scan is the driver software for Nikon Metrology laser scanner integrations on CMMs. It provides off-line and on-line scanner path definition, and acquires and pre-processes the raw point cloud data. The software is fully integrated with Focus Inspection, Reverse Engineering and Automation. Focus Scan's off-line module enables users to create, modify and prove out part programs using 3D CAD models, allowing CMMs to be used exclusively for measurement.



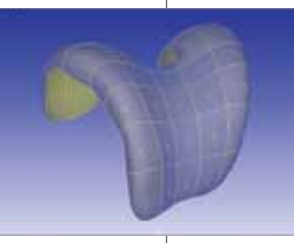
Besides requiring simpler scanner motion paths, automatic scan path programming further reduces measurement preparation time.

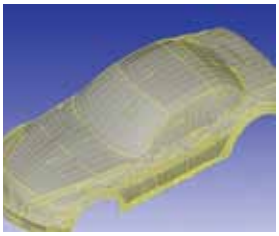


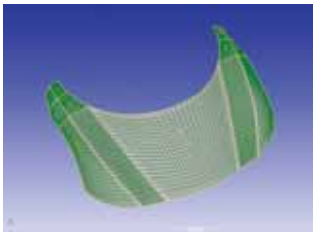
A breakthrough in validating scan macros is the new point spray feature that simulates a point cloud as if the part is measured on the CMM.

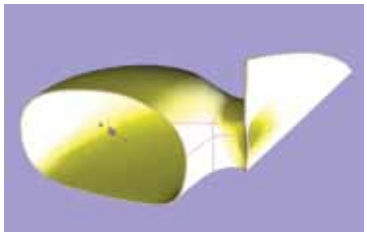
Focus RE Basics - Straightforward reverse engineering

Focus RE Basics quickly creates CAD surface models from individual point clouds using a straightforward workflow. Reverse engineering is typically applied when original CAD data is missing, to create CAD from handmade clay models, to update designs, or as input for rapid prototyping of freeform parts and products.









LC60Dx/LC50Cx/LC15 Line scanners

Digital laser scanning boosts inspection performance

The all-digital LC60Dx brings laser scanner in the accuracy range of tactile measurement, while offering the advantage of capturing a multitude of measurement points. Equipped with state-of-the-art CMOS technology and powerful on-board data processing, the LC60Dx scanner more than triples today's common scan rates. This enables manufacturers to drastically reduce the inspection cycle time for freeform parts, or boost the number of features that can be scanned in the same time frame.

The LC50Cx laser scanner offers an adequate productivity with its 50mm stripe width and scanning rate of 45 stripes per second. And LC15, with its smaller field of view perfectly suits digitizing small or detailed objects with higher point density and tighter tolerances.

To effectively scan surfaces with varying color or high reflectivity, LC60Dx and LC50Cx provide automatic real-time adjustment of sensor settings for each individual point of the laser stripe.

Features

- Laser stripe width of 60mm (LC60Dx), 50mm (LC50Cx) or 15mm (LC15)
- Accuracy of 9µm (LC60Dx), 19µm (LC50Cx) and 4µm (LC15) in multi-stylus test comparable to EN/ISO 10360-5 MPE_{AL}
- Enhanced Sensor Performance (ESP3) incorporates dynamic point-per-point adaptation of laser source intensity.
- Scanning rate 75,000 (37,500) points/sec for LC60Dx (LC50Cx)
- Fully compatible with Renishaw PH10M(Q) and automatic change racks (ACR)
- Data collection over multi-wire is integrated into most CMM brands and types
- Designed for minimum warm-up time and maximum operational stability and robustness

LC60Dx

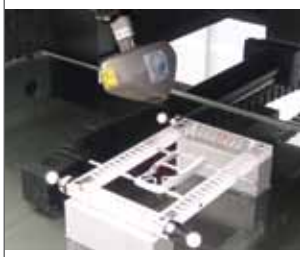
LC50Cx

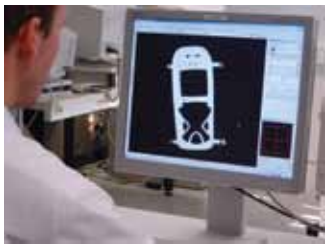
Applications

Inspection and reverse engineering of mobile phones, turbine blades, tools, castings, dies, sheet metal parts, plastics, etc.

Related solutions

- Bridge, horizontal arm and gantry CMMs
- Focus point cloud software, Inspection and Reverse Engineering software
- Camio multi-sensor CMM software





Detailed analysis of mobile phone cover using LC15

BENEFITS OF CMM-BASED LASER

- Simplified measurement and processing setup
  - Teach scan paths or indicate scan area on CAD
  - Import feature properties and GD&T information directly from CAD
  - Macro functionality for fully automated scanning and inspection
- Reduced measurement time
  - Reduction of probe head movements
  - XC65D(-LS) scanner captures full feature information in a single movement

XC65D(-LS) Cross Scanner

Full 3D capture of complex features and surfaces

Incorporating 3 lasers in a cross pattern, the XC65D captures all full 3D details of features, edges, pockets, ribs and freeform surfaces in a single scan. By digitizing complex features from 3 sides, the Cross Scanner acquires the complete 3D geometry of the features, driving the accurate extraction of positions and dimensions.

The Cross Scanner's entirely digital operation boosts scanning frequency and drives intelligent laser intensity adaptation to scan any surface without user interaction.

Features

- Cross-pattern of 3 lasers to obtain full 3D view in one scan
- Drastically reduces time-consuming probe head indexing and eliminates C-axis
- Fast digital scanner operation including high-speed CMOS camera technology
- XC65D-LS longer stand-off variant for optimum capture of deep pockets and slots
- Accuracy 9µm (XC65D) and 12µm (XC65D-LS)

The XC65D is the scanner of choice for sheet metal, plastics and composites inspection applications.

Applications

- Inspection sheet metal features (slots, holes, etc.)
- Inspection of castings and complex surfaces
- Feature inspection
- Gap & flush inspection

The scanner's high field of view depth results in major time savings when inspecting automotive cast parts.

SCANNING

- Unique capability to measure freeform and fragile surfaces
  - Detailed description of freeform surfaces in short time interval
  - Non-contact measurement eliminates the need to touch fragile and delicate parts
  - Powerful reporting with colored CAD deviation maps
  - Input for reverse engineering, rapid prototyping, finite element calculations, and digital archiving

HN-6060 Multi-sensor metrology system

Fast, non-contact inspection of complex shapes with tactile accuracy

The HN-6060 multi-sensor 3D metrology system makes automatic non-contact shape measurement of complex components a reality. Equipped with a newly developed high-speed laser scanner, the HN-6060 is suited to perform high-precision inspection of shapes even with glossy surfaces or without no surface texture. A vision sensor with built-in TTL laser AF (with proven performance in Nikon's NEXIV VMR series CNC Video Measuring System) and touch probe complete the multi-sensor system.

With its advanced laser scanner, 5-axis synchronized hardware control and ultra-stiff design combined with powerful processing software, the HN-6060 sets new standards for ultra-precise and fast inspection of complex shapes including gear teeth, turbine blades, appliance housings and many more.

Benefits

- High precision results with non-contact measurement
- Easy preparation and operation
- Fast, automated scanning and inspection
- High stability due to rigid 5-axis hardware
- Multi-sensors cover a wide application range
- Seamless integration with dedicated measurement software

Applications

Surface shape inspection (part-to-CAD comparison) and reverse engineering of:

- Aerospace instruments (turbine blades)
- Complex automotive parts (e.g. gears)
- Machined components
- Molded parts
- Medical devices (artificial joints)

etc.

Related solutions

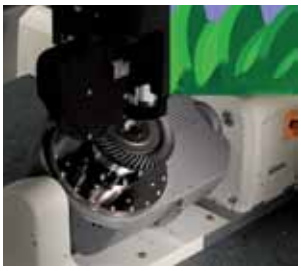
- Focus Inspection for advanced Part-to-CAD comparison and creation of detailed reports

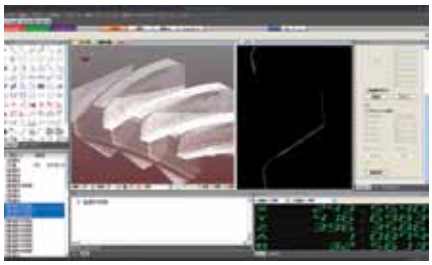
Features

- High precision point clouds at a rate of 120,000 points/sec
- Achieves 5µm of maximum permissive error for non-contact probing
- True multi-sensor system featuring high-accuracy laser scanner, vision Shape-From-Form (SFF) sensor and tactile probe
- Scanning of dark components or shapes with glossy surfaces without special part preparation (such as applying powder)
- Five-axis synchronized hardware control for high-precision metrology
  - Three-axis orthogonal system driven by linear motors
  - Two-axis rotary table allows better reachability and optimized scanner orientation
- Fixed viewpoint five-axis operation control for easy acquisition of surface point clouds
- Collision detection and measurement simulation mode

Software

- HN Metrology 3D software is based on the proven dimensional inspection software for Nikon NEXIV VMR series
- Integrates a whole range of tasks, including
  - Touch probe and image-processing measurement
  - Acquisition of point clouds using light section and SFF sensors
  - Part-to-CAD model for deviation comparison





ModelMaker MMDx/MMCx

Intuitive scanning and one-click analysis

The ModelMaker handheld laser scanners are ideally suited for portable 3D inspection and reverse engineering applications. MMDx camera technology is a major leap forward in 3D laser scanning, as it introduces high frame rate and a large stripe width up to 200mm for ultra-productive scanning. MMDx/MMCx incorporates Enhanced Sensor Performance (ESP3) to scan all sample materials and surface finishes in a single move.

The digital camera benefits from a true non-interpolated resolution of more than a thousand points per stripe, providing optimum resolution for efficient scanning of freeform surfaces and features. ModelMaker is compatible with MCA and MCAII series and many 3rd party articulated arms in addition to the K-Series Optical CMM system.

Features

- Multiple stripe widths available from 50 to 200mm
- Accuracy down to 10µm (1σ)
- Enhanced Sensor Performance for scanning materials with varying surface materials and reflectivity
- Out-of-the-box scanning with direct plug into PC
- Focus software for handheld 3D laser scanning
  - Real-time rendered scan visualization
  - Localizer-driven scanning menu
  - Mesh creation and processing
  - Part-to-CAD comparison

Applications

- Part-to-CAD inspection
- Inspection of geometric features
- Gap & flush inspection
- Reverse engineering – from concept studio clay to class A surfaces
- Input for rapid prototyping

Benefits

- Ergonomic solution thanks to lightweight housing and full scanner control at your fingertips
- Superior scanning accuracy for freeform and feature inspection
- High scanning throughput through fast digital data capture
- Robust design for use under all shopfloor conditions

Related solutions

- MCA II articulated measuring arms
- K-Series Optical CMM
- Focus point cloud processing software

MMDx scanner is available in 50/100/200mm stripe width and MMCx features a 80/160mm stripe width

K-Scan MMDx

Walk-around scanning in large work volumes

K-Scan MMDx is a handheld walk-around laser scanner for portable metrology applications in a large work volume. Continuous and precise probe tracking through the system's Optical CMM and 20 infrared markers integrated into the laser scanner device eliminate all mechanical constraints for effortless scanning.

Accurate performance and superior ergonomics make K-Scan MMDx a user-friendly handheld scanning solution. K-Scan MMDx is the ideal tool for accurate part-to-CAD inspection and productive reverse engineering of large components. Dynamic referencing guarantees consistent measurement results even when the camera or the measurement object moves during scanning.

Features

- Measuring volume of 17m^3 expandable by adding more cameras
- Stripe width between 100 to 200mm (depending on the selected scanner type)
- Lightweight carbon fiber probe design
- Dynamic referencing to measure instable or moving parts
- SpaceProbe available for tactile measurements

Benefits

- Measure anywhere
- Effortless handling through probe tracking and ergonomic design
- High scanning throughput and superior accuracy
- Multi-camera setup enlarges work volume to capture complete car or truck

Applications

- Full surface and feature inspection of larger parts
- Flush & gap inspection
- On-site troubleshooting
- Solving assembly problems

Related solutions

- K-Series Optical CMM
- SpaceProbe
- Focus point cloud processing software

K-Series Optical CMM

Through triangulation, K-Series' linear CCD cameras dynamically measure the position of infrared markers integrated into the ergonomic handheld ModelMaker laser scanner or SpaceProbe device.

X-RAY AND CT INSPECTION

Get the inside picture of complex electronics or industrial parts, by literally looking into the internal structure. Then use CT capability to qualify and quantify any inner or outer dimension, all in a smooth, non-destructive process.

XT H 225 INDUSTRIAL CT SCANNING

XT H 450 HIGH-POWER CT SCANNING

XT V 130 ELECTRONICS X-RAY INSPECTION

XT V 160 ELECTRONICS X-RAY INSPECTION

XT H 225 industrial CT scanning

Full inner and outer inspection of industrial components

Detailed capture and measurement of internal component and assembly features is often vital for quality control, failure analysis and material research. XT H 225 offers a powerful micro-focus X-ray source, a large inspection volume, and high X-ray and CT imaging resolution. XT H 225 suits a wide range of applications, including inspection of small castings, plastic parts as well as material research.

Features

- Powerful 225kV micro-focus source with optional rotating target
- Real-time X-ray visualization, fast CT reconstruction
- CT measuring volume up to 250mm and 600mm height
- 5-axis fully programmable part manipulator
- Customizable macros automate measurement workflow
- Small footprint and castors & roller for easy handling

Applications

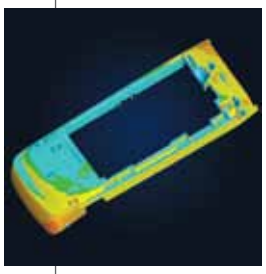
- Evaluation and measurement of precision plastic parts and small castings, complex mechanisms, internal components, part-to-CAD comparison, etc.
- Detailed failure analysis
- Advanced material research and analysis of biological structures
- Digital archiving of models
- Troubleshooting of assembly issues

Related solutions

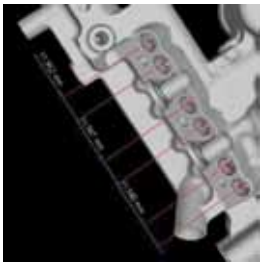
- XT H ST (Stretched) and XT H LC (Large Cabinet)
- 320kV source (LC cabinet only)
- Inspect-X software
- Focus Inspection software
- A wide range of customer-specific CT configurations can be provided

Benefits

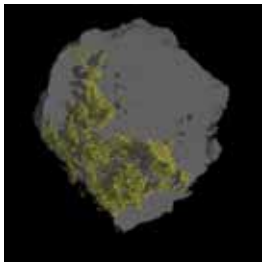
- Flexibility combined in a single system: X-ray for quick visual inspection, CT for in-depth analysis
- Fast data capture and high-quality images
- Fast operation with interactive joystick navigation
- High-resolution digital imaging and processing
- Safe system requiring no special precautions or badges
- Tight integration with industry standard post-processing applications



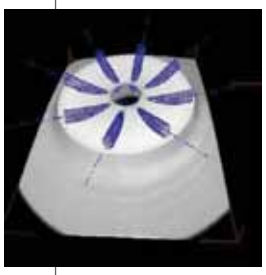
Part-to-CAD analysis



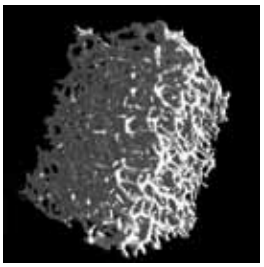
Dimensioning



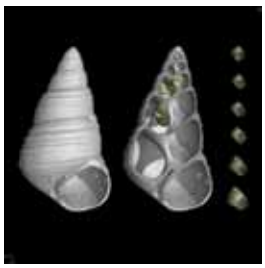
Spurs of gold in calcite



Cylinders fitted in holes



CT of foam structure



Snail fossile with offspring

An X-ray source with rotating target boosts X-ray flux by up to 5 times, enabling customers to obtain faster CT data acquisition or achieve higher CT data accuracy in the same time span.

XT H 450 for CT inspection of blades and castings

High power 450kV micro-focus source

The XT H 450 sets a new reference for turbine blade measurement and NDT of small to medium castings. At the core of this powerful equipment is a 450kV micro-focus source, providing superior resolution and accuracy.

The curved linear array detector optimizes the collection of X-rays by eliminating scatter phenomena that typically corrupt 2D radiographs of blades and other metal parts.

Features

- Unique 450kV micro-focus source
- Measuring volume up to 600mm diameter and 600mm height
- High efficiency linear detector 5-axis fully programmable turntable manipulator with precision ball screws and linear slides
- Dedicated application for automatic pass/fail inspection of turbine blades

Applications

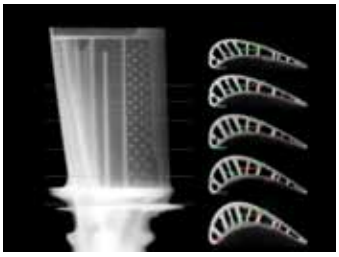
- Detailed analysis of the internal structure of turbine blades
- Automated pass/fail inspection of blades
- Inspection of high density parts (e.g metal parts, castings) with a need for micron accuracy

Benefits

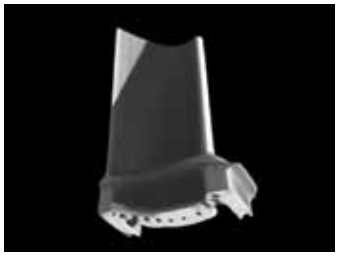
- Flexibility combined in a single system: X-ray for quick visual inspection, CT for in-depth analysis
- Fast data capture and high-quality images
- High-resolution digital imaging and processing
- Safe system requiring no special precautions or badges

Related solutions

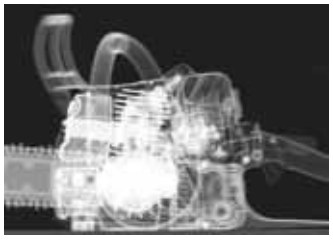
- XT H 225
- A wide range of customer-specific CT configurations can be provided



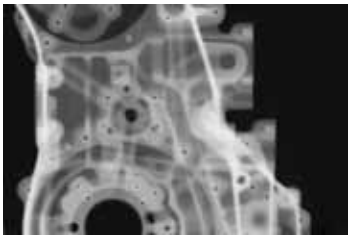
X-ray inspection of turbine blade



CT volume model of turbine blade



X-ray of chainsaw



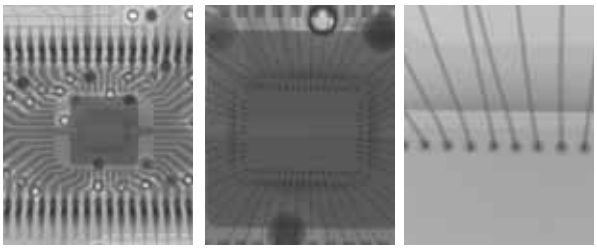
X-ray of engine casting

CT volume model of engine casting

XT V 130 electronics X-ray inspection

Compact, versatile and easy-to-use electronics QA system

With the advent of many newer type of electronic components, surface inspection is no longer an option. As most electrical connections remain hidden for the eye, the ability to run premium quality real-time X-ray is more important than ever before. Designed for 100% (µ)BGA, multi-layer and PCB solder joint inspection, the XT V 130 X-ray system is a high-precision, flexible solution that facilitates defect analysis in loaded PCB boards. The system's Inspect-X software offers automated inspection functions and (optional) automatic board identification, which ensure high inspection throughput rates.



Up to 320x image magnification enables users to zoom in on any specific item of interest

Applications

- Electronic and electrical components
  - Broken wedge bonds, lifted ball bonds, wire sweep, die attach, dry joints, bridging/shorts, voiding, BGA, etc.
- Poulated and unpopulated PCBs
  - View surface mount defects i.e. misaligned devices, solder joint porosity and bridging
  - Detailed inspection of vias, through-hole plating and multi-layer alignment
  - Wafer-level chip scale packages (WLCSP)
  - BGA and CSP inspection
  - Non-lead solder inspection
- Micro-electro-mechanical systems (MEMS, MOEMS)
- Cables, harnesses, plastics and many more

Related solutions

- XT V 160
- Inspect-X

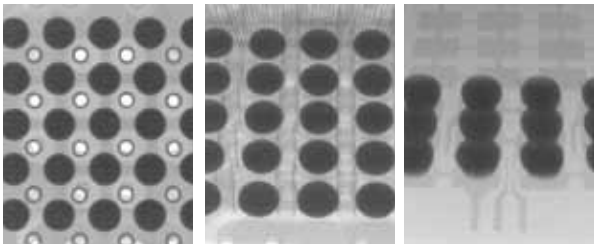
Features

- Proprietary micro-focus source with 3 micron focal spot size
- True tilt angles up to 60° for easy inspection of internal features
- High, 16-bit resolution imaging and image processing tools
- Large tray for loading multiple boards
- Optional rotation table (360° continuous)

Benefits

- X-ray inspection workhorse for electronics quality assurance
  - Macro-based automation requires no programming skills
  - Component-specific automated pass/fail analysis, off-line visualization station and automatic report generation
  - Ready to automate complex tasks with VBA
- On-line operation with intuitive joystick navigation
- Low-cost maintenance with open-tube technology
- Safe system requiring no special precautions or batches
- Small footprint and low-weight for easy installation

Large door with automatic interlocked X-ray off function



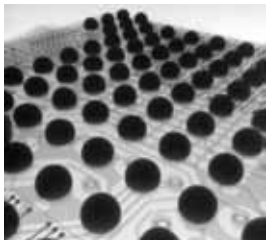
Tilt angle up to 60° offers sufficient flexibility to trace connectivity issues quickly

XT V 160 electronics X-ray inspection

Top-class inspection system for miniaturized electronic components

Component connections on today's compact and densely populated PCBs are hidden by other components, making X-ray the only viable inspection solution. XT V 160 is an easy-to-use, cost-effective and high-quality PCB inspection system targeting production facilities and failure analysis laboratories.

In automated inspection mode, samples can be inspected at the highest throughput. In manual mode, intuitive software and high-precision sample manipulation enable operators to visualize and evaluate the tiniest internal defects and deficiencies.

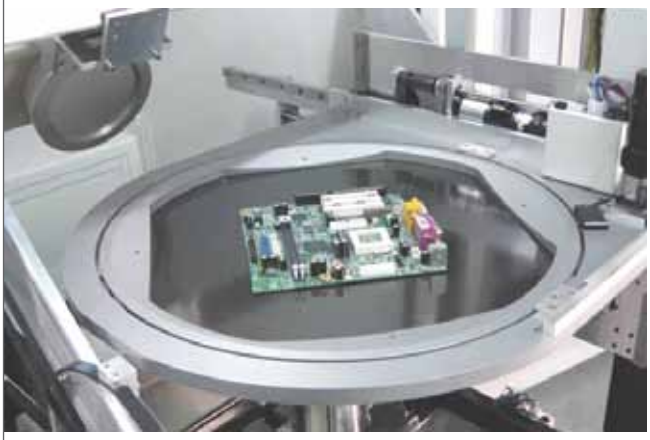


Features

- NanoTech™ source with submicron focal spot size
- True 75° tilting angle for optimum inspection of BGAs
- Fast data capture and high-quality imaging
- Large tray for loading multiple boards
- Customizable macros automate measurement workflow
- Remote validation station available

Related solutions

- XT V 130
- Inspect-X



Under any combination of rotation, tilt and magnification, the region of interest is consistently locked into the center of the field of view

Benefits

- Flexibility combined in one system
  - Interactive visualization
  - Fully automatic X-ray inspection
  - Optional CT for in-depth analysis
- Maximum magnification at unrivalled angles (up to 75°)
- Fast operation with intuitive GUI and interactive joystick navigation
- Low-cost maintenance with open-tube technology
- Safe system requiring no special precautions or badges
- Small footprint

Applications

- Solder reflow analysis
- BGA connectivity and analysis
- Solder void calculation
- Through hole measurement and inspection
- Die attach voiding measurement
- Ball bond analysis
- Stitch bond analysis
- Micro BGA / chip on chop analysis
- Pad array analysis
- Dry joint detection and analysis

INDUSTRIAL MEASURING INSTRUMENTS

Precision metrology instruments ensure the finest quality assurance throughout production. Founded on Nikon's optical excellence, video measuring systems, measuring and industrial microscopes and optical comparators set new standards for measuring even the smallest of work pieces.

- VIDEO MEASURING SYSTEMS
- MEASURING MICROSCOPES
- PROFILE PROJECTORS
- AUTOCOLLIMATORS
- DIGITAL HEIGHT GAUGES
- SOFTWARE

ShuttlePix P-400R digital microscope

A handheld microscope offering portability and ease-of-use of a digital camera

ShuttlePix 400R is a revolution in microscopy. A handheld digital microscope enabling you to take images everywhere, even on places where you never could imagine using a microscope. ShuttlePix features Nikon optics to guarantee razor sharp images and feels as comfortable as a digital camera. Featuring 20x optical zoom with up to 400x magnification and a 4-segment LED ring light, it allows to capture highly detailed images in any light conditions.

And what's more, one can even use the ShuttlePix as a digital desktop microscope. This portable microscope targets a wide range of industrial applications that require fine image recording and inspection without having to move the sample.

Point-and-shoot image indoors or outdoors, regardless of the lighting conditions

Applications

- Industrial parts and materials
- Pipe lines and structures
- Car, boat and airplane engines and frames
- Electronics
- Molded parts
- Artwork restoration and conservation
- Forensic investigation

Related products

- Motorized Z-axis stand
- Sample stages (sliding, tilting, etc)
- Touch panel monitor

Features

- 20-400x zoom range spanning from low to high magnifications (20x optical zoom)
- Integrated 4-segment ring LED illumination
- Desktop use with motorized Z-axis stand and touch panel microscope control.
- Extended depth of focus (EDF) on the motorized focusing stand controller
- TIFF and JPEG image storage through USB or SD card
- Complete set of accessories

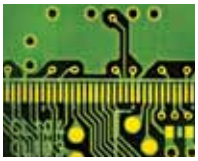
Benefits

- Point-and-shoot image indoors or outdoors, regardless of the lighting conditions
- Ergonomic, handheld microscope with Nikon optical quality
- Multi-purpose use in the field and in the lab
- No microscope knowledge or experience required to operate ShuttlePix
- Dedicated applications software supports graphic analysis and reporting

Desktop use with motorized Z-axis stand and touch panel microscope control

Cast metal

Crack in wall



Electronics

Painting

iNEXIV VMA-2520

Multi-sensor CNC video measuring system

The iNEXIV VMA-2520 is a lightweight and compact multi-sensor benchtop measuring system for fast, full-automatic and high-accuracy features. It is ideally suited for a wide variety of industrial measuring, inspection and quality control applications. The iNEXIV is designed to measure 3D workpieces, is touch probe ready, integrates the latest imaging processing software, and incorporates a new 10x optical zoom system and laser auto focus option.

The standard 10x zoom optics meet the industry's demanding needs for superb resolution at high magnifications while offering a wide field of view at low magnifications. Low distortion optics and high-intensity white LED illumination sources improve contrast to enhance throughput. This combination assures reproducible measurements even for colorful parts.

Multi-sensor capability makes surface and side coordinate measurement of complicated 3D parts possible

Applications

- Mechanical parts (e.g. metal and injection molding parts)
- Electronic devices
- Dies
- Molds
- Medical devices

Related solutions

- NEXIV video measuring systems
- VMA Automeasure software

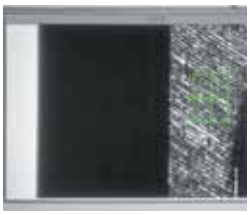
Features

- Space-saving body weighing only 72kg
- 250 x 200mm xy stroke and 200mm z stroke
- Sophisticated VMA AutoMeasure software
- High-speed and highly accurate laser autofocus (option)
- Multi-sensor ready : vision, laser and touch probe

Benefits

- High accuracy through white LED illumination and use of aluminum alloy materials in the construction of the system
- Fast stage controls increase inspection yield
- New zooming optics make 3D part measurement easier
- Advanced image processing algorithm and intelligent seach capability

iNEXIV VMA-2520



Vision autofocus

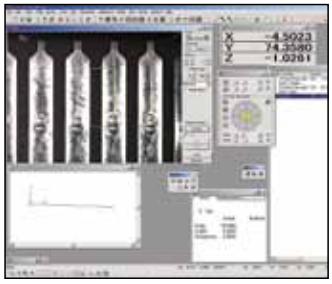
Aluminum die casting part

NEXIV VMR series

Legendary optics combine with ultra-precise automated video measurement

Nikon offers a complete line of NEXIV vision systems, each possessing Nikon's trademark optical quality and rugged design for the highest precision measuring tasks. The NEXIV automated video inspection systems range from small to ultra-wide measurement platforms, and offer a variety of optical head options.

Outer ring illuminator extends application reach



Metallized patterns of FPC

Features

- Model types providing submicron accuracy
- Submicron accuracy achieved by robust hardware design and maximum magnification module VMR–Z120X, featuring 8-step zoom up to 120X
- Sophisticated VMR AutoMeasure software
- High-speed and highly accurate laser autofocus
- Optional 3D surface analysis, gear evolution, real-time SPC and rotary index

Applications

- Mechanical parts (e.g. machined, casted, stamped, etched and molded parts)
- Electronics (e.g. MEMS, probe cards, SMD, PCB, connector)
- Semiconductor packaging and advanced packaging technology (e.g. wafer-level CSP, flipchip)
- LCD-array process and flat panel display devices
- High-precision dies and molds
- Medical devices

Benefits

- Broad size range of stages available (up to 1200x720mm)
- Advanced intelligent search enhances accuracy for increased productivity
- Excellent edge detection through advanced video edge probes and Nikon's proprietary edge detection algorithm (patent pending)
- Fast stage controls increase inspection yield

Related solutions

NEXIV VMR systems are available in different stage sizes:

- NEXIV VMR-1515 (150x150mm)
- NEXIV VMR-3020 (300x200mm)
- NEXIV VMR-6555 (650x550mm)
- NEXIV VMR-10080 (1000x800mm)
- NEXIV VMR-12072 (1200x720mm)

Larger NEXIV VMR systems offer stages with strokes up to 1200x720mm. They are ideally suited for measuring PCB patterns, display panels and large-size workpieces, such as FPD devices.

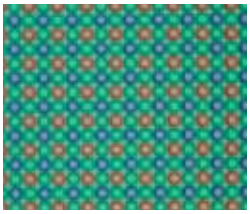
MM-800/400/200 series of measuring microscopes

Measuring microscopes integrating digital imaging with industrial metrology

MM-800 measuring microscope

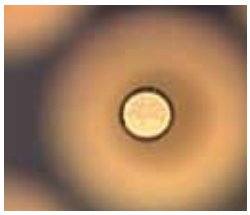
Nikon's measuring microscopes offer performance, convenience and an unprecedented degree of flexibility for upgrading and expansion. The MM400/800 Series deliver complete digital control for maximum measuring accuracy in demanding industrial environments. Measuring microscopes are excellently suited to inspect and measure 2D and 3D small parts.

The MM-200 is a compact and lightweight measuring microscope with an affordable price for all who require precision and accuracy for measuring a variety of metal, plastic and electronic parts in all industries; especially automotive and electronics.

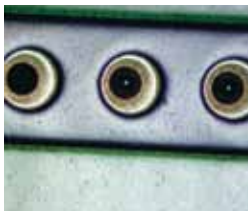


CCD

Plastic gear teeth



PGA – Insertion pin



Brightfield image

Features

- Seamless integration with Nikon digital cameras and E-Max metrology software
- High-intensity white LED illuminator is standard for brightfield use
- Backpack interface facilitates automated illumination, XY stage and Z data control through an external computer running E-Max software
- Optional TTL Laser Auto-Focus
- For larger workpiece measuring, a stage up to 12x8 inch is available

Applications

- Lab-on-a-chip
- MEMS
- Plastic manufacturing (e.g. injection molded parts)
- Medical devices
- Microelectronics and optoelectronics
- Micro tooling
- Surface analysis
- Cracks & failure analysis

Benefits

- Excellent geometric data processing and storage
- Ease of operation greatly improved through various motorized controls and ergonomic design
- Added body strength allows for using larger stages
- Expanded observation range by offering many options in illuminators and light sources
- A fully motorized high-power microscopy model is also available for digital imaging capability

Related solutions

- NEXIV and iNEXIV video measuring systems
- Industrial microscopes

MM-200

MM-400

Eclipse series of industrial microscopes

Industrial microscopes at the forefront of optical and technological innovation

Eclipse LV150

Nikon Metrology offers a complete portfolio of industrial microscopes for a wide range of applications, from basic models to sophisticated systems for high-end inspection. The Eclipse range featuring optical and digital microscope systems offers outstanding versatility, performance and productivity to tackle practically any application.

Features

- Choice of observation methods: brightfield, darkfield, polarizing, Nomarski DIC, episcopic, diascopic, epifluorescence, etc.
- Upright or inverted microscopes
- Premium ergonomics for comfortable viewing through tilting eyepiece tube, easy accessible controls, electrostatic protection, vibration isolation, etc.
- Nikon's acclaimed CFI60 optics achieve new levels of brightness, contrast and operability

Eclipse L300

Eclipse LV100D

Eclipse MA200

AZ100 Multizoom

LV-UDM

SMZ 800/1000

Eclipse L300 microscope series of for large-size flawless inspection of LCDs and wafers
Configured for 300mm wafer and mask inspection, the Eclipse L300 Series also satisfies the need for flat panel display backend inspection. The L300 Series utilizes Nikon proprietary CFI60 optical system, offering high resolution, contrast and transmittance.

Eclipse L200 series of microscopes for inspecting 200mm wafers and masks
Combined with Nikon's superior CFI60 LU/L optical system and an extraordinary new illumination system, this microscope provides brighter images with greater contrast. The L200 series is ideally suited for the inspection of wafers, photo masks and other substrates.

Eclipse LV150 series of microscopes for industrial inspection
The Eclipse LV150 Series microscopes provide superb performance when inspecting semiconductors, flat panel displays, packages, electronics substrates, materials, medical devices, and a variety of other samples.

Small-footprint Eclipse LV100 series delivers superb optics and ergonomics
Nikon's Eclipse microscopes are renowned for their ability to produce clearer images with higher contrast. The LV100 delivers brighter images, lower power consumption and less heat generation, thereby reducing the chance of heat-induced focus drift.

Eclipse MA200
A inverted metallurgical microscope optimized for digital imaging and ergonomic efficiency. Its unique box design allows easy access to the sample on the stage and nosepiece, with a footprint, one third of the conventional model.

SMZ series of stereo microscopes
Nikon zoom stereomicroscopes offer users the most extended zoom range of any such instrument, along with modularity, comfort and ultra-high-performance optics.

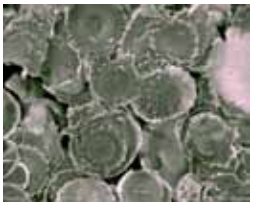
Related solutions

- LV UDM / AZ 100 step-in models for basic optical inspection
- Modular design concept and huge choice of accessories (e.g. illuminators, objective lenses, stages, wafer loaders) to meet the inspection requirements
- Availability of microscope variants for dedicated inspection purposes (e.g. polarizing capability, metallurgical use)
- Availability of motorized nosepieces and digital imaging

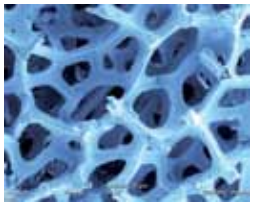
NeoScope benchtop SEM

Combining digital camera familiarity with scanning electron microscope (SEM) capability

NeoScope SEM



Diatoms



Foam

The NeoScope benchtop SEM microscope features the powerful electron optics of an SEM, but is as simple to operate as a digital camera. Offering the high resolution and depth of field of a powerful SEM, NeoScope helps accelerate the pace of failure analysis of manufacturing materials.

Basic operation of the NeoScope is simple with auto focus, auto contrast and auto brightness controls. Samples can be loaded and imaged in less than three minutes, without requiring any special sample preparation. Pre-stored parameter files (recipes) allow the user to quickly and automatically set up the NeoScope for a wide variety of material samples. The NeoScope operates in both low and high vacuum modes and has three settings for accelerating voltage.

Offering image resolution up to 25nm, NeoScope also offers a depth of field unmatched by optical microscopes for superior live imaging and image capture. Additionally, a magnification range of 10X-40 000X is possible without any adjustments or lens changes. The specimen stage accommodates samples up to 50mm thick so that clear crisp images are possible even with larger samples.

For a wide range of samples from biological to materials, NeoScope has high vacuum and low vacuum modes, secondary electron and back scattered electron imaging, and three selectable accelerating voltages of 5, 10, and 15kV.

Basic operation through the sophisticated Graphical User Interface (GUI) is as familiar as a digital point and shoot camera with automatic settings for biological and materials samples. Manual control is also available.

6B/6D Autocollimators

Brightfield and darkfield instruments for checking alignment and measuring angles

Nikon Metrology's autocollimators check alignment and measure very small angular deviations to measure flatness or height by simple geometry. Darkfield model autocollimator is perfect for measuring small, flat mirrors. Brightfield model autocollimator utilizes hallmark Nikon optics to illuminate surface details.

Applications

Applications involve surface flatness inspection, alignment of components with reflective surfaces (e.g. CD player pickup lens) as well as measurements related to machine tools (e.g. straightness in movement of stages, angles of indexers).

Profile projectors V-24B/20B/12B series and Horizon 14E/16E series

Optical comparators with an effective screen diameter up to 600mm diameter

V-24B

V-20B

V-12B

Horizon 14E (USA only)

Nikon's profile projectors apply the principles of optics to the inspection of manufactured parts, by projecting the magnified silhouette of a part on a screen. To suit your specific application, each profile projector comes with multiple projection lenses, each featuring a different magnification, working distance and field of view size.

The V-24B top model has a large effective screen diameter of 600mm. Its superior magnification accuracy is ideal for measuring and inspecting profiles, surface conditions and other aspects of large workpieces.

The Horizon line of horizontal benchtop comparators yield powerful, reliable illumination for surface and profile inspection and measurement.

Applications

- Profiles (metal and plastic manufacturing)
- Surface conditions
- Other part aspects
- Crack and failure analysis

Related solutions

Different profile projector types are available:
- V-24B (Screen diameter 600mm, except for EC)
- V-20B (Screen diameter 500mm)
- V-12B (Screen diameter 300mm)
- Horizon 16E (Screen diameter 400mm, only for USA)
- Horizon 14E (Screen diameter 350mm, only for USA)

MF-1001/MF-501 Digimicro

Nikon's most advanced photoelectric digital length measuring systems

M-1001 digital height gauge

M-501 digital height gauge

Flawless contact measurements of dimensions, thickness and depth

The MF-1001 and MF-501 Digimicro series offer flawless contact measurements of dimensions, thickness and depth. They feature measuring length equal to 100mm and 50mm respectively and accuracy of 1µm at 20°C. Stands are available in ceramic, steel or granite for added stability and a wide variety of probe tips are available to suit most applications

Semiconductor inspection systems: AMI, Optistation and Nexiv

Advanced, versatile semiconductor inspection and wafer management systems

VMR-C4540

P3

Optistation 3200

Manufacturing equipment from steppers to the most sophisticated inspection systems has given Nikon invaluable experience in the field of microelectronics. This experience has allowed Nikon to become a worldwide leader in microelectronics technology and in the manufacture of advanced instruments designed specifically for the inspection of semiconductors and flat panel displays.

Features

- Advanced and versatile semiconductor inspection systems
- Built for factory automation and contamination-free inspection
- Laser autofocus and CFI optics achieve new levels of brightness, sharpness, contrast and operability
- Integrated graphical software for wafer inspection and review

Automatic AMI-3000 and 2000 macro inspection systems feature high throughput and exceptional sensitivity.
The AMI-3000 automatic macro inspection system brings together all of Nikon's expertise in semiconductor manufacturing to enhance macro inspection precision, providing quantified reference criteria and enabling more efficient process management.

P3 lithography inspection platform designed to improve product yield by capturing yield-limiting defects
The Nikon P3 system is designed for automated pattern profile management and line width roughness monitoring of 300mm wafers with fully incorporated macro defect detection, EBR inspection, and automatic defect classification for unsurpassed performance down to the 55nm node.

Optistation 3200, 3100, 3000, 7 and V series of 300mm wafer inspection systems
Nikon's advanced and versatile Optistation semiconductor inspection solutions provide advanced micro/macro systems to efficiently trace defects and monitor process quality. Optistation systems are designed for highly accurate and efficient 300mm wafer inspection.

NEXIV FOUP series of non-contact, fully automated wafer carrier measuring systems
The NEXIV VMR-C4540 is designed for use with 300mm Front Opening Unified Pod (FOUP) & Front Opening Shipping Box (FOSB) wafer carriers. It provides all dimensional measurements required for wafer carrier fabrication including control of deformation due to aging of wafer carriers.

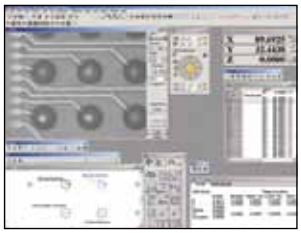
Eclipse series of semiconductor microscopes and NWL series of advanced IC inspection wafer loaders
Eclipse semiconductor microscopes are configured for (300mm) wafer and mask inspection as well as LCD inspection of flat panel displays. The NWL200 series is the first lineup of sophisticated wafer loader for IC inspection microscopes.

Related solutions

- Eclipse series of semiconductor microscopes
- A choice of high-performance illuminators and image processing options
- Integrated DUV microscope modules supporting present and future design rules
- Flexibility in loader type and positioning
- DART series of wafer inspection and review software

AutoMeasure software

User-friendly software that makes measuring automation simple



AutoMeasure integrates an intuitive wizard menu, customizable GUI and engineer/operator mode within a multiple-language environment.
AutoMeasure software runs on iNEXIV VMA and NEXIV VMR video measuring systems.

E-Max Series of data processing software

FOV measurement with advanced digital imaging processing technology

The E-MAX series software offers state-of-the-art image processing that supports general-purpose measurement for a wide range of manual measuring instruments, including measuring microscopes and profile projectors.

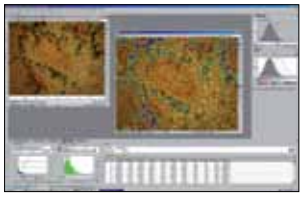
DART series of wafer inspection and review software

Integrated software package to fully automate the inspection process

DART is an integrated software package that can fully automate the wafer inspection process. It allows users to recall, review and classify defects based upon an integrated graphical map. It offers a choice of image archiving, defect review, post probe review and online communication features. Ideal for use with Nikon Optistation and NWL wafer loader systems, the DART software automatically controls all routine functions, including programming and point-to-point/die-to-die inspection.

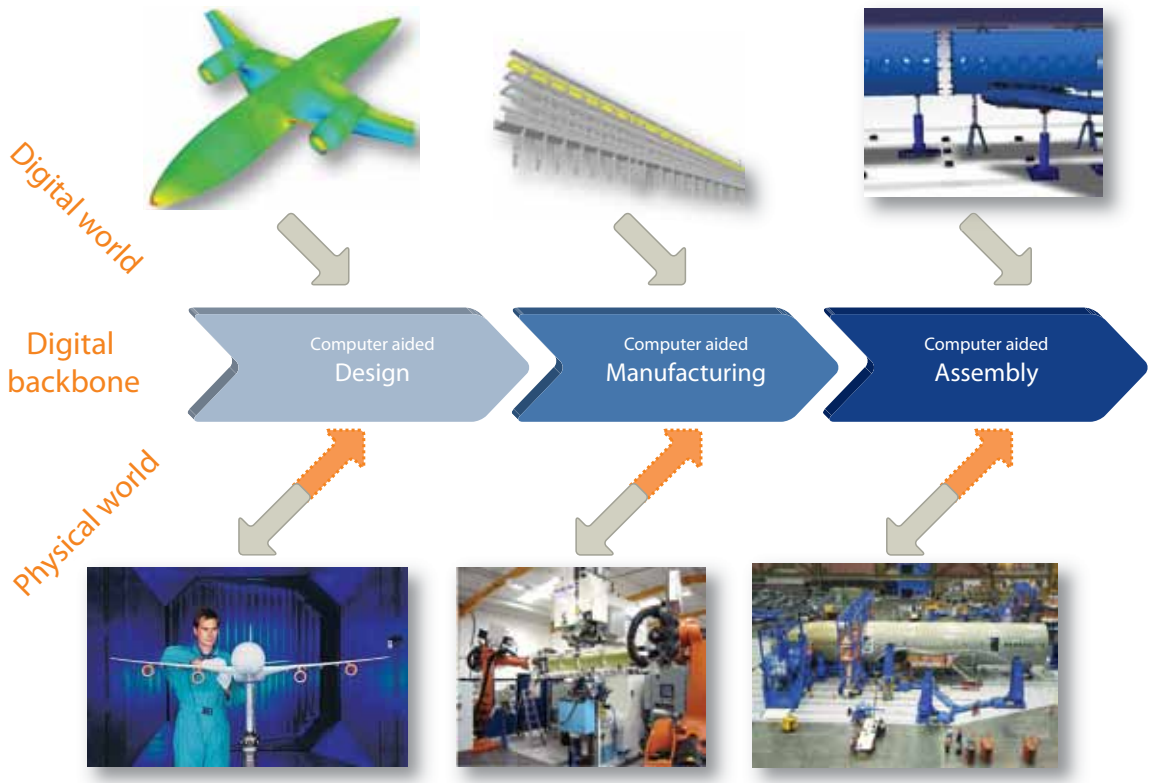
NIS-Elements software

Comprehensive device control and image analysis, visualization and archiving tools



NIS-Elements revolutionizes imaging software for the microscopy market by combining automated intelligence to microscopes, cameras, components and peripherals with powerful archiving, analysis, visualization and archiving tools. Its intuitive interface simplifies workflow and speeds up image acquisition times while providing a versatile range of features, such as image stitching, object counting and volume views.

METROLOGY ASSISTED PRODUCTION / ROBOTICS



Nikon Metrology assists customers in successfully deploying metrology-driven manufacturing capability. Metrology assisted production builds on accurate geometric data to consistently increase the precision and speed of design, manufacturing and assembly operations.

LASER RADAR

iGPS/iSPACE

ADAPTIVE ROBOT CONTROL

RCA - ROBOT CMM ARM

K-ROBOT

Laser Radar MV330/350

Automated, non-contact large volume inspection

Laser Radar is a versatile metrology system that offers non-contact and true single-operator inspection. As it is CNC-programmable, it is ready for completely automated unattended operation. Laser Radar incorporates patented laser reflection technology that allows for direct surface and feature measurement at high data rates. As a result, Laser Radar eliminates the tedious use of photogrammetry dots, spherically mounted retroreflectors (SMRs) or handheld probes, slashing inspection time and operator overhead. Laser Radar is able to scan dark diffuse and highly reflective material and finish surfaces at challenging incident angles.

Applications

- Inspection of fuselage, wing, wing/body connection, landing gear door and jet engine blade
- Gap and step inspection of jet engine cowling
- Automated inspection of riveting hole positions
- Mold, first article and serial inspection of composite parts
- On-machine verification of large machined parts
- Dimensional verification of forged and molded parts before milling process starts
- Measuring wind turbine blades and concentrated solar panels
- Verification of space telescope hardware, parabolic antenna and heated surface

Related solutions

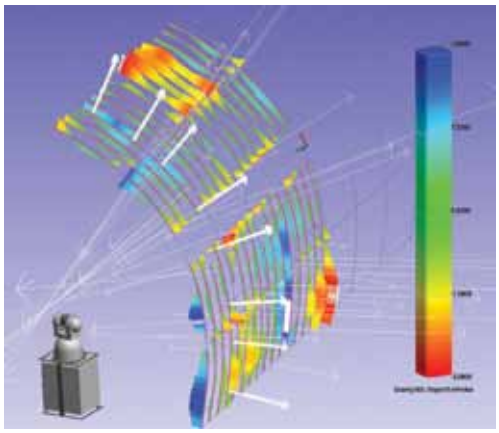
- iGPS and iSpace

Features

- Measurement range for MV350 up to 50m, MV330 up to 30m
- Vision Scan inspection mode captures up to 2000 points per second
- Accuracy from 24µm (2m distance) to 201µm (20m distance)
- Powerful hole and edge measurement capabilities
- Expanded line of sight using mirrors
- All acquired data referenced to a single contiguous coordinate system
- Supports a variety of large volume metrology software

Benefits

- Productivity multiplier thanks to fast measurement and low operator overhead
- Non-contact measurement ideal for delicate and inaccessible specimens
- Automation saves on operator expenses and manipulation errors
- Reliable range measurements on composite materials
- Seamless integration in measurement process



Laser Radar's use in green energy markets is increasing because it is capable of measuring large and delicate structures such as solar panels and wind turbine blades

iGPS/iSpace

Modular positioning, tracking and measurement system for factory-wide deployment

iGPS is a modular large scale metrology solution that transforms large fabrication facilities into accurate metrology-enabled areas. Within the facility, an unlimited number of handheld measurement probes or tracking sensors (fixated on tools and components) can operate concurrently.

Unique iGPS capabilities in terms of scalability, robustness and concurrent use provide quick return on investment as well as a solution that grows along with expanding manufacturing operations.

Predefined iSpace configuration packages use iGPS technology to track multiple measuring devices – handheld probes, articulated arms and laser radars – that can be operated concurrently.

Applications

- Large scale positioning and tracking suited for aerospace, shipbuilding, train, etc.
- Part joining and assembly
- Dynamic tracking of parts, tools, robot positions, AGVs and ship models in water tanks
- Handheld large volume inspection in automotive (engineering lab, racing workshop), aerospace and other industries like casting and turbine blade production
- Automatic annotation of handheld NDT measurements with positional information

Related solutions

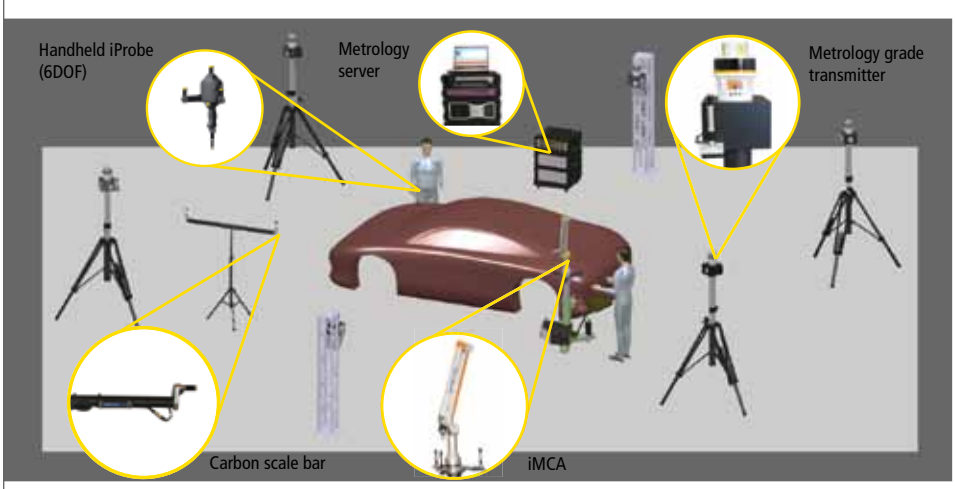
- iProbe - 6DOF tactile measurement probe
- iMCA - iSpace enabled articulated arm
- Integration Services & Technologies

Features

- Expand measurement volume by extending transmitter network (iGPS)
- Measurement volumes ranging from 400 to 1200m^3 (iSpace)
- Continuous health monitoring and transmitter redundancy
- Unlimited number of users and applications within the iGPS-enabled working volume
- Multiple devices can be equipped with iGPS receivers for accurate positioning

Benefits

- Supports factory-wide deployment (iGPS)
- Easily deployable for measuring the dynamic positioning of handheld probes, articulated arms, laser radars and other measurement equipment (iSpace)
- Uniform accuracy throughout the entire workspace
- Scalable, accurate and robust solution
- Concurrent use of an unlimited number of handheld probes and tracking sensors
- Point localization accuracy down to 200µm



iSpace supports concurrent use of an unlimited number of handheld probes and tracking sensors

Using iProbe the operator can freely walk around and perform measurements in a large volume

Adaptive Robot Control

Accurate robot positioning in any circumstances

Adaptive Robot Control activates a closed metrology-driven feedback loop that firmly increases the precision of industrial robots. Regardless whether robots are deployed for machining, inspection, applying beads or manipulating objects, roboting tasks are consequently executed with 0.1mm absolute accuracy, irrespective of degrading phenomena like play, mechanical flexibility, backlash or thermal effects.

Features

- Dynamic tracking and closed feedback loop to robot controller
- Tracking volume of 17m³ (expandable)
- Tracking sample rate up to 1000Hz
- Simultaneous measurement of up to 1024 points
- Accuracy down to 0.1mm in the entire working volume of the robot

Benefits

- Independent metrology chain for industrial robot applications
- Providing high level of absolute robot accuracy
- Portable and scalable solution
- Investment is only a fraction of new product equipment with comparable accuracy

Applications

- Accurate drilling and riveting on wings and fuselages where the motion of the part is monitored
- Robot machining (drilling/fettling/milling) where the motion of the tool is monitored
- High-precision placement of objects or tools
- Accurate material depositing (sealant, tape layering, etc.)

Related solutions

- K-Series Optical CMM
- Robot calibration & testing
- Integrated Services & Technologies

Adaptive Robot Control - driven by Optical CMM or iGPS - establishes a closed feedback loop that nearly eliminates the influence of robot warm-up, drift and backlash

RCA - Robot CMM Arm

Automation – Accessibility – Mobility

Extreme accessibility and powerful automation capabilities are RCA's major strength

RCA combines the best of two worlds by offering the automation capability of a traditional CMM and the mobility and part accessibility of an articulated arm. To accelerate repetitive 3D inspection, RCA interfaces a highly accurate internal 7-axis articulated arm with an external skeleton driven by electric motors.

Applications

- In-line or next-to-line sheet metal inspection
- Feature and surface inspection
- Full part-to-CAD inspection
- Flush & gap inspection
- Repetitive on-site inspection of castings and machined aerospace parts
- Troubleshoot production issues by having RCA temporarily inspect production samples

Features

- Inspection volume up to 4.2m diameter
- Optimal scanning through continuous adaptation of scanner orientation
- Excellent material scanning and fast data acquisition
- Handheld control panel runs on Camio software
- Internal metrology arm and integrated controller
- Operating temperature range from 0 to +45°C (32 to 113°F)
- Off-line programming from CAD

K-Robot

In-line robotized scanning and inspection

Fast repetitive laser scanning for in-production-line inspection

K-Robot is a flexible, productive and accurate metrology solution for in-production-line inspection using an industrial robot.
The Optical CMM dynamically tracks the location of K-Robot's ModelMaker laser scanner while the robot is running an automatic scanning job. High scanning accuracy is guaranteed, as proven metrology components of K-Robot obsolete cyclic robot calibration and eliminate the influence of robot warm-up, drift and backlash.

Applications

- Feature and surface inspection
- Gap & flush
- Sheet metal and body-in-white as well as forged or molded parts
- Partial in-line inspection of the entire production volume
- Complete bypass inspection of production samples

Features

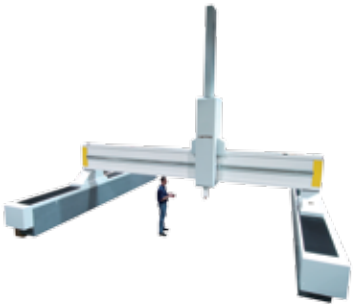
- Global absolute accuracy: better than 100µm in the entire work volume
- Robust against ambient light conditions
- Inspection results in Microsoft Excel and SPC-compatible formats
- Automatic rapid digitizing for part-to-CAD inspection or adaptive machining
- Excellent material scanning and fast data acquisition
- Operating temperature range from +15 to +35°C (59 - 95°F)

TRADITIONAL METROLOGY SOLUTIONS


LK V


LK V-SL


LK V-R


LK V-GP


LK H-R



C3 V


MCA II

A complete portfolio of CMMs and articulated arms

BRIDGE, HORIZONTAL ARM, GANTRY CMM PORTFOLIO

ARTICULATED MEASURING ARMS

MULTI-SENSOR CMM SOFTWARE

TACTILE SOFTWARE FOR CNC, MANUAL AND PORTABLE CMMS

LK V Bridge and LK V HA High Accuracy CMM

High-performance ceramic bridge CMMs

LK V 15.12.10

LK's ceramic bridge and spindle components coupled with proven air-bearing design provide the ultimate in stiffness and stability, altogether delivering significantly improved repeatability.

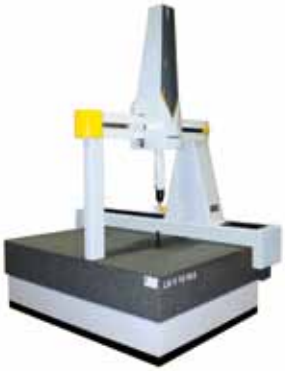
Features

- Flexible multi-sensor platform: touch probes, analog scanning and laser scanning
- High capacity (loads) table

Benefits

- Premium performance
- High velocities/accelerations for low cycle times
- Excellent accuracy and repeatability
- Total solution for probing, scanning and digital inspection

LK V 8.7.6 (Tripod stand)



LK V 15.10.8

Applications

- Machined and pressed parts
- Plastic moldings
- Casting and forgings
- Touch trigger and non-contact inspection
- Digitizing, scanning and reverse engineering

Specifications

- Volumetric accuracy
  - from 1.8µm + L/350 (LK V)
  - from 1.5µm + L/375 (LK V-HA)
- Repeatability
  - from 1.8µm (LK V)
  - from 1.5µm (LK V-HA)
- Velocity
  - up to 42m/min (LK V)
  - up to 50m/min (LK V-HA)
- Acceleration
  - up to 7840m/min^2 (LK V)
  - up to 5400m/min^2 (LK V-HA)

LK V (small) - Standard bridge style CMM (high-accuracy versions available)

Sizes [1] (Tripod stand)	Sizes[1]	Probe head	Probes
6.5.4	10.10.8	PH10T	TP20
8.7.6	15.10.8	MH20i	TP200
10.7.6	20.10.8	PH10M	SP25M
	25.10.8		LC15, LC50Cx, LC60Dx, XC65D (-LS)

LK V (medium to large) - Standard bridge style CMM

Preferred sizes[1]				Probe head	Probes
15.12.10	20.15.12	25.15.15	20.20.15	PH10MQ	TP20 (LK V only)
20.12.10	25.15.12	30.15.15	30.20.15		TP200
25.12.12	30.15.12	35.15.15	35.20.15		SP25M
30.12.10	35.15.12	40.15.15	40.20.15		LC15, LC50Cx, LC60Dx, XC65D (-LS)

[1] (other sizes available on request)

LK High-speed scanning bridge CMM

LK V-SL and LK V-SL HA offering ultimate scanning and inspection performance

LK V 10.10.8 SL equipped with an LC60Dx laser scanner

The LK V-SL features a revolutionary design that delivers the best scanning and inspection performance currently available in the marketplace. Particularly suited to meet the demands of automotive and aerospace applications, the LK V-SL is a unique and distinctive multi-sensor CMM. With the HA option, such a system becomes a metrology lab reference CMM featuring submicron accuracy for applications requiring highest precision.

Features

- Granite table with ceramic Y & Z guideways
- Raised X-axis guideway provides ultrafast dynamics
- S-axis 0.1 micron scale
- Multi-sensor capability
- Pneumatic anti-vibration mounts
- Temperature compensation as standard

Benefits

- Increased scanning performance delivering high accuracy and throughput
- Increased stiffness and stability of the metrology frame
- Ready for shop floor and metrology lab

LK V-SL (HA) metrology lab reference CMM

Applications

- Analog, digital or laser scanning
- Automotive, engine and transmission components
- Aerospace blade, engine and aircraft components
- General precision engineering
- Medical instruments

Specifications

- Volumetric accuracy
  - from 1.1µm+L/400 (LK V-SL)
  - from 0.7µm+L/600 (LK V-SL HA)
- Repeatability
  - from 0.7µm (LK V-SL)
  - from 0.5µm (LK V-SL HA)
- Velocity
  - up to 51m/min (LK V-SL)
  - 20m/min (LK V-SL HA)
- Acceleration
  - up to 5065m/min^2 (LK V-SL)
  - 722m/min^2 (LK V-SL HA)

Ceramics for LK PREMIUM performance

Stress-free ceramic guideways are most dimensionally stable, provide high and long-lasting measurement accuracy, and require minimum machine verification, saving both time and money.

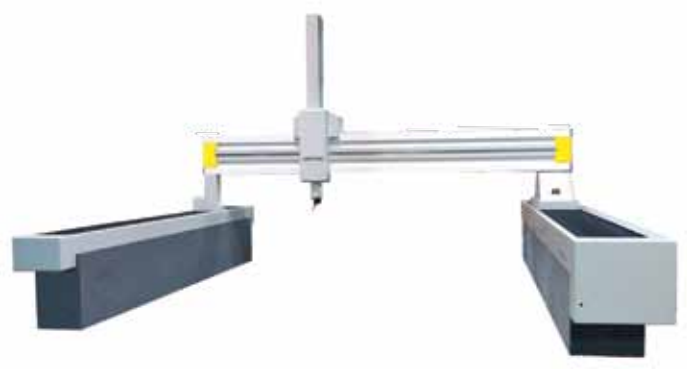
LK V-SL and LK V-SL HA - High accuracy bridge style CMM

Preferred sizes[1]			Probe Head	Probes
8.7.6	10.10.8	20.12.10	PH10MQ	TP200
10.7.6	15.10.8			SP25M
15.7.6				LC15, LC50Cx, LC60Dx, XC65D (-LS)

[1] (other sizes available on request)

LK V Large scale twin-rail mounted and gantry CMMs

A new breed of large scale CMMs



LK V 50.40.12 R

Nikon Metrology offers large scale gantry and twin-rail mounted bridge style CMMs when size really matters. In addition to high accuracy with maximum volume, these large scale CMMs support a variety of probing solutions, including touch-trigger digital, analogue and laser options. Nikon Metrology also provides customized gantry CMM projects that meet customers' exacting requirements.
LK large scale CMMs are constructed using materials with high thermal stability to guarantee optimum accuracy.

Features

- High-performance air bearings
- LK CMMs feature granite rails with ceramic Y and Z guideways
- Supports tactile styli, analogue scanning and laser scanners

LK V-R twin-rail mounted bridge style CMM

Benefits

- Ceramic material offering 300% more stiffness over aluminium allows for ultra large machine sizes with premium accuracy
- Floor-mounted or raised gantry versions to suit all environments and component handling situations
- Twin drive systems valued for smooth motion
- Available with separate measuring plate if required

Applications

- Automotive and commercial vehicles
- Aerospace components and structures
- Marine and locomotive engine components
- Telecommunications and satellite equipment

Specifications

- Volumetric accuracy
  - from 4.5µm + L/200 (LK V-R)
  - from 3.5µm + L/250 (LK V-G(P))
- Repeatability
  - from 4.5µm (LK V-R)
  - from 3.5µm (LK V-G(P))
- Velocity
  - up to 32m/min (LK V-R)
  - up to 27m/min (LK V-G(P))
- Acceleration
  - up to 2270m/min^2 (LK V-R)
  - up to 2070m/min^2 (LK V-G(P))

LK V-R and LK V R-SL - Twin-rail mounted bridge style CMM
(short-leg models available)

Sizes[1]	Probe Head	Probes
Rail lengths from 3m to 10m+ Bridge sizes from 2m to 4m Spindle lengths from 1.2m to 3m *(short-leg model with steel legs or concrete riser foundation)*	PH10MQ	TP20 TP200 SP25M LC15, LC50Cx, LC60Dx, XC65D (-LS)

LK V-G(P) - High accuracy and ultra high accuracy bridge style CMM

Sizes[1]	Probe Head	Probes
Rail lengths from 2m to 10m+ Bridge sizes from 4m to 7m Spindle lengths from 3m to 4m *(available with steel legs or concrete riser foundation)*	PH10MQ	TP20 TP200 SP25M LC15, LC50Cx, LC60Dx, XC65D (-LS)

[1] (other sizes available on request)

LK H Horizontal arm CMM

The fastest high accuracy horizontal arm CMMs on the market

LK H-R premium series twin-rail mounted horizontal arm CMM with walk-on covers

Nikon Metrology's complete range of horizontal arm CMMs provides unequalled performance in speed, accuracy and repeatability. Ceramic guideways and air bearings used in the construction of LK H CMMs, offer stability at high velocity and acceleration. LK horizontal arm CMMs provide unique access to the measuring envelope and can be supplied as subfloor or floor level installations, or as part of fully-automated measurement cells.

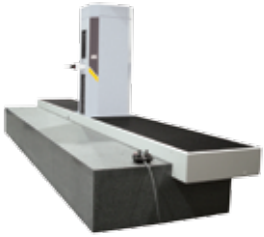
Features

- Multiple CMM configurations available: table, rail, twin, etc.
- Supports laser scanners and touch sensors
- Can be supplied with cast-iron measuring plate if required

Benefits

- High velocities/acceleration for low cycle times
- Excellent accuracy and repeatability
- Flexible multi-sensor platform: touch probes, analog scanning, laser scanning

LK H-R dual column horizontal arm CMM



LK H-T high accuracy table mounted horizontal arm CMM

LK H-T featuring rotating table

Applications

- Automotive full body and panels inspection
- Inspection of large parts such as mold tools, housings, castings, etc.
- Integrated in-line inspection
- Touch trigger and non-contact inspection
- Digitizing, scanning and reverse engineering

Specifications

- Volumetric accuracy
  - from 1.9µm + L/250 (LK H-T)
  - from 10µm + L/200 (LK H-R)
- Repeatability
  - from 1.9µm (LK H-T)
  - 6.0µm (LK H-R)
- Velocity
  - up to 51m/min (LK H-T)
  - up to 40m/min (LK H-R)
- Acceleration
  - up to 10830m/min^2 (LK H-T)
  - up to 7580m/min^2 (LK H-R)

LK H-R - high accuracy rail mounted horizontal arm style CMM (single or twin column)

Sizes[1]	Probe Head	Probes
Rail lengths from 4m to 10m+ Spindle lengths from 0.4m to 1.6m Column heights from 2m to 3m *(available with walk-on or bellow covers for rails)*	PH10MQ	TP7M TP20 TP200B SP25M LC15, LC50Cx, LC60Dx, XC65D (-LS)

LK H-T - high accuracy table mounted horizontal arm style CMM

Sizes[1]	Probe Head	Probes
Rail lengths from 1m to 5m Spindle lengths from 0.4m to 1.6m Column heights from 0.6m to 2m	PH10MQ	TP20 TP200B SP25M LC15, LC50Cx, LC60Dx, XC65D (-LS)

[1] (other sizes available on request)

C3 V Bridge CMM

Aluminum general-purpose bridge CMM

C3 bridge CMMs are high-specification, cost effective metrology solutions

With super-light aluminium as a key structural component, and air bearings on all axes, the C3 V bridge CMM is a high performance and cost-effective metrology solution. Due to its size, high capacity table and comprehensive selection of options, the C3 V bridge CMM family is suitable for a wide range of small to medium size applications.

Features

- Full CNC and manual joystick control
- 0.5µm resolution scales
- Protected guideways on all axis
- Passive anti-vibration mounts
- Aluminium Y and Z guideways
- Granite table and X guideway
- Air bearings on all axis

Benefits

- High acceleration for low cycle times
- Excellent accuracy and repeatability
- Flexible multi-sensor platform:
- touch probes, analog scanning, digital scanning
- Small footprint
- High loading capacity table
- Suitable for a shop floor environment
- Floor-mounted or raised gantry versions to suit all environments and component handling situations
- Twin drive systems valued for smooth motion
- Available with separate measuring plate if required

C3 V 5.4.4

Applications

- Machined and pressed parts
- Plastic mouldings
- Casting and forgings
- Touch trigger and non-contact inspection
- Digitizing, scanning and reverse engineering

Specifications

- Volumetric accuracy
  - from 2.0µm + L/333
- Velocity
  - from 52m/min
- Acceleration
  - from 9360m/min^2

C3 V - bridge CMM

Sizes[1]	Probe Head	Probes
X: 500 to 2000mm Y: 400 to 1000mm Z: 400 to 1000mm	CMM model size dependent	TP20 TP200 SP25M LC15, LC50Cx, LC60Dx, XC65D (-LS)

MCA II - Manual CMM Arm

Full flexibility and portable productivity

MCA II is a precise, reliable and comfortable portable measuring system that can be equipped with a wide range of probing devices. Battery operation and wireless data communication enable users to quickly set up the portable system and efficiently utilize it in the metrology lab, on the shopfloor and in the field.

MCA II comes in different sizes and in two accuracy variants. The 6-axis version is ideally suited for touch trigger measurement. Equipped with the brand new ModelMaker Dx, the MCA II is an ultra-modern and accurate handheld scanning combination that handles every inspection task, regardless of specimen size, material and location.

Features

- 6 and 7-axis versions
- High accuracy in volumetric length accuracy test - 23µm for 6-axis version (6ft) - 35µm for 7-axis version (6ft)
- Quick and repeatable sensor exchange and support of multiple sensors (laser scanner and tactile probe)
- Lightweight and thermally stable arm thanks to advanced carbon fiber and aluminum alloy components
- Ultrafast Wireless WiFi data transmission for scanning and tactile measurements
- Li-ion battery offering hours of measurement autonomy for arm and scanner
- Effortless single-handed operation through integrated pneumatic counterbalance and infinite-rotation arm joints

Applications

- Full part-to-CAD inspection
- Feature inspection
- Flush & gap inspection
- On-site troubleshooting
- Solving assembly problems
- Data collection for reverse engineering

Benefits

- Scan and go! - Easy and fully integrated solution for 3D scanning using an articulated arm
- True portability and robust operation allow users to measure anywhere
- Ergonomic design and quick repeatable sensor exchange increase productivity and ensure that the focus is on the inspection job
- Get instant graphic feedback or evaluate measuring reports at a later convenient time

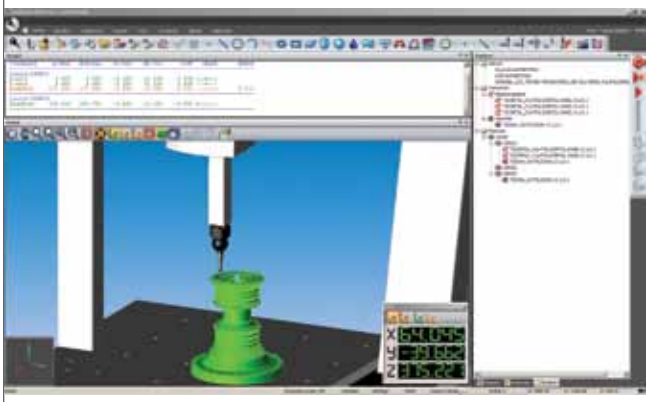
Related solutions

- ModelMaker laser scanners
- Focus software

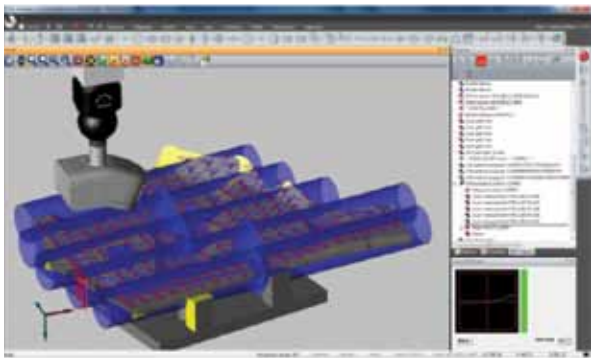
MCA comes in 6 or 7-axis versions for touch trigger or laser scanner measurement

CAMIO7 Multi-sensor CMM metrology software

The standard for DMIS coordinate measuring machine programming

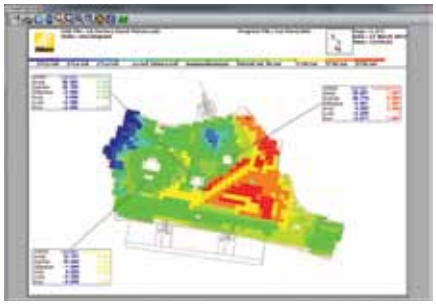


NEW **CAMIO**7 interface developed for ease of use based on powerful programming functions



Laser scanner paths can be programmed based on CAD data or taught from the hand-box

Comprehensive graphical reporting



Graphical reporting combining GD&T tolerances and full part to CAD comparison

CAMIO7 is the world's leading multi-sensor CMM programming software supporting traditional touch-trigger probes, continuous contact scanning probes and the full range of Nikon laser scanning probes.

Regardless of whether inspecting stamped, moulded, fabricated or machined parts **CAMIO**7 drives accurate and efficient inspection programs for geometric features or full surface analysis with CAD compare.

Features

- An interface reflecting the latest Microsoft® Windows© standard with ribbon style toolbars providing instant access to all programming functions.
- Simple programming environment optimized for a minimum number of mouse-clicks.
- Fast workflow to program multiple features of multiple types (ie points, circles etc.) in a single operation.
- Structured and comprehensible probe management.
- Probe check function to verify the probe path before committing to the program or CMM operation.
- Flexible reporting options with multiple outputs including full colour graphics, ASCII text, excel or internet browser compatible formats.
- Support for the latest versions of CAD data: IGES, VDA-FS, STEP, ACIS®, CATIA® v4 and v5, Pro/ENGINEER®, Unigraphics®, Solidworks® and Parasolids®.
- Fully I++ compliant.

Benefits

- The ability to create CMM programs using multiple probe types to achieve the best CMM inspection routine for your application.
- Easy to use programming functions to suit all levels of user.
- Reduced programming time.

Comprehensive off-line programming capability

- **CAMIO**7 planning provides the capability create new or open existing inspection plans direct from CAD data including the import of part axis and GD&T tolerance data.
- Full machine simulation and collision avoidance.
- Creates CMM programs in true DMIS output without translation.
- **CAMIO**7 can be used as a stand-alone solution to create programs to run in compatible 3rd party DMIS software* including PC-DMIS® and Metrolog XG®.

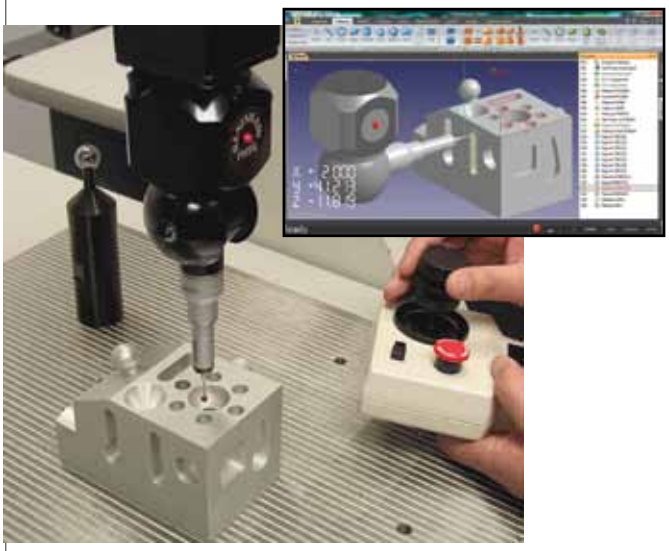
Related solutions

- Bridge, horizontal arm and gantry CMMs
- RCA Robot CMM Arm

* compatibility check to the DMIS standard is advised

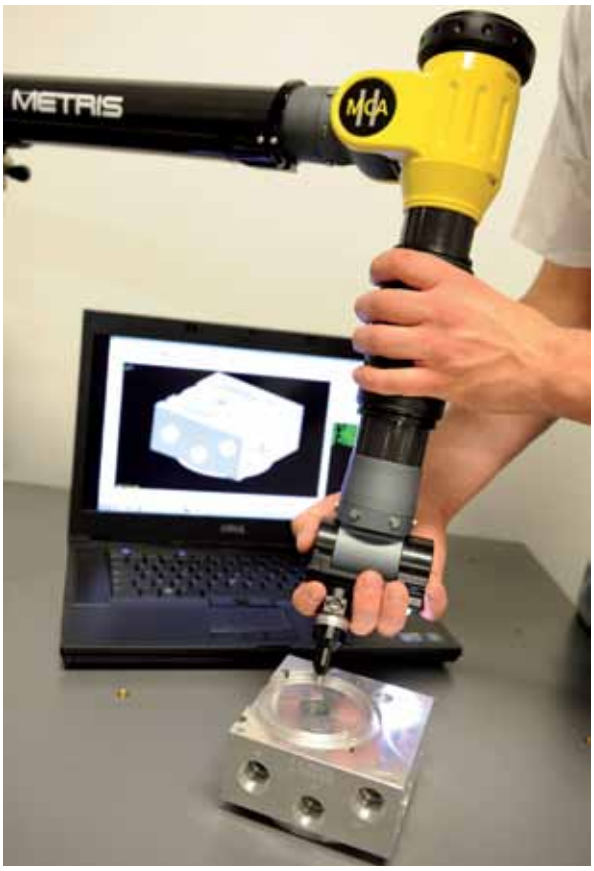
CMM-Manager metrology software

A full-featured metrology software for manual, CNC and portable CMMs



CMM-Manager for Windows is by far the most value-for-money tactile inspection software that runs on nearly all manual, CNC and portable CMMs. Users accomplish more in less time with CMM-Manager, by automating serial inspection or by easily taking a few points on the spot.

It is a task-oriented, highly intuitive software featuring quick walk-in measurement, one-click CAD measure, collision-free CAD teach, virtual simulation, real-time verification, CAD and datum alignment, and many more smart functions. CMM-Manager's Windows 7 graphical user interface makes the software even more informative and interactive.



Features

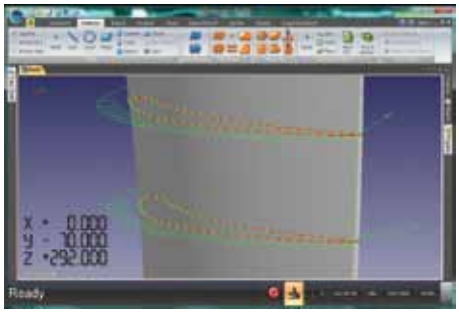
- CAD based graphical programming
- Automatic collision avoidance
- Smart alignment features
- Automatic probe recognition
- Leap frogging to extend measurement volume for portable measurement
- Best-fit analysis for improved inspection accuracy
- Drag and Drop web-ready graphical reporting

Benefits

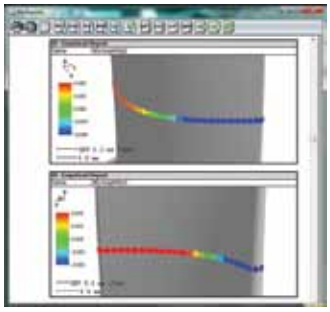
- Focus on quick and accurate measurement results
- Easy to use, yet very complete metrology software
- Single software package for CNC, manual and portable measurement

Retrofit capabilities

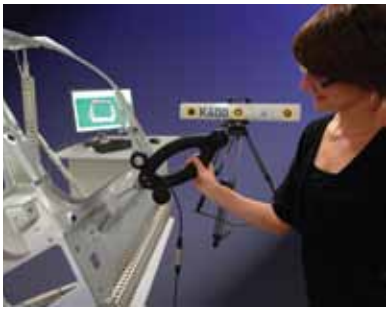
- CNC or Manual CMM: Nikon Metrology, Sheffield, Mitutoyo, Brown & Sharpe, DEA, Zeiss, Starrett, Numerex, Helmel, Wenzel, Renishaw
- Portable CMM retrofits: MCA, K-Series Optical CMM, Faro, Romer/CimCore, Sheffield, Brown & Sharpe, Mitutoyo, Renishaw



Easy-to-use software capable of measuring complex parts

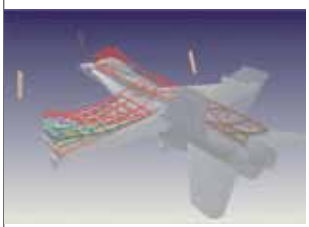


Quick data interpretation through color-coded local geometry deviation



K-Series Optical CMM with SpaceProbe for large volume measurements

DMM - Dynamic Motion Measurement



Deformation analysis of aircraft wings

DMM is the perfect tool for motion and deformation measurement and evaluation by accurately measuring the individual LED point coordinates. It is a digital metrology system that accurately measures the dynamic evolution of point coordinates. DMM's Optical CMM measures displacements and deformations of points and objects at high accuracies and sampling rates, providing detailed insight into motion characteristics and space envelopes.

To maintain high quality standards, car manufacturers run door slam tests to acquire motion and displacement data of various door, lock and body points. This is critical information in the assessment of the dynamic loading conditions that occurs during a door slam sequence.

K-Series DMM can also be used to capture the wheel motion and displacement of a car on a test bench. Such rig tests efficiently and realistically simulate the changing loading conditions the vehicle undergoes during normal use.

Features

- Tracking volume of 17m^3 (expandable)
- Tracking sample rate up to 1000Hz
- Simultaneous measurement of up to 1,024 marker points

Benefits

- Measurement of dynamic and quasi-static motion
- High accuracies and sampling rates
- Direct data streaming to third party systems
- Portable and scalable solution
- Easy setup and standalone operation

Applications

- Door and roof closure testing
- Suspension degradation testing
- Body component vibration testing
- Motion/deformation verification of fuselage, wing, flaps, slats, landing gear and doors
- Real-time tracking of 6-DOF actuators
- Thermal deformation testing
- Dynamic tracking of ship models in water tanks

Nikon Metrology services and support

A vision of Total Customer Support

Nikon Metrology provides ISO9001/2000 and UKAS accredited metrology solutions to a wide range of industries and bluechip customers in a global marketplace, utilizing a worldwide network of highly trained metrology experts. The complete range of services including helpdesk support, training, maintenance programs, retrofit capabilities and contract work, enables our customers to get the maximum value out of their Nikon Metrology solutions or to solve their inspection issues in the shortest possible time.

HELPDESK
Instant help – the skills and technical knowledge to solve your application/software problems by dedicated helpdesk engineers.

METROLOGY TRAINING/SEMINARS
Knowledge base – on-site/off-site, basic, intermediate and advanced software and hardware training and seminars using dedicated staff with hands-on experience.

PROGRAMMING CONSULTATION
Operational assistance - highly-skilled engineers provide part programs or programming consultation - expertise which can reduce your product inspection costs.

MAINTENANCE AND CALIBRATION
Technical service – the manpower, state-of-the-art technology and logistics to maximize reliability, uptime and equipment performance.

SUB-CONTRACT INSPECTION
Nikon Metrology offers a wide range of subcontract inspection work. The broad product portfolio includes the right tool for every inspection challenge of the customer. On top of Nikon Metrology own inspection service facilities, Nikon Metrology also has a broad worldwide network of Nikon Metrology Service Centers, that are accredited by Nikon Metrology to perform contract inspection work.

- UKAS accredited CMM sub-micron, temperature-controlled inspection offering the capability to measure all component types and sizes.
- Laser scanning work for part-to-CAD inspection or Reverse Engineering
- X-ray and CT inspection work for electronics and industrial applications

UPGRADES AND RETROFITS
Existing CMMs often see an improvement in performance, life expectancy, and accuracy with the retrofit of an advanced Nikon Metrology CMM controller, powerful DMIS-compliant Camio Studio or CMM-Manager software or an innovative Nikon Metrology scanner. A full range of hardware upgrades and retrofits is available to meet all of your current and future needs.

SOFTWARE UPGRADES
The rapid development of CMM metrology software means that CMMs may face operational issues with outdated software, regardless whether supplied by Nikon Metrology or as part of your existing CMM system. Nikon Metrology retrofits your CMM with the latest, easy-to-use Camio or CMM-Manager 3D metrology software, either through Nikon Metrology-Controller technology, proprietary protocol support or via the I++ DME open protocol standard. Whether you use manual or CNC CMMs, Nikon Metrology has an extensive range of software products designed to support your programming and reporting applications.

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