NIKON METROLOGY SOLUTIONS

COORDINATE MEASURING MACHINES

CMM LASER SCANNING

HANDHELD LASER SCANNING

METROLOGY SOFTWARE

LARGE SCALE METROLOGY

ROBOT METROLOGY

X-RAY AND CT INSPECTION

VIDEO MEASURING INSTRUMENTS

MEASURING MICROSCOPES

INDUSTRIAL MICROSCOPES

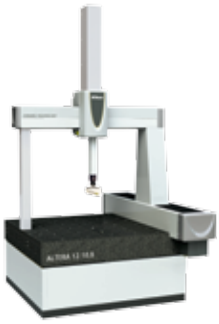
METROLOGY SERVICES

Nikon 100th anniversary

NIKON METROLOGY SOLUTIONS

NIKON METROLOGY | VISION BEYOND PRECISION

MULTI-SENSOR METROLOGY



ALTERA

LK V-R

LK H-R

HN-C3030

L100

LC15Dx

XC65Dx-LS

MMDx

MCAx

MULTI-SENSOR METROLOGY SOFTWARE

COORDINATE MEASURING MACHINES

CMM LASER SCANNING

ARTICULATED ARMS

HANDHELD LASER SCANNING

MULTI-SENSOR METROLOGY

Nikon Metrology multi-sensor technology provides manufacturers with greater measurement flexibility and a better understanding of product conformance while increasing CMM throughput. The interoperability across CMM platforms, sensor technology and manufacturing sites, is a unique advantage which guarantees the longevity of your investment in software and inspection programs.

CHOOSE THE RIGHT PROBE FOR THE JOB

Laser scanner

High speed measurement with interactive 3D visualization of deviation from nominal. Non-contact technology eliminates the measurement errors associated with tactile probing.

L100

The ultimate CMM laser scanner combining productivity and accuracy

Applications
- Form/Surface inspection
- Feature inspection
- Reverse engineering

LC60Dx

Universal line scanner

Applications
- General inspection
- Reverse engineering

LC15Dx

High accuracy line scanner

Applications
- Precision parts
- Small geometry
- Intricate detail

XC65Dx(-LS)

High productivity Cross Scanner

Applications
- Sheet metal feature inspection
- Complex surfaces
- Long stand-off version for difficult-to-reach areas

All probe head and probes configurations are listed in the product datasheets

Touch probe

Flexible solution with a range of accessories for general inspection.

TP20, TP200

Standard touch probe

Applications
- Feature inspection
- Form measurement (TP200)
- Internal geometry

Scanning probe

High speed feature measurement and profile scanning indexing probe head with stylus lengths up to 400 mm and offset styli for difficult to reach features.

SP25M

High accuracy scanning probe with long stylus capability

Applications
- Feature scanning
- Form scanning
- Internal geometry

5-axis measurement system

5-axis technology uses synchronised motion of the CMM and the head axes to minimize machine's dynamic errors at high measuring speeds.

REVO-2, PH20

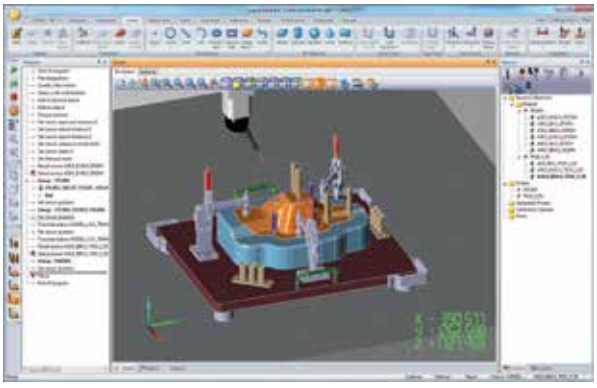
Applications
- Prismatic parts
- Blade inspection

High precision scanning head

SP80 high precision fixed scanning head with stylus lengths up to 800 mm for powertrain applications and large high-precision machined components.

BETTER INSIGHTS, HIGHER PRODUCTIVITY

CAMIO offers true multi-sensor capability, allowing best-practice selection of sensor technology for each task. By combining touch trigger, analog scanning and 3D laser scanning sensors within the same inspection program, the right inspection results are obtained in the fastest way.
Nikon Metrology multi-sensor solutions provide manufacturers with greater measurement flexibility and a better insight of product conformance while increasing CMM throughput.



Features

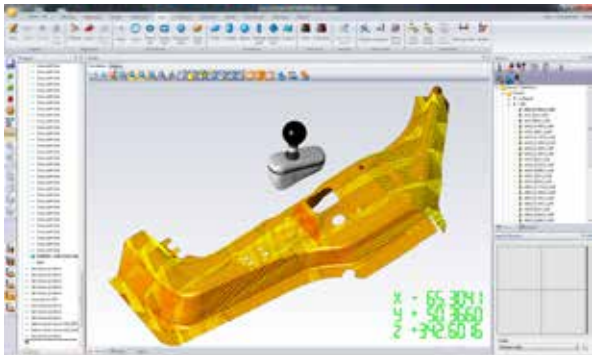
- Simple CAD-based programming environment optimized for a minimum number of mouse clicks.
- Open inspection plans direct from CAD data including the import of part axis and GD&T tolerance data.
- Fast workflow to program multiple features of multiple types (ie points, circles etc.) in a single operation.
- Structured and comprehensible probe management.
- Full machine simulation and collision detection to verify the probe path before execution on the 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.
- Fully DMIS, I++ compliant

Benefits

- Select the right sensor for the job to get better insights while reducing overall cycle time
- Easily write your inspection program based on the CAD model
- Proof programs offline with collision detection and measurement simulation
- Analyze product conformance through graphic CAD comparison for features and surfaces
- Speed up the decision process with instant reporting
- Increase productivity by automating the inspection processes

Productive scanning

Scanning geometric features and complex surfaces is simple using CAMIO. Scan paths that follow the surface shape are created automatically, while simulated point cloud data enables checking part coverage. Scan paths can be fine-tuned interactively to include areas that were missed.



Full graphical representation of the planned scanning path.

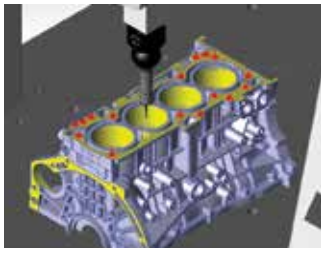
Full compliance to DMIS standard

CAMIO's strict adherence to the industry standard for CMM inspection programs, Dimensional Measuring Interface Standard (DMIS), offers users significant benefits while ensuring the longevity of their investment in CMM software and inspections programs.

CAD-based feature inspection

The CAMIO program editor provides an easy to follow iconized view of the inspection program. Editing the program is as simple as double clicking or using drag and drop to re-order the inspection sequence.

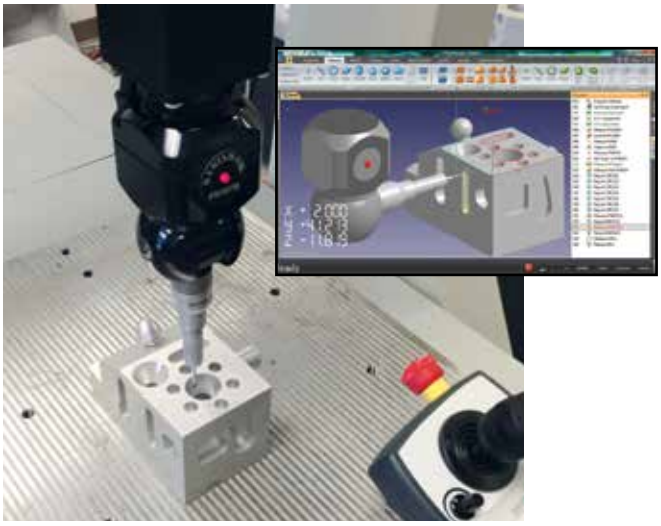
CAMIO program editor.



Multiple circles on a single plane are selected with one click.

CMM-Manager Metrology software

FULLY FEATURED FOR MANUAL, CNC & PORTABLE CMMs



CMM-Manager for Windows is 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

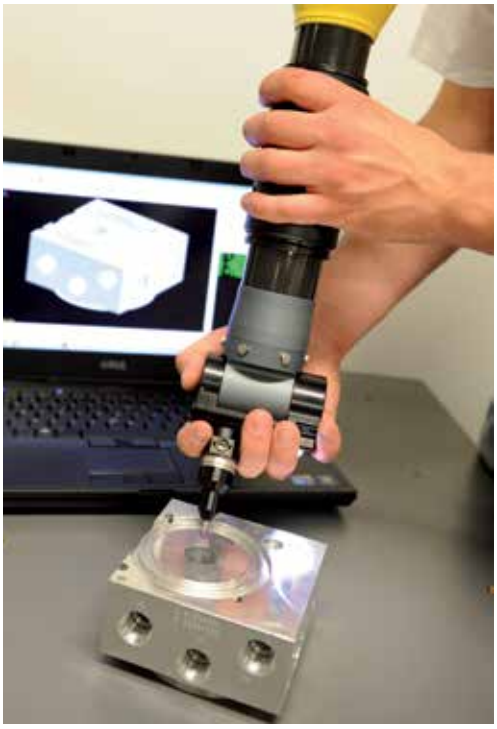
- CAD based graphical programming
- Automatic collision avoidance
- Smart alignment features
- Automatic probe recognition
- Leap frogging to extend measurement volume for portable measurement
- Best-fit analysis for improved inspection accuracy
- Drag-and-Drop web-ready graphical reporting

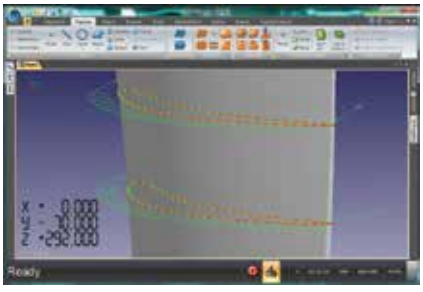
Benefits

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

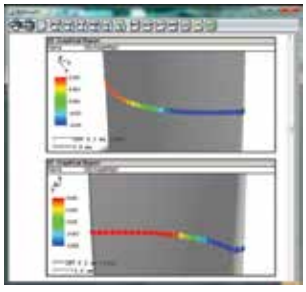
Retrofit capabilities

- CNC or Manual CMM: Nikon Metrology, Sheffield, Mitutoyo, Brown & Sharpe, DEA, Zeiss, Starrett, Numerex, Helmel, Wenzel, Renishaw
- Portable CMM retrofits: MCA (I, II, x), K-Series Optical CMM, Faro, Romer/CimCore, Sheffield, Brown & Sharpe, Mitutoyo, Renishaw
- iNEXIV video measuring systems

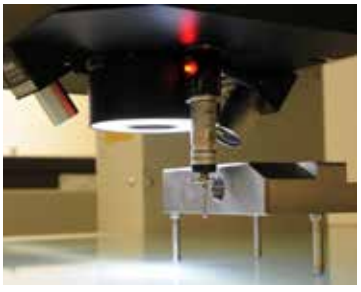




Easy-to-use software capable of measuring complex parts



Quick data interpretation through color-coded local geometry deviation



CMM-Manager is also available on iNEXIV video measuring systems

ALTERA MULTI-SENSOR CMMs

ALTERA 20.12.10

Nikon Metrology's range of premium quality ALTERA CMMs meet the varying needs of manufacturers, both today and in the future. The superior ceramic design, with near perfect stiffness-to-weight ratio and greater resistance to temperature shifts, provides consistent performance across all manufacturing environments

With the use of advanced components and optimized designs, the new ALTERA series offers high performance, vast reliability and low service costs.

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

ALTERA 7.5.5 ALTERA 20.12.10 ALTERA 25.20.15

Applications

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

Specifications

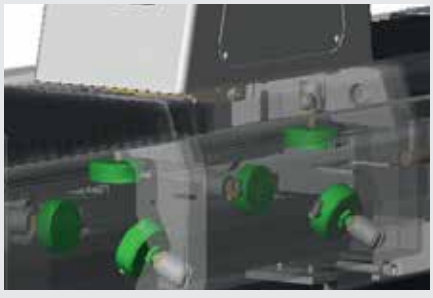
- Volumetric accuracy
  - from 1.8 µm + L/400 (ALTERA)
  - from 1.5 µm + L/375 (ALTERA+)
- Repeatability
  - from 1.8 µm (ALTERA)
  - from 1.5 µm (ALTERA+)
- Velocity
  - up to 762 mm/s^2 (ALTERA)
  - up to 833 mm/s (ALTERA+)
- Acceleration
  - up to 2303 mm/s^2 (ALTERA)
  - up to 2514 mm/s^2 (ALTERA+)

Enduring accuracy

Ultra-stable ceramic bridge and spindle guideway with high resolution 0.05 µm optical scales result in volumetric accuracies as low as 1.5 µm + L/375.

Precise motion

Granite dove-tail table guideway with unique single orifice grooved pre-loaded air bearings for precise motion control at high speeds.



HIGH PERFORMANCE CERAMIC BRIDGE TECHNOLOGY

ALTERA+ 10.10.8

ALTERA+ CMMs are a range of high accuracy, high productivity multi-sensor CMMs for simple to complex inspection applications.

Produced to the most rigorous standards for the highest level of accuracy, ALTERA+ is ideal for inspection of function or performance critical components manufactured to the tightest of tolerances.

ALTERA								ALTERA+ [1]	
7.5.5	8.7.6	10.10.8	10.12.10	15.15.10	20.15.12	20.15.15	25.20.15	8.7.6	10.10.8
	10.7.6	12.10.8	15.12.10	20.15.10	25.15.12	25.15.15	30.20.15	10.7.6	15.10.8
	15.7.6	15.10.8	20.12.10	25.15.10	30.15.12	30.15.15	35.20.15	15.7.6	20.10.8
		20.10.8	25.12.10	30.15.10	35.15.12	35.15.15	40.20.15		25.10.8
			30.12.10	35.15.10	40.15.12	40.15.15	45.20.15		30.10.8
			35.12.10	40.15.10	45.15.12	45.15.15	50.20.15		
			40.12.10	45.15.10		50.15.15	60.20.15		
							65.20.15		

Full CMM specifications are available in the data sheets.

10 YEAR ORIGINAL ACCURACY GUARANTEE

Unique accuracy guarantee
Nikon Metrology is the only manufacturer to guarantee the accuracy of its CMMs for 10 years.

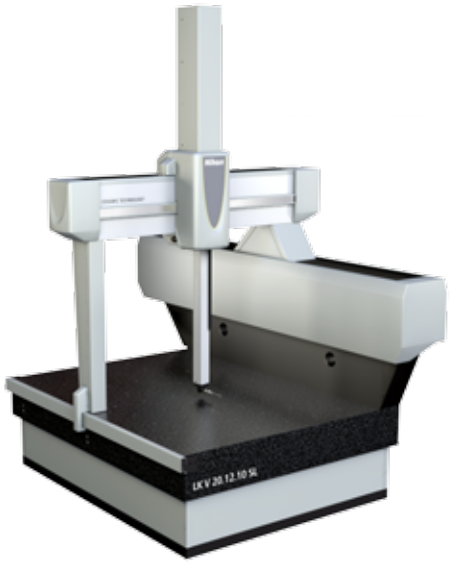
Anti-vibration

Superior pneumatic self-levelling vibration isolation for optimum performance in areas subject to high levels of low frequency vibration.

Shop floor ready

Ready for harsh shop floor environments, the ALTERA range features thermally resistant ceramic bridge and guideways protected from airborne dust or oil contaminants.

ULTIMATE SCANNING AND INSPECTION PERFORMANCE



LK V 20.12.10 SL

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

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 1.1 µm+L/400 (LK V-SL)
  - from 0.7 µm+L/600 (LK V-SL HA)
- Repeatability
  - from 0.7 µm (LK V-SL)
  - from 0.5 µm (LK V-SL HA)
- Velocity
  - up to 850 mm/s (LK V-SL)
  - up to 317 mm/s (LK V-SL HA)
- Acceleration
  - up to 1407 mm/s^2 (LK V-SL)
  - up to 566 mm/s^2 (LK V-SL HA)

Ceramics for 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 PLUS	TP200
10.7.6	15.10.8		REVO-2	SP25M
15.7.6				LC/L/XC series laser scanners

[1] (other sizes available on request)

UNEQUALLED PRICE/PERFORMANCE

ALTO is ideal for manufacturers purchasing a cost-effective CMM with easy-to-use software for a variety of measurement tasks. From first article to final inspection, fixture calibration to troubleshooting, ALTO is the perfect quality control tool for inspection and production departments alike.

The small half-gantry design combines aluminium construction, air bearings and state-of-the-art electronics with today's most intelligent CMM software for outstanding performance.

Benefits

- Affordable quality
- Easy-to-use software
- Outstanding performance
- CNC or manual version
- Small footprint (5.4.4 or 6.5.4)

Features

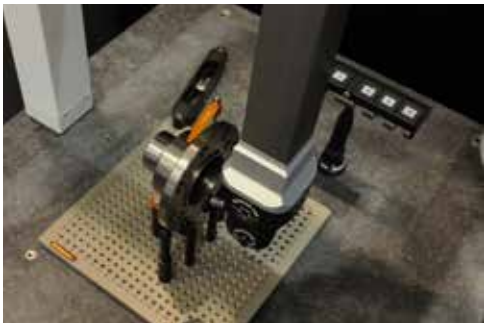
- Aluminium alloy beam and spindle, micro-machined for additional precision
- Low maintenance air bearings with increased spread for lasting stability
- Zero hysteresis friction drive on all axes for smooth motion control
- High accuracy 0.1 µm optical scale system
- Also available as manual version with the option to upgrade to CNC

Intelligent software

CMM Manager empowers users of all skill levels after just a few hours. Intelligent software tools such as quick-measure and one-click CAD measure guide the user through the inspection and boost CMM productivity. Graphical reports instantly provide a concise analysis of inspection data and can be easily shared with others via web-ready reporting.

ALTO probes/probe heads

- MH20i – Manual adjustable indexing head with integral touch probe
- RTP20 – Low-cost 'motorized head functionality' automated indexing head with integral touch probe
- PH10 PLUS – Industry standard motorized indexing probe head with multi-sensor support
- PH20 – Advanced motorized 5-axis head with integral touch probe



A NEW BREED OF LARGE SCALE CMMS

LK V 50.40.12 R

LK V-R twin-rail mounted bridge style CMM

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, analog scanning and laser scanners

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 4.5 µm + L/200 (LK V-R)
  - from 3.5 µm + L/250 (LK V-G(P))
- Repeatability
  - from 4.5 µm (LK V-R)
  - from 3.5 µm (LK V-G(P))
- Velocity
  - up to 533 mm/s (LK V-R)
  - up to 467 mm/s (LK V-G(P))
- Acceleration
  - up to 631 mm/s^2 (LK V-R)
  - up to 581 mm/s^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 3 m to 10 m+ Bridge sizes from 2 m to 4 m Spindle lengths from 1.2 m to 3 m *(short-leg model with steel legs or concrete riser foundation)*	PH10MQ PLUS	TP20 TP200 SP25M LC/L/XC series laser scanners

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

Sizes[1]	Probe Head	Probes
Rail lengths from 2 m to 10 m+ Bridge sizes from 4 m to 7 m Spindle lengths from 3 m to 4 m *(available with steel legs or concrete riser foundation)*	PH10MQ PLUS	TP20 TP200 SP25M LC/L/XC series laser scanners

[1] (other sizes available on request)

LK H Horizontal arm CMM

PRODUCTIVITY COMBINED WITH HIGH ACCURACY

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.

LK H-T high accuracy table mounted horizontal arm CMM

LK H-T featuring rotating table

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

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 1.9 µm + L/250 (LK H-T)
  - from 10 µm + L/200 (LK H-R)
- Repeatability
  - from 1.9 µm (LK H-T)
  - 6.0 µm (LK H-R)
- Velocity
  - up to 850 mm/s (LK H-T)
  - up to 667 mm/s (LK H-R)
- Acceleration
  - up to 3008 mm/s^2 (LK H-T)
  - up to 2106 mm/s^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 4 m to 10 m+	PH10MQ PLUS	TP7M
Spindle lengths from 0.4 m to 1.6 m		TP20
Column heights from 2 m to 3 m		TP200B
(available with walk-on or bellow covers for rails)		SP25M
		LC/L/XC series laser scanners

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

Sizes[1]	Probe Head	Probes
Rail lengths from 1 m to 5 m	PH10MQ PLUS	TP20
Spindle lengths from 0.4 m to 1.6 m		TP200B
Column heights from 0.6 m to 2 m		SP25M
		LC/L/XC series laser scanners

[1] (other sizes available on request)

DIGITAL LASER SCANNING BOOSTS INSPECTION PERFORMANCE

L100 – The ultimate CMM laser scanner combining productivity and accuracy

The L100 CMM laser scanner offers the best possible combination of speed, accuracy and ease-of-use. Suited for both surface and feature measurement, the L100 quickly delivers accurate data and insightful part-to-CAD comparison reports even on shiny or multi-material surfaces.

The L100 is ideal to inspect larger components where productivity is key, but without having to compromise on accuracy. Equipped with a high quality glass Nikon lens and a high definition camera, the L100 features a point resolution of 42 µm and an exceptionally small probing error of 6.5 µm, enabling delivery of smooth meshes and high levels of detail.

LC60Dx – All purpose, digital scanner

The LC60Dx is an all-purpose scanner is designed for effortless scanning of varying or hard-to-scan surface materials. Like all other Nikon digital scanners, the LC60Dx is equipped with the unique Enhanced Sensor Performance capability, providing real-time, point per point laser intensity adjustment that constantly adapts to the material surface.

Benefits of CMM-based laser scanning

- **Better insights into deviations**
  - Colorful part-to-CAD surface / profile / feature reports provide in a visual way detailed information on product conformity
  - Leads to faster decision-making and corrective actions
  - Results in fewer and shorter design iterations and faster time-to-market
  - Shortens production downtime through faster troubleshooting
- **Enhance the capability of your current CMM**
  - Upgrade to a versatile multi-sensor CMM offering both non-contact and touch probe inspection
  - Retrofit existing CMMs controller hardware and software. Retrofit kits are available for most leading CMM controller brands
- **Increase inspection productivity**
  - Laser scanners collect more information in less time
  - Faster feature measurement due to fewer CMM movements
  - Easy off-line CAD-based programming saves on preparation and modification of measurement programs
- **Measure soft and fragile components**
  - Measure delicate surfaces that cannot be touched
  - No deformation of soft materials like foams, rubber, membranes, etc
  - Scan any material - No special treatment required for dark or shiny parts

FULL 3D CAPTURE OF FEATURES AND COMPLEX SURFACES

LC15Dx – Closing the gap with tactile accuracy

The all-digital Nikon LC15Dx scanner brings 3D digitizing in the accuracy range of tactile measurement, while offering the advantage of capturing a multitude of inspection points. Thanks to the high quality Nikon lens, the LC15Dx achieves a probing accuracy of 1.9 µm and a multi-stylus test accuracy of 3.9 µm in tests comparable to EN/10360-2 and -5.

With its smaller field-of-view, it perfectly suits digitizing small or detailed objects with higher point density and tighter tolerances.

XC65Dx(-LS) Cross Scanner – Productive feature inspection

Incorporating 3 lasers in a cross pattern, the XC65Dx 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 XC65Dx-LS has a longer stand-off for optimum capture into deep pockets and slots, and accessing other hard-to-reach locations. The Cross Scanner is suited for inspection of sheet metal vehicle body parts with 2D or 3D features, casted engine parts and complex plastic molded parts etc.

Specifications

	L100	LC15Dx	LC60Dx	XC65Dx	XC65Dx-LS
Field-of-view	Approx 100x60 mm	18x15 mm	60x60 mm	65x65 mm (3x)	65x65 mm (3x)
Probing error (MPE_p) [1]	6,5 µm	1.9 µm	9 µm	12 µm	15 µm
Data acquisition (approx. pts/sec)	200,000	70,000	77,000	3 x 25,000	3 x 25,000
Enhanced Scanner Performance	ESP4	ESP3	ESP3	ESP3	ESP3

[1] *Nikon Metrology test comparable to EN/ISO 10360-2*

HIGH SPEED, NON-CONTACT METROLOGY

HN-C3030 is an innovative non-contact 3D metrology system equipped with a high-speed, high-precision laser scanner. Five-axis automatic control allows scanning of parts with complex shapes using optimum scanning angles. The HN-C3030 is suitable for measurement of various gear types, turbine blades, and other complex shapes. The HN-C3030 combines speed and accuracy to satisfy a faster time-to-market compared to traditional tactile inspection.

Benefits

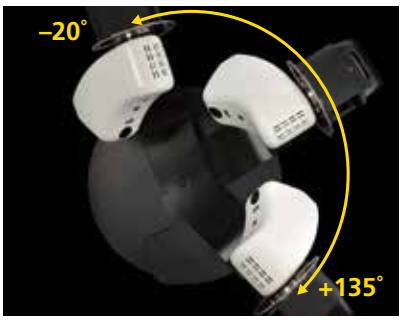
- Dense 3D scan provides better insight into complex shapes (part-to-CAD comparison, waviness)
- Laser scanning offers higher measurement speed and resolution compared to tactile inspection
- Non-contact eliminates the need for probe tip compensation
- Reveal surface defects that are not detected by tactile measurement
- Measure small parts or features impossible for tactile probes

Applications including

- Hypoid gears, bevel gears, helical gears, spur gears, internal gears, splines,
- Turbocharger wings, impellers
- Oil seals, hob cutters etc.

Key features

- High accuracy non-contact measurement 5µm (ES, MPE)
- High throughput acquisition data rate at 120.000 pts/sec
- Optimal measuring position with 5-axis control
- Sizes up to 300mm x 300mm with a weight of 30kg
- Production floor use (option)
- Wide range of application software



Five-axis scanning control guarantees optimal scanning angle

Laser scanning of a hypoid gear

Inspection of all tooth surfaces on an automotive bevel gear can be done in only 5 minutes

MCAx with laser scanners

PREMIUM PORTABLE METROLOGY & INTUITIVE SCANNING

The MCAx Manual Coordinate Measuring Arm, is a precise, reliable and easy-to-use portable 7-axis measuring system. It is the perfect partner for the ModelMaker MMDx digital handheld laser scanners and ideally suited for portable 3D inspection and reverse engineering applications. The MMDx camera technology represents a major leap forward in 3D laser scanning as it features a high frame rate and a large stripe width up to 200 mm. On top of this, the ModelMaker automatically adapts its laser intensity to digitize nearly all shiny or multi-coloured parts without any surface preparation.

Applications

- Full part-to-CAD inspection
- Inspection of geometric features
- Flush & gap inspection
- Reverse engineering
- On-site troubleshooting
- Input for rapid prototyping

MCAx articulated arm features

- Flexible probing options
- Intuitive scanning and inspection software
- Available in lengths between 2 m and 4.5 m
- Advanced construction: aerospace grade carbon fiber arms – strong but light with lifetime warranty
- Infinite rotation of all principle axes for unrestricted use

ModelMaker laser scanner features

- Multiple stripe widths available from 50 mm to 200 mm
- Accuracy down to 10 µm
- 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

MMDx scanner is available in 50/100/200 mm stripe width

Benefits

- High accuracy and fast data throughput saves time and money
- Quick and easy setup with zero warm-up time
- Ergonomic solution & robust design with full scanner control at your fingertips

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 sensors 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

- Stripe width between 100 to 200 mm (depending on the selected scanner type)
- Lightweight carbon fiber probe design
- Dynamic referencing to measure unstable or moving parts
- SpaceProbe available for tactile measurements

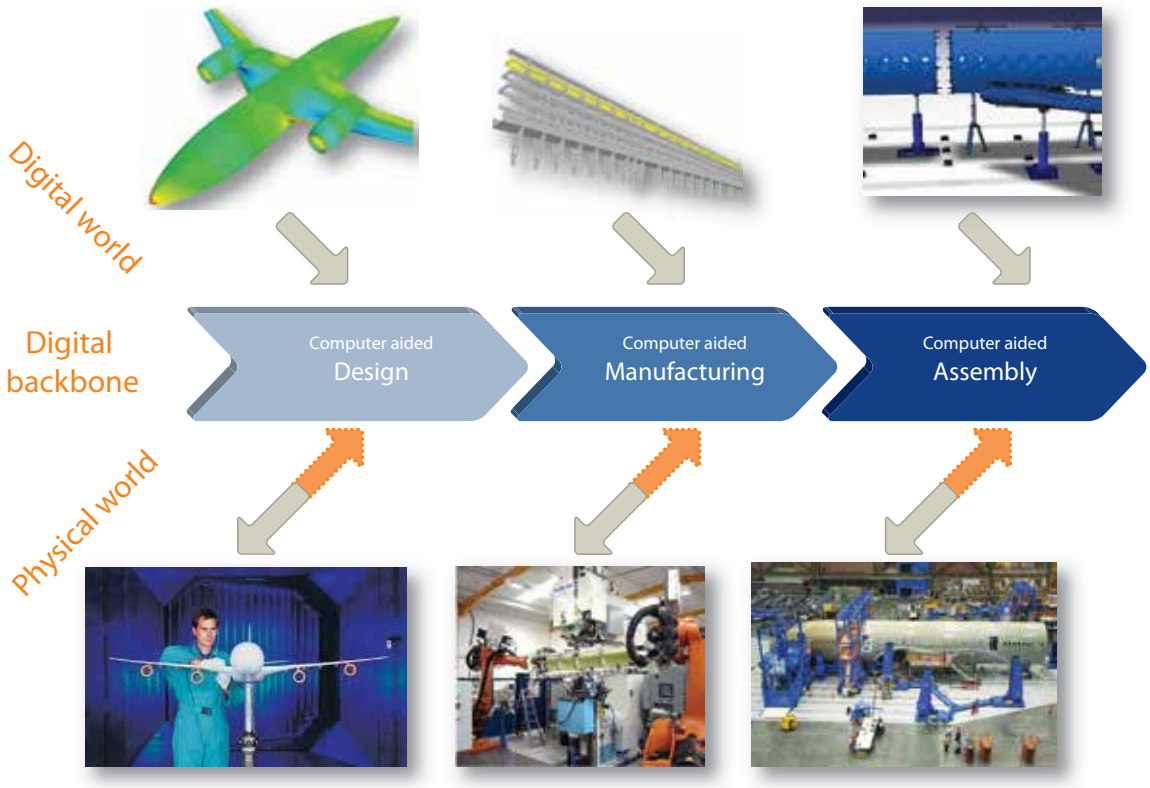
Benefits

- 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

METROLOGY ASSISTED PRODUCTION / ROBOT METROLOGY



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

ROBOT BASED METROLOGY APPLICATIONS

iGPS

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

Features

- Measurement range for MV351 up to 50 m, MV331 up to 30 m
- Vision Scan inspection mode captures up to 2000 points per second
- Accuracy from 24 µm (2 m 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

The Laser Radar is used for large volume inspection of objects ranging from a passenger door to an entire aircraft, reducing costs and improving product and process quality.

SHOP FLOOR CMM FOR CAR BODY INSPECTION

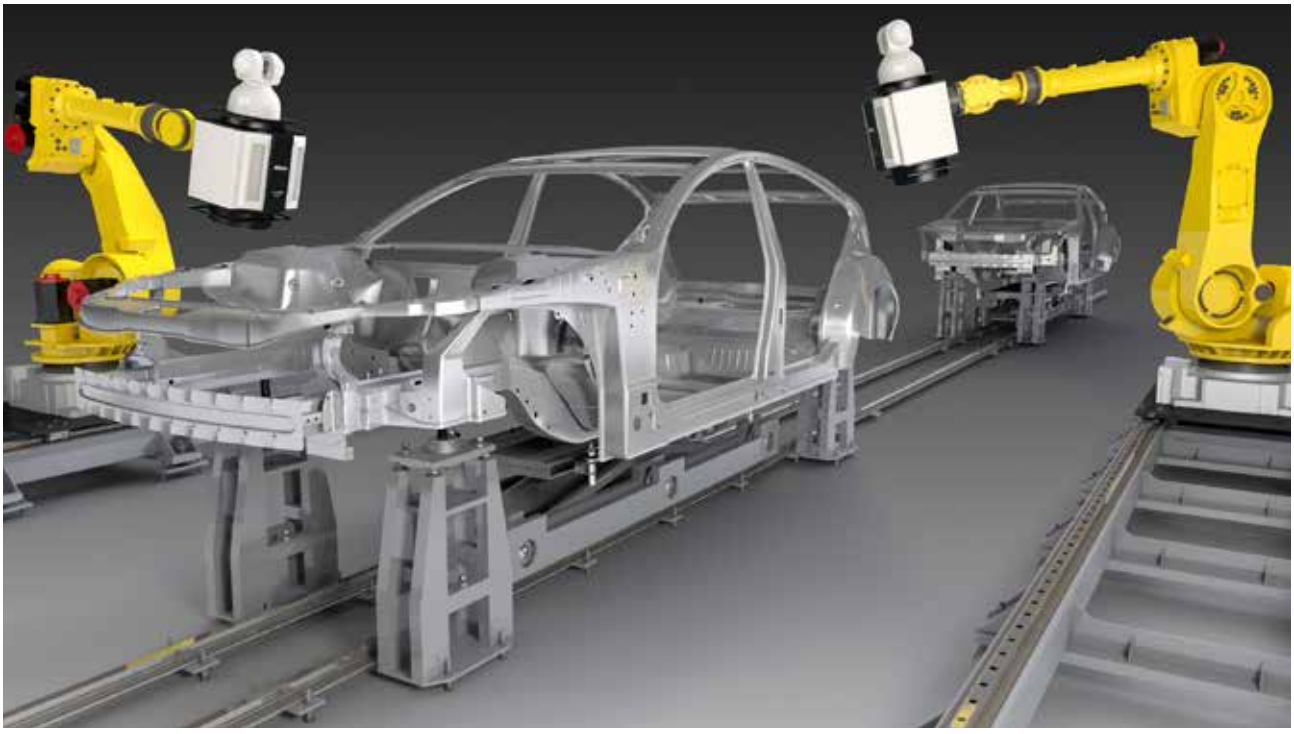
**The Laser Radar mounted on an industrial robot introduces an innovative approach to body-in-white (BIW) inspection.
This shop floor system provides accurate, dimensional measurements in the car coordinate system allowing direct comparison to CAD without the need for a reference part. Unlike horizontal-arm CMM, its high-speed measurements fit within short production cycle times. At the same time it is a more flexible solution to adapt with changes in model mix and factory layout.**

Laser Radar mounted on a robot is an innovative alternative for a traditional horizontal arm CMM

Key features

- Flexible, automated inspection
- Absolute measurements in vehicle coordinates
- <0.1 mm accuracy over the volume of the car
- Large stand-off prevents collisions
- Fully (offline) programmable
- Available as stand-alone solution or robotized integration for use in measurement room, as by-pass station or directly on the production line.
- Interfaces with leading industrial robot brands

Features like holes, slots, pins, studs etc are inspected in an automated way at a scanning rate of 2000 points/sec



Laser Radars are mounted on 6-axis robot arms that are located on each side of the production line.

FLEXIBLE INSPECTION, PRODUCTIVE MEASUREMENTS

Adaptive Robot Control

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

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.)

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

K-Robot

K-Robot is a flexible, productive and accurate metrology solution for 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

Benefits

- Truly absolute measurement accuracy
- Eliminates effects of robot warm-up, drift and backlash
- Interfaces to any robot brand, size and accuracy level
- High scanning accuracy and throughput
- Off-line teaching and programming

iGPS - Indoor Global Positioning System

MODULAR POSITIONING, TRACKING AND MEASUREMENT

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.

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

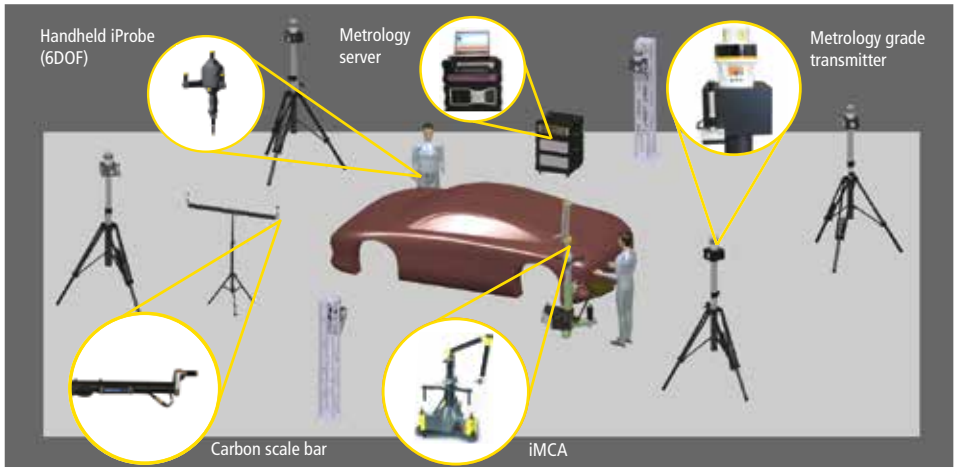
i5 integrated sensor

Features

- Expand measurement volume by extending transmitter network (iGPS)
- 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

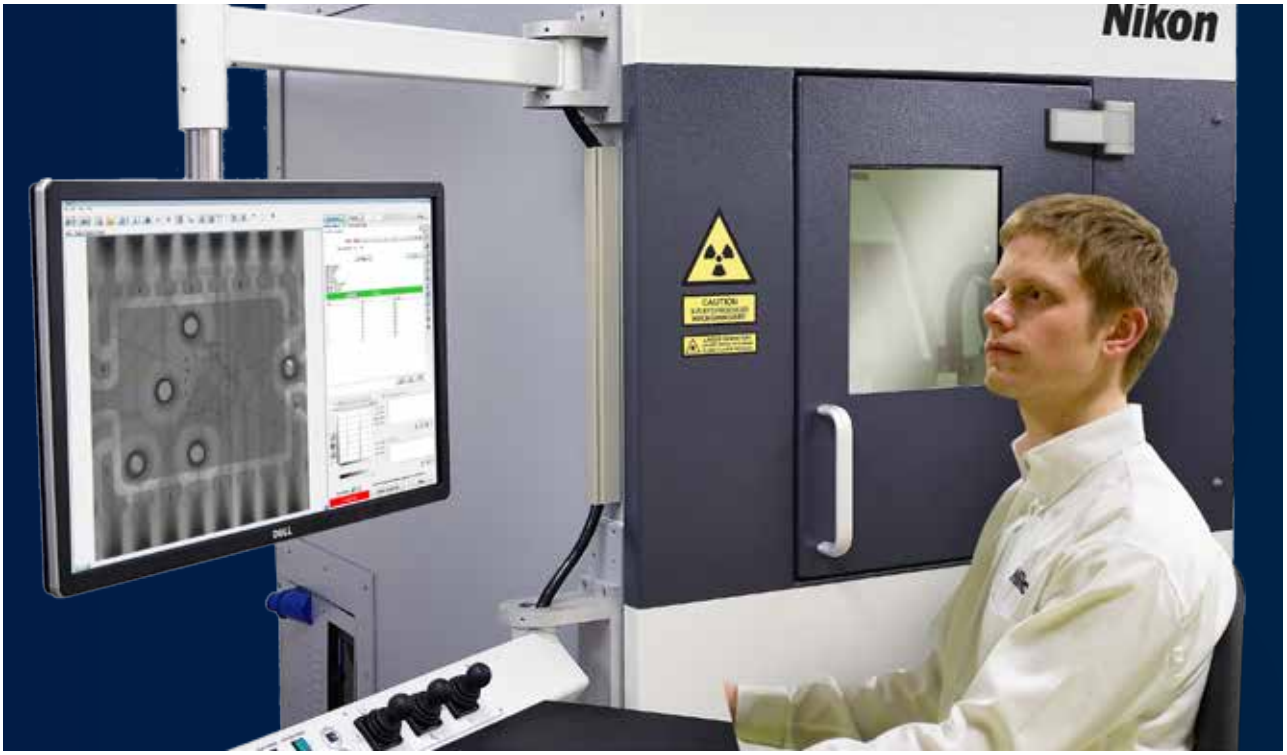
- Supports factory-wide deployment (iGPS)
- Easily deployable for measuring the dynamic positioning of handheld probes, articulated arms, laser radars and other measurement equipment
- Uniform accuracy throughout the entire workspace
- Scalable, accurate and robust solution
- Concurrent use of an unlimited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



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

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.

X-RAY SOURCES

XT H 160 / 225 / 225 ST INDUSTRIAL CT

XT H 320 INDUSTRIAL CT

XT H 450 HIGH VOLTAGE CT

MCT225 METROLOGY CT

XT V 130C / XT V 160 ELECTRONICS X-RAY INSPECTION

X-RAY SOURCES

In-house design and build

Nikon Metrology X-ray sources are at the heart of our technology and have been designed and manufactured in-house from 1987 to this day, offering over 25 years of experience. All sources are open-tube giving a low cost of ownership and range from low (160) to medium (225) to high (450) kV, all with micron resolution.

180 kV transmission target

Applicable for samples smaller than 10 mm, such as small rock cores or bone samples, the Transmission Target operates up to 180 kV to achieving a minimum spot size of 1 µm leading to high resolution CT.

160/225 kV reflection target

With up to 225 kV and a minimum spot size of 3 µm, the 225 kV microfocus source is the core of Nikon's XT H 225 range, devising flexibility to cope with a range of sample sizes and densities.

225 kV rotating target option

Nikon Metrology is the only company to produce an industrial 225 kV rotating target option. Using a rotating target, the electron beam falls on a moving instead of a fixed surface, which yields much more effective cooling. This offers the opportunity to measure objects faster, or denser objects with higher accuracy than using a conventional static 225 kV.

320 kV source

The 320 kV source is a unique microfocus source for samples too large or dense for 225 kV whilst still maintaining a small spot size. Ideal for rock cores and small castings the source is an option in the XT H 320 cabinet.

450 kV static and high brilliance source

The unique 450 kV microfocus source gives industry leading performance for small high density or small to medium castings with unrivalled power and resolution.

Nikon's 450 kV high-brilliance source delivers 450 W continuous power, without any measurement time restriction, whilst maintaining a smaller spot size for faster CT scanning, collecting data up to 5x faster or with higher accuracy in a similar scan duration of the default 450 kV.

ENTER THE WORLD OF X-RAY CT

Detailed capture and measurement of internal component and assembly features is often vital for quality control, failure analysis and material research.

The entry-level XT H 160 and versatile XT H 225 systems feature a microfocus X-ray source offering high image resolution.

The XT H 225 ST system is an extended version capable of housing larger or heavier samples and a choice of X-ray sources ranging from transmission target 180 kV to rotating target high flux 225 kV. They cover a wide range of applications, including the inspection of plastic parts, small castings and complex mechanisms as well as researching materials and natural specimens.

Features

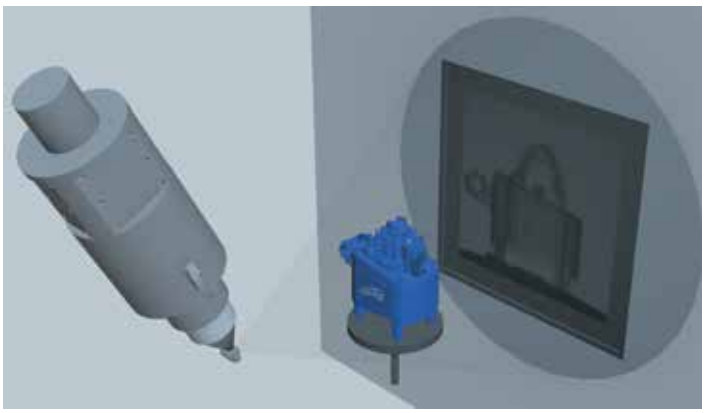
- Choice of different proprietary microfocus X-ray sources
  - 160 kV Reflection Target (XT H 160)
  - 180 kV Transmission target
  - 225 kV Reflection target
  - Optional rotating target (ST only)
- Choice of Varian or Perkin Elmer flat panels
- Real-time X-ray visualization, fast CT reconstruction
- CT measuring volume up to X:450 mm, Y:350 mm, Z:750 mm (ST version)
- 5-axis fully programmable part manipulator
- Customizable macros automate measurement workflow
- Small footprint and castors & roller for easy handling

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

Computed Tomography

To generate a 3D CT volume, a series of sequential 2D X-ray images are captured as the object is rotated through 360°. These images are then reconstructed to generate a 3D volumetric representation of the object. In addition to the outer surfaces, the reconstructed volume contains all information of interior surfaces and structure - as well as information on the material structure. It is possible to navigate through the CT volume at any given point, through any plane. As a result even interior measurements can be easily obtained, as well as the added benefit of localizing structural material imperfections and identifying assembly errors not usually visible through traditional methods of NDT.



XT H 320

THE FIRST STEP IN HIGH VOLTAGE MICROFOCUS

The XT H 320 is a large cabinet system for the X-ray CT scanning and metrology of large components. The system consists of a 320 kV microfocus source delivering up to 320 W of power.

A high resolution flat panel is used to collect high quality images of the sample. The system is controlled by Inspect-X software which makes the collection of CT data and setting up of measurements simple and easy. The system can output volume data to industry standard volume viewing software

Stunning images

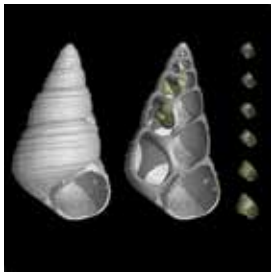
Multi-material or lower attenuating samples are better scanned with Perkin Elmer flat panels due to the high dynamic range. High resolution voxel data is achieved in CT scans by having flat panels with many pixels. The larger cabinets are configurable with higher resolution 4000 x 4000 pixel Perkin panels, offering razor sharp images.

320 kV microfocus

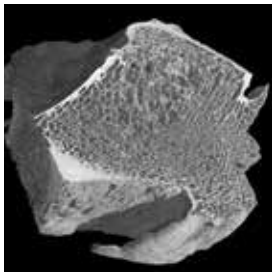
Most system suppliers only offer microfocus sources up to 225 kV, while more powerful sources in their offerings are minifocus. With larger samples, one often needs more penetration power and therefore Nikon Metrology offers a unique 320 kV microfocus X-ray source. As the X-ray spot size of these sources is orders of magnitude smaller compared to minifocus sources, end users benefit from superior resolution, accuracy and a wider array of measurable parts.

With Nikon Metrology CT systems you can

- Verify complex internal structures
- Isolate and inspect included components
- Measure internal dimensions without sectioning the sample
- Automatically detect and measure internal voids/volumes
- Reveal internal and external surfaces with ease
- Reduce total inspection time
- Reduce number of iterations to fine-tune (pre-) production parameters

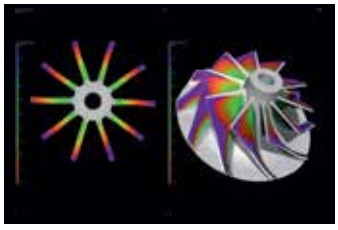


Snail fossil



Femur bone

Shaving foam can



Wall thickness evaluation on impeller

HIGH VOLTAGE 450 kV MICROFOCUS CT

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 450 kV 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 open-tube 450 kV micro-focus source
- High-brilliance source available (option)
- Different imaging options
  - Perkin Elmer flat panel detector (XT H 450 3D)
  - Curved Linear array Detector (XT 450 2D)
  - Combination of plat panel and CLDA detector
- Measuring volume up to 600 mm diameter and 600 mm height
- 5-axis fully programmable turntable manipulator with precision ball screws and linear slides
- Dedicated application for automatic pass/fail inspection of turbine blades

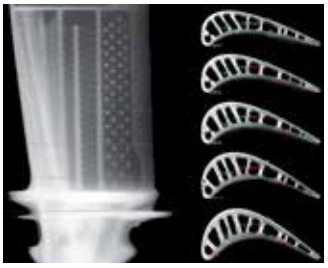
Applications

- Detailed analysis of the wall thickness and 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

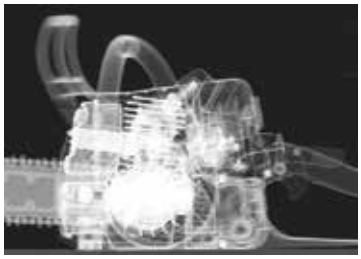
Faster throughput or higher data quality with high-brilliance source

The new (optional) 450 kV high-brilliance source enables the user to get the most out of this XT H 450 system. For a given spot size and power, data can be collected typically 3-5x faster, giving the user faster throughput. Alternatively for a given power and measurement time, the available resolution will be higher and so the data quality will be improved. The high-brilliance source also delivers continuous 450W without measurement time restriction.

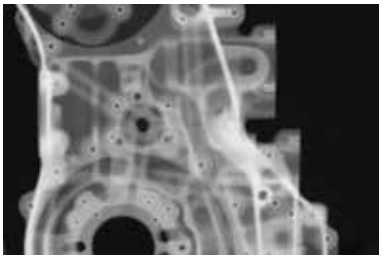
The 450 kV high-brilliance source provides the same advantages as a rotating target source: faster data collection or a higher data quality at continuous power



X-ray image and CT slices of a single-crystal aerospace turbine blade generated using a Curved linear diode array (CLDA) detector.



X-ray of chainsaw



X-ray of engine casting

CT volume model of engine casting

MCT225 Metrology CT

ABSOLUTE ACCURACY FOR INSIDE METROLOGY

MCT225 efficiently measures internal and external geometry without reference measurements and damaging the sample. With fifty years' CMM experience and twenty five years' X-ray experience, our pedigree for reliable high quality Metrology CT is second to none.

Material penetration guide

PLASTIC	170 mm
ALUMINIUM	75 mm
IRON	15 mm

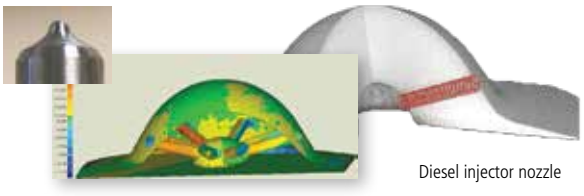
Other suitable materials include:
STEEL, CERAMIC, CARBON FIBRE, WOOD

Absolute accuracy

MCT225 is pre-calibrated using accuracy standards traceable to the UK's national measurement institute (NPL) and verified using VDI/VDE 2630 guidelines for Computed Tomography in Dimensional Measurement. Absolute Accuracy guarantees measurement accuracy without time consuming comparative scans or reference measurements, samples are simply placed on a rotary table inside the enclosure and measured. Several key metrology features provide long term stability and enable the MCT225 to achieve an impressive accuracy specification of 9+L/50 µm.

Features

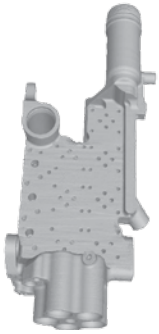
- Nikon Metrology developed micro-focus X-ray source
- Temperature controlled enclosure
- High precision linear guideways
- Axis travels error corrected
- Liquid cooled X-ray source
- High resolution optical encoders
- High resolution 4Megapixel detector
- Finite Element Analysis (FEA) optimized manipulator



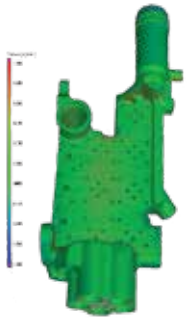
Diesel injector nozzle

Metrology CT process

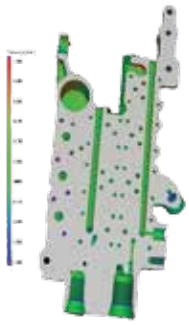
F1 car
hydraulic manifold



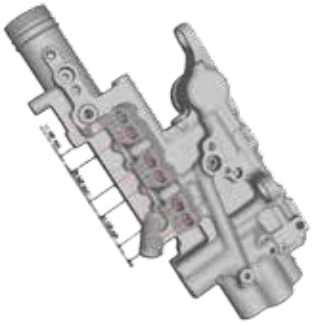
CT volume
reconstruction



Direct comparison
to CAD model



Section of
internal geometry

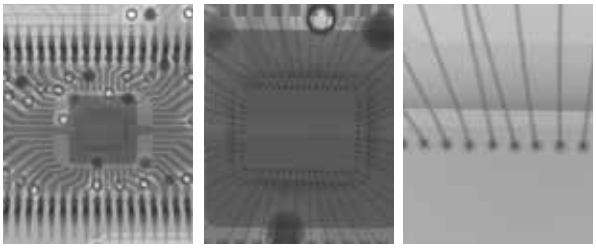


Dimensional report
GD&T

VERSATILE AND EASY-TO-USE ELECTRONICS QA SYSTEM

The XT V 130C is a highly flexible and cost-effective electronics and semiconductor inspection system. The system features a 130 kV/10 watt Nikon Metrology manufactured source, a globally recognized open tube design with integrated generator, and a high-resolution imaging chain.

Through a series of factory and field upgrades, the end-user can configure these systems to its own needs with a higher power source, a rotating sample tray, automatic inspection software, a digital flat panel option, and the ability to add future-proof CT technology.



Superb 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

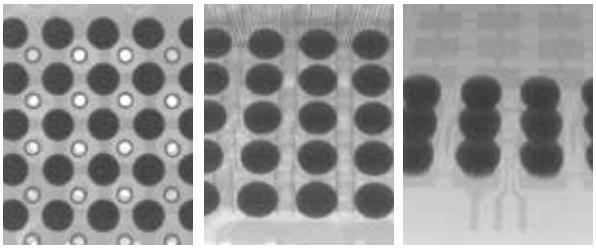
Features

- Proprietary 20-130 kV micro-focus source with 2 µm feature recognition
- Measurement area of 406x406 mm
- True 75° manipulator tilting angle allows oblique viewing for easy inspection of internal features
- A hinged door providing easy access to the inspection area
- Serviceable components are easily accessible

Benefits

- 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
- CT option possible

Easy access to the inspection area



Tilt angles up to 75° offers sufficient flexibility to trace connectivity issues quickly

XT V 160

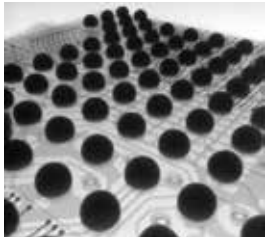
TOP-CLASS X-RAY INSPECTION SYSTEM

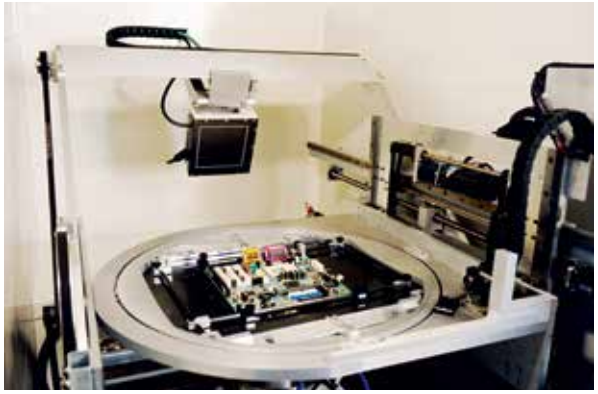
Component connections on today's compact and densely populated PCBs are hidden by other components, making X-ray the only viable inspection solution. XT V 160 is an easy-to-use, cost-effective and high-quality PCB inspection system targeting production facilities and failure analysis laboratories.

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

- Proprietary 160 kV 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





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-chip analysis
- Pad array analysis
- Dry joint detection and analysis

MEASURING INSTRUMENTS

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

VIDEO MEASURING SYSTEMS

MEASURING MICROSCOPES

PROFILE PROJECTORS

DIGITAL HEIGHT GAUGES

AUTOCOLLIMATORS

MULTI-SENSOR CNC VIDEO MEASURING SYSTEMS

iNEXIV VMA-4540

iNEXIV CNC Video Measuring Systems automatically inspect the dimensions of a variety of precision equipment and electric parts, using optical measuring and image processing technologies. By precisely detecting the edges of the sample using CCD camera images and data processing, the measurement of complex sample shapes is possible

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 10x optical zoom system and laser auto focus option.

The cost-effective VMA-4540V/4540 offers a larger measurement stroke enabling inspection of both large and tall mechanical and electronic parts. While the VMA-4540V offers video measurement only, the VMA-4540 additionally provides optional touch probe measurement.

The VMA-6555 is suitable for large samples (up to 650 x 550 x 200 mm) and simultaneous measurement of multiple parts. It features optimal cost-performance with the same strong cast-iron body and direct bearing as the high-end models.
The VMA-6555V is for video measuring, while the VMA-6555 is touch-probe ready.

Features

- Space-saving body weighing only 72kg (VMA-2520)
- Comfortable measuring volumes:
  - 250 x 200 mm XY stroke and 200 mm Z stroke (VMA-2520)
  - 450 x 400 mm XY stroke and 200 mm Z stroke (VMA-4540)
  - 650 x 550 mm XY stroke and 200 mm Z stroke (VMA-6555)
- 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 search capability

Applications

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

iNEXIV VMA-2520

iNEXIV VMA-6555 large stroke model

Aluminum die casting part

THE LATEST ADVANCEMENTS IN NEXIV TECHNOLOGY

VMZ-R4540

Accurate measurements of advanced products (i.e. smartphones and tablets) and high-speed image processing technology for mass production have become a standard inspection operation. These next-generation NEXIV systems aim for fast and accurate measurement of the dimensions and shapes of high density and multi-layered electronic components and mechanical parts.

Features

- New Laser Auto Focus designed to detect surface of thin transparent material
- 4 types of optical zoom systems
- New 8-sector Ring Light system with three incident angles
- Improved measuring accuracy with high resolution linear encoder
- Available in different sizes (VMZ-R3020, VMZ-R4540, VMZ-R6555)
- Streamlined software user interface enables every user to operate the system and create automated measurement programs

VMZ-R3020 VMZ-R6555

Highly accurate and fast measurements

A higher level of accurate measurements is achieved by Nikon's in-house developed linear encoder. In addition, improvements to the image transfer technology and changes to the illumination source have shortened overall measuring time.

Measurement flexibility

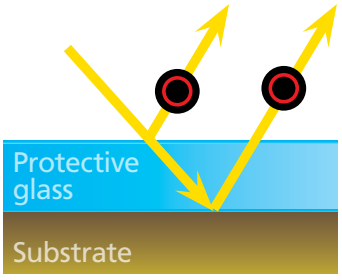
A third ring illumination angle features advanced edge detection, while enhancements to the TTL (Through The Lens) Laser Auto Focus have strengthened the system's ability to measure transparent components.

Advanced operability

Work efficiency has improved by reducing the number of steps needed to create teaching files. Developed for easier understanding and better comprehension, the newly added "Guide Panel" function has improved the main program.

New 8-sector Ring Light system with three incident angles

Episcopic, diascopic and Ring illumination employ white LED and provide stability and long life.
New Ring Light System with three incident angles designed for correct edge capture.



New Laser Auto Focus is designed to detect surfaces of thin, transparent material. The new sensor detects both top and back surfaces.

New 8-sector Ring Light system with three incident angles is designed for better capturing edges

CONFOCAL Nexiv VMZ-K3040

3D MEASUREMENTS USING CONFOCAL IMAGES

The Confocal NEXIV, a ground-breaking multi-functional video measuring system, was developed on the strength of Nikon's leading opto-mechatronics technologies. It incorporates confocal optics for fast and accurate evaluation of fine three-dimensional geometries, and brightfield optics with a 15x zoom. It allows both 2D and height measurements in the same field of view. The Confocal NEXIV can be optimally used for the inspection of highly complex structures such as bump heights on advanced semiconductor packages, probe cards and laser marks on wafers, etc.

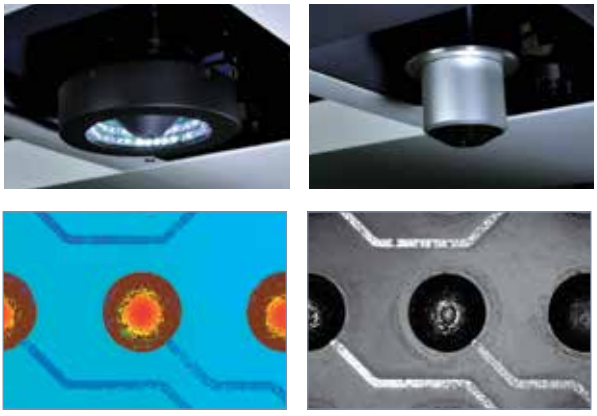
Moreover, online communication software and an automatic 300 mm wafer loading system for use in cleanrooms at semiconductor manufacturing fabs are also available to realize the fully automated confocal-based metrology system.

Applications

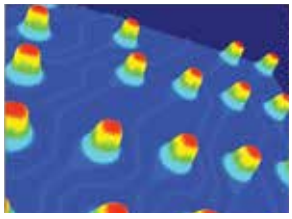
- Bumps on advanced IC packages
- Probe cards
- Precise optical components (micro lens, contact lens)
- Laser marks on semiconductor wafers
- MEMS
- Wire bonding

Features

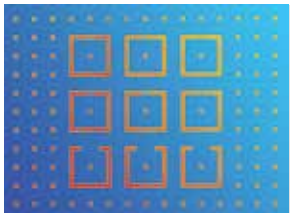
- Simultaneous wide-area height measurements with Nikon proprietary confocal optics
- 2D measurement with 15x brightfield zoom optics
- Fully compatible with 300 mm wafer measurement



Confocal images captured by Z scan are reconstructed in real time into 3D contour map and EDF (Extended Depth of Focus) images.



Bird's-eye view Wafer Level package with 3D viewer software (option)

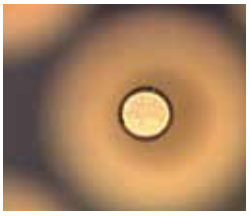


Fine bump and substrate pattern

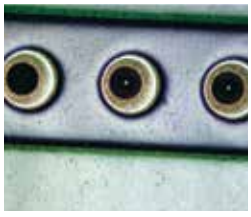
The dedicated 300 mm wafer loading system for Confocal NEXIV allows fully automatic measurement by mounting wafer carriers on load ports.

INTEGRATING DIGITAL IMAGING WITH INDUSTRIAL METROLOGY

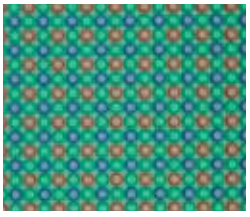
MM-800 measuring microscope



PGA – Insertion pin



Brightfield image



CCD

Plastic gear teeth

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

Related solutions

- NEXIV and iNEXIV video measuring systems
- Industrial microscopes

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.

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

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

MM-200

MM-400

UNRIVALED PRECISION, UNMATCHED PERFORMANCE

Profile projectors

V-20B

V-12B

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 600 mm. 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.

Related solutions

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

Applications

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

MF-1001/MF-501 Digimicro

MF-1001 digital height gauge

MF-501 digital height gauge

The MF-1001 and MF-501 Digimicro series offer flawless contact measurements of dimensions, thickness and depth. They feature measuring length equal to 100 mm and 50 mm respectively and accuracy of 1 µm 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

6B/6D Autocollimators

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 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).

INDUSTRIAL MICROSCOPES

As a world leader in imaging technology, Nikon manufactures complete optical and digital microscope systems with outstanding versatility, performance and productivity for any application.

STEREOSCOPIC MICROSCOPES

INDUSTRIAL MICROSCOPES

SCANNING ELECTRON MICROSCOPES

SOFTWARE

Complete range of stereoscopic microscopes

A GIANT STEP FORWARD FOR STEREO MICROSCOPY

The SMZ25 and SMZ18 are revolutionizing stereo microscopy with their unique zoom range, along with modularity, comfort and ultra-high-performance optics.

These new SMZ cover a wide range of functionality, from basic stereoscopic images of unparalled quality to the most sophisticated observation.

Features

- World's largest zoom range (25:1 for SMZ25) and highest resolution in the SMZ series
- Motorized focus and zoom operation (SMZ25)
- Crystal clear images in fluorescence as well as normal illumination techniques
- Easy-to-operate slim LED DIA base with OCC illumination (oblique lighting method developed by Nikon)

Injection needle

Printed circuit board (brightfield)

Printed circuit board (fluorescence)

Watch

SMZ1270i

SMZ800N

SMZ745T

The SMZ1270/SMZ1270i is a stereo microscope with the largest zoom ratio in its class. The SMZ800N excels by featuring enhanced optics and operability.

These stereo microscopes enable researchers to carry out high-magnification, large-zoom-ratio and high-definition imaging with ease. The clarity of the images and improved ease-of-use benefit researchers in a variety of industrial fields.

The complete line of Nikon stereomicroscopes covers a wide range of functionality, from sophisticated observation to affordable and ergonomic. Available models are:

- SMZ 25/18
- SMZ 1270i/1270/800N
- SMZ 745/745T
- SMZ 660
- SMZ 445/460
- SMZ-5/SMZ-2

AT THE FOREFRONT OF OPTICAL INNOVATION

Eclipse LV100ND

Eclipse LV150N

Eclipse L200N

Eclipse L300N

Eclipse MA200

Wafer loading system NWL200

The new DS series are the first Nikon microscope digital cameras equipped with a Nikon FX-format CMOS sensor, offering 16 megapixel images.

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.

Small-footprint Eclipse LV100N series deliver superb optics and ergonomics

Nikon's Eclipse microscopes are renowned for their ability to produce clearer images with higher contrast. The LV100N delivers brighter images, lower power consumption and less heat generation, thereby reducing the chance of heat-induced focus drift.

LV150N 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.

L200N for inspecting 200 mm wafers and masks

Combined with Nikon's superior CFI60-2 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.

L300N for large-size flawless inspection of LCDs and wafers

Configured for 300 mm wafer and mask inspection, the Eclipse L300N Series also satisfies the need for flat panel display backend inspection. The L300N Series utilizes Nikon proprietary CFI60-2 optical system, offering high resolution, contrast and transmittance.

Eclipse MA200 / MA100 inverted metallurgical microscope

MA200 is an 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. The Eclipse MA100/ MA100L is a compact-size inverted microscope developed for brightfield observation and simple polarizing observation.

NWL200 wafer loader for IC inspection microscopes

The NWL200 is capable of loading 100 micron thin wafers. The new loading system achieves highly reliable loading suitable for inspection of next-generation semiconductors.

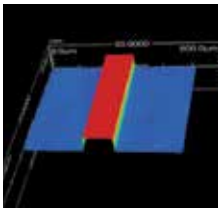
Related solutions

- 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

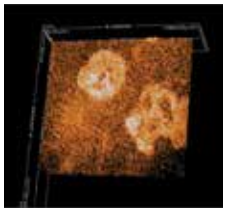
BW-S/D series – White light interferometric microscope systems

ULTRA HIGH VERTICAL RESOLUTION OF 1 PICOMETER

BW-S/D series measure surface profiles from sub-nano to millimeter height ranges speedily and accurately. BW series are available with optical microscope such as LV150N, MM800, L300N, CM10, etc.



VLSI Step Height Standard: 8nm



The Planarized SiC Wafer

Configurations

Compact Microscope CM Series

Measurement Microscope MM Series

Optical Microscope LV Series

Optical Microscope L Series

CCD Camera

Piezo Single Lens Actuator

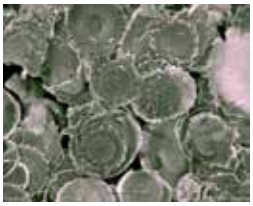
Piezo Nosepiece Actuator

Computer

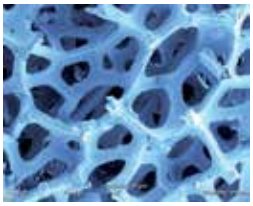
NeoScope Benchtop scanning electron microscope (SEM)

COMBINING DIGITAL CAMERA FAMILIARITY WITH SEM

NeoScope SEM



Diatoms



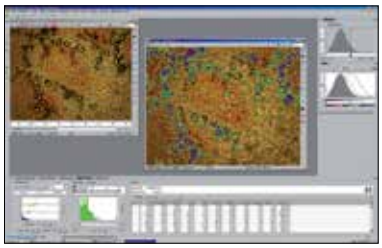
Foam

The JCM-6000Plus "NeoScope™", is a touch panel controlled, multi functional desktop scanning microscope that answers the increasingly diversified needs among users worldwide. 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.

INSTRUMENTS SOFTWARE OVERVIEW

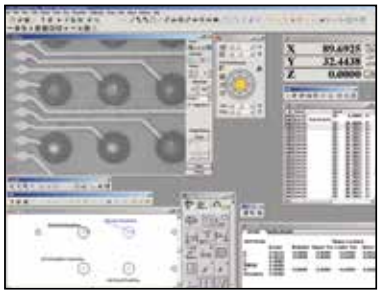
NIS-Elements software



Comprehensive device control and image analysis, visualization and archiving tools

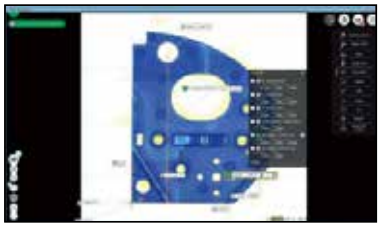
NIS-Elements revolutionizes imaging software for the microscopy market by combining automated intelligence to microscopes, cameras, components and peripherals with powerful archiving, analysis, visualization and archiving tools. Its intuitive interface simplifies workflow and speeds up image acquisition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

AutoMeasure (Measuring instruments)



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.



Automeasure Eyes (iNEXIV)

Auto Measure Eyes features easy operation with measurement programs that can be created with just a few clicks. It also features comprehensive reporting functions to obtain profound insight into product quality.

E-Max Series of data processing software (Measuring instruments)

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.

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 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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