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CAIRNHILL METROLOGY 2022

CAIRNHILL METROLOGY

www.cairnhill.com

CAIRNHILL METROLOGY

Precision and Advanced Metrology

Quality Assurance Always

Cairnhill Metrology is an industrial metrology solutions provider established on 16 August 1983. Working long-term, we partner with principals who are global leaders in their fields, whose strengths in technology and innovation, we complement with up-to-date uniform high standards of service delivery through our network of offices in Singapore, Malaysia, Indonesia, the Philippines and Thailand.

Our **Vision** is to be the trusted industrial metrology solutions provider of choice to our customers.

Our **Mission** is to support our customers' quests for production efficiencies and quality via appropriate and reliable metrology solutions, supported throughout the solutions' useful lives.

Our **Values** are summed up in the Golden rule, "What you wish that others do to you, do so to them".

Our Solutions are focussed by groups:

- **Food, Pharmaceutical Industrial Solutions (FPIS)**
- **Portable Metrology (PMT)**
- **Industrial Metrology (IMT)**
- **Industrial X-Ray Computed Tomography (XCT)**
- **Software for Visualization, Analysis, Metrology, Process Control and Reverse Engineering**

Precision and Advanced Metrology (IMT and XCT)

Our precision and advanced metrology solutions include X-Ray CT for inspection, analysis and metrology; latest CMMs equipped with tactile, optical and laser sensors, Micro CMMs for 2D/3D feature measurements and surface profiling, Surface, Form and Geometry metrology solutions, length metrology measurement, handheld tools and Software that supports and complements all of the above.

Productivity

Reliable precision and advanced dimensional metrology facilitate innovation, creativity and productivity for manufacturers by reducing first article set-up times, allowing complex new designs to be measured and inspected and via at the line monitoring which supports yields enhancements and process control. These solutions can also be applied for research and development and for advanced analysis.

Reliability

Our solutions are from our long term partnerships with Osaka Seimitsu, Tokyo Seimitsu, Starrett and Nikon as well as newer principals such as GE Phoenix and Volume Graphics. These leaders in their respective fields, offer reliable and innovative leading-edge, sometimes breakthrough solutions.

Traceability

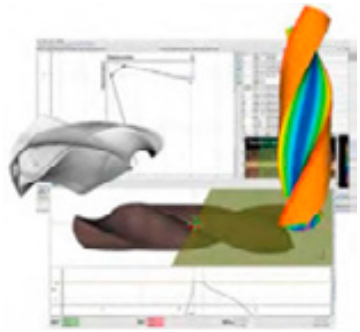
We are accredited by SAC-Singlas for Singapore, Malaysia, Thailand and the Philippines and by KAN for Indonesia, for field calibration activities to ISO IEC 17025; to ensure the traceability of measurements performed by the calibrated instruments to the primary SI units within expressed uncertainties.

Quality is a continuous learning process quest and journey, as we continually add on to our scope of test procedures and range of instruments as well as constantly strive to improve our calibration measurement capabilities and accuracies, for the benefit of our customers and industry partners.

Table of Contents

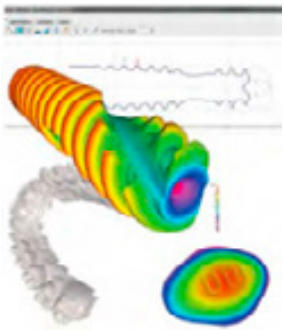
ALICONA Key Markets & Applications

Alicona hi-resolution automated and traceable 3D optical metrology supports laboratories and production in verifying accuracies for higher reproducibility and reliability of processes and standardization.



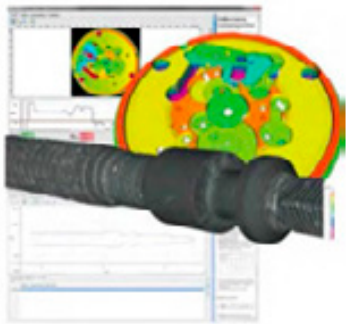
Tool Industry

Verify cutting edge preparation, bevel geometry, define correct machining parameters, surface finish of cutting quality, edge chipping throughout profile roughness measurement, full form measurement with Real3D technology and Reverse Engineering.



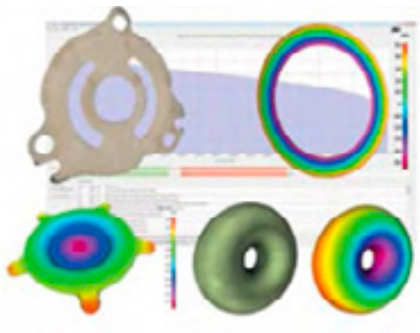
Medical Technology & Pharmaceutics

High surface finish roughness of dental, knee, hip and spinal disc implants, pills or capsules, orthodontic brackets, packaging products and materials, surgical instruments, needle protection for syringes, fusion tubes and others produced by plastic injection molding.



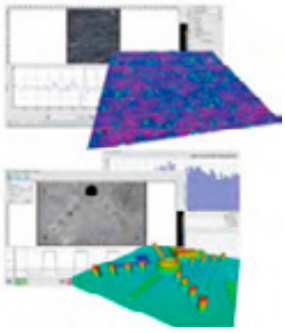
Micro Precision Manufacturing

Automatic measurement of micro gears, complex shapes with small radii, high volume angles, composites with reflective properties, dies, stamping and forming parts, shape and roughness within one single measurement, dimensional accuracy, finish quality, failure analysis.



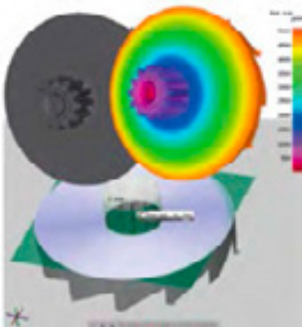
Automotive Industry

Evaluation of fuel injection nozzles, valves, connecting rods, envelopes, valve seat roundness, cam, engine and transmission components, pump systems, car body, steel and honed surfaces, optical and haptic characteristics of car seats and dashboards.



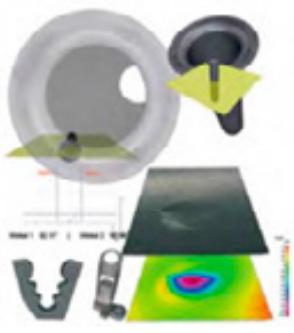
Additive Manufacturing

Optimize 3D printing process, quality assurance of additive manufactured parts, porosity analysis, 3D measurements to achieve optimum finishing process, e.g. polishing



Injection Molding

Quality assurance and measurement of precision molds, micro molds, eroded molds, electrodes including surface finish throughout areal surface texture measurement, process optimization



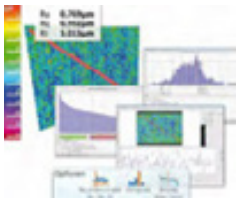
Aerospace

Automated measurement of cooling holes, turbine blade edges, milling and cutting processes of hard-to-machine materials, edge and geometry of turbine discs plus inspections, failure analysis and quality assurance of various materials and geometries.

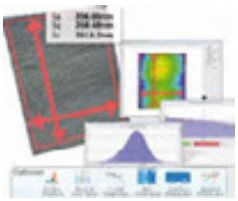
InfiniteFocus® Measurement Modules

Accurate and repeatable form, surface and geometry measurement including edge measurements.

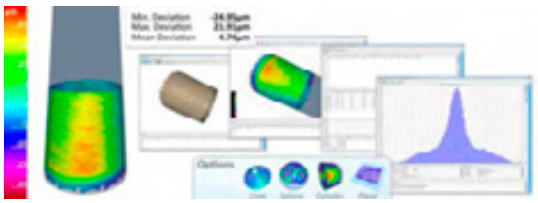
Profile-Form – Radii, angle, height steps, distances, circum- and in-circle profiles, thread parameters, cutting edges, basket arch form, wedge angles and bevel lengths



2D Roughness – Ra, Rq, Rz per ISO 4287/4288, waviness, frequency, statistical bearing ratio curve or spectral analysis graphically visualized.

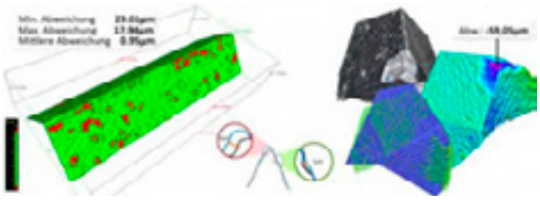


Areal Surface Texture – Sa, Sq, Sz per ISO25178 with statistics, fractal dimension, gradient, spectral distribution, local homogeneity, Roughness filtered from 3D waviness.

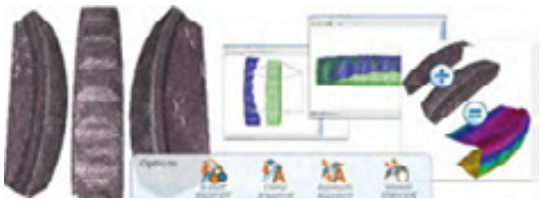


3D Form Module – Automatic fitting of spheres, cones and cylinders to measured geometries and curved surfaces for visualization with analysis of form deviation from nominal.

Contour Module – Measures angles, distances, circles, thread pitch etc. from every position. Handles complex profiles for e.g. along a helix with roughness also measured.



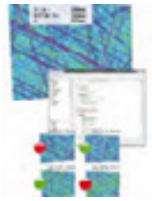
Difference – Compares form deviations or two geometries, e.g. wear before and after cutting tool use to a CAD-dataset



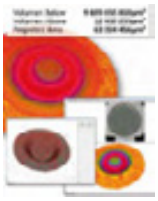
Fusion – Merge individual measurements at various positions into 3D data set for visualization from different angles

Multi-Measurement – Users define measurements automatically or merged. Settings are saved for fully automatic repeat measurements

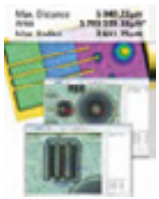
MetMeX – Perform robust measurements with the µCMM users do not need any specific metrology knowledge



Automation – Customisable repeat measurements with script-language



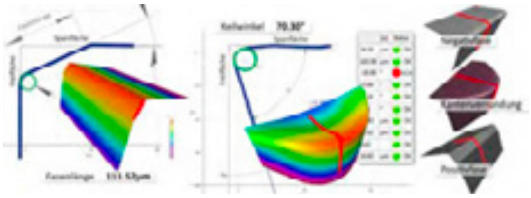
Volume – Pits and peaks. Easy positioning of cutting layers as a universal tool



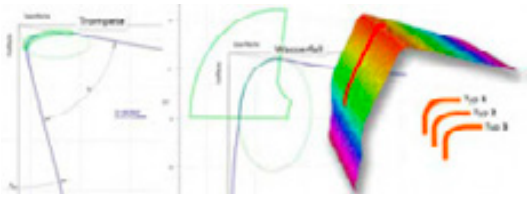
2D Image – Circles, lines, angles, distances, ellipses, rectangles etc.

InfiniteFocus® Tool Measurement

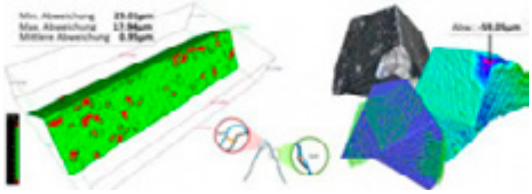
Used by leading manufacturers for visual, traceable, repeatable high-resolution quality assurance of cutting tools edges, geometries and elliptical-fit roughness, edge break and ridges, etc.



Measurement of Radius and Form – Radius-fit, clearance angle (α), wedge angle (β), rake/chipping angle (γ), edge symmetry (K), ± ve projected / true bevel lengths and angles



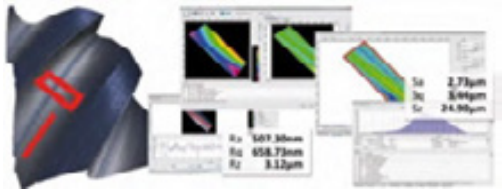
"True" Contour Through Elliptic Fit – Waterfall or Trumpet fit into edge region describes shape by two radial parameters. Compares edge to basket arch files of arbitrary shape



Form Deviation with Difference Measurement – 3D measurements compared to CAD with min/max/mean deviations visualised graphically in colour

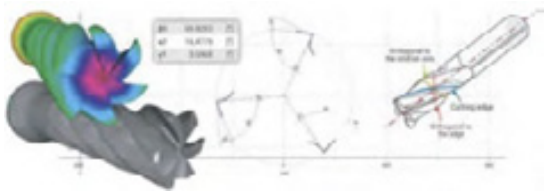
Flash (Burr) Measurement – Flash Width and Height to predict potential wear of molding tools in inserts

Chipping Measurement – High res measurement of ISO 4287 parameters (Ra, Rq, Rz, Rp, Rv) to view defects along edge



Tool Roughness Measurement – Measure tool roughness both profile and areal based in addition to chipping along the edge

Chamfer Measurement – Measures edge break, chamfer width, angles, normal distances and other ISO 1375 parameters

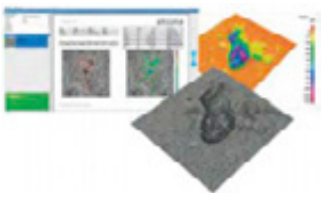


Angle Measurement – Measure clearance/wedge/rake angles of inserts, drills, end mills and other round tools.

Applications for the Aerospace Industry

Non-contact Measurement of Critical Turbine Engine Components

Automatic Measurement of Cooling Holes – Automatically verifying angle, size, and shape of up to 500 cooling holes, some of them with different shapes



Automatic Defect Measurement – Quantitatively detect defects on larger surfaces as well as component edges with Area-based 3D measurements.

Focus Variation The Technical Principle

Focus-Variation combines the small depth of focus of an optical system with vertical scanning to provide topographical and color information from the variation of focus. The main component of the system is a precision optics containing various lens systems that can be equipped with different objectives, allowing measurements with different resolution.

In contrast to other optical techniques that are limited to coaxial illumination, the max. measurable slope angle is not only dependent on the numerical aperture of the objective. Focus-Variation can be used with a large range of different illumination sources (such as a ring light) which allows the measurement of slope angles exceeding 87°

Focus Variation

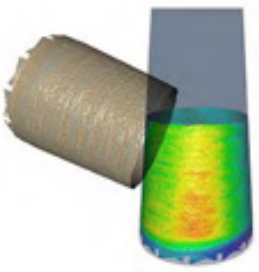
Real3D Technology Full Form Measurement

Real 3D

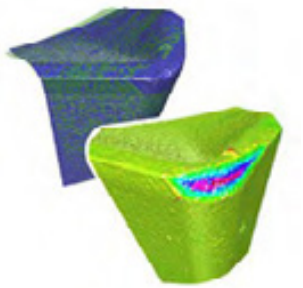
Using Real3D, users measure surfaces from numerous perspectives. Single measurements are then automatically merged into a full 3D dataset. High-precision and calibrated rotation and tilt axes ensure automated, repeatable and traceable measurement of form and roughness on the whole measurement object. Users are able to visualize and measure surface features such as diverse flank angles, thread pitch and undercuts.

Fusion Measurement

Contour Measurement



3D Form Measurement

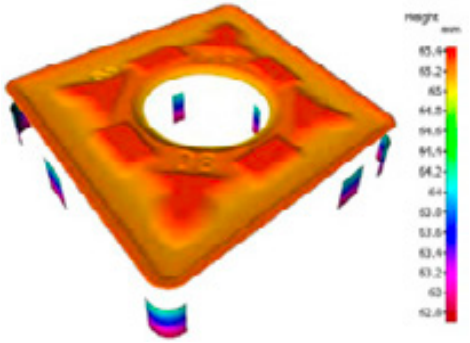


Difference Measurement

Vertical Focus Probing Lateral Probing of Components

Vertical Focus Probing, an extension of Focus-Variation technology, allows the measurement of geometries such as bore holes of injection valves in the automotive industry, and steep flanks >90° with high accuracy in high resolution and short measuring times.

Vertical Focus Probing can be used for a wide range of applications in dimensional metrology such as tooling, precision manufacturing, automotive, aerospace industries etc.



Vertical Focus Probing

Application of InfiniteFocus Systems


Additive Manufacturing


Aerospace


Automotive


Injection Molding


Micro Precision Manufacturing


Medical


Tooling


Forensics

Accessories and Standards for InfiniteFocus Systems


InsertGrip G2

For small objects in oblique positions


AdvancedInsertGrip


RotationGrip

Horizontal mounting of drill parts


Clamping Set

For flat, steep or round components


Real3D Rotation Unit

With Motorized Tilt-Axis


NanoGrip

Fixing of Smooth Components


ToolGrip

For Complex Cutting Geometries


RotationTable

For Exact Alignments


PTB traceable Roughness Standard for optical and tactile roughness


PTB traceable Cal Tool with 1000µm step height and chess patterns for lateral verification


PTB traceable Form Verification Tool with steep slopes, angles and cylinder artefacts

International Standardization

ÖNORM 1388	Geometrical product specification and verification (GPS) - Guide for operation and definition of the competence of operators of optical surface topography measurement devices
ISO 25178-6	Geometrical product specifications (GPS) – Surface texture: Areal – Part 6: Classification of methods for measuring surface texture
ISO 25178-606	Geometrical product specification (GPS) -- Surface texture: Areal -- Part 606: Nominal characteristics of non-contact (focus variation) instruments
VDI/VDE 2617, 12.2 (draft)	Accuracy of coordinate measuring machines – Characteristics and their testing – Acceptance and reverification tests for optical CMM measuring microgeometries

InfiniteFocus® G6 *NEW!* Unrivaled Measurement Performance

- **Advanced Focus-Variation** combines the functionalities of a roughness measuring system and a coordinate measuring machine with vibration-insensitive design for high-resolution and repeatable results, that is ideal for manufacturing
- Expansion from 3 to 5 axes allows measurements of geometries that are otherwise difficult or impossible to access
- High-precision tilting and rotating axes enable the measurement of GD&T and roughness parameters on the entire measured object
- Integrated **SmartFlash 2.0** technology ensures high-resolution measurement of smooth, reflective and highly polished surfaces
- **Real3D** turns individual measurements into a complete 360° data set
- **MetMaX** user software allows users to specify measurements already in the CAD model of a component
- Single-button solutions and automated measurement sequences ensure efficient workflows and measurements without user interaction
- Digital Twin combined with a virtual measurement simulation enables safe operation of the measuring instrument
- **Vertical Focus Probing** enables the optical, lateral probing of components. Users measure holes and vertical flanks (>90°)
- Applications: complex tools, drills, milling cutters, micro-electronics, die casts, paper, forensics, airfoil blades, etc.

InfiniteFocus® G6

InfiniteFocus G6		
Measurement Principal		Non-contact, optical, three-dimensional Technologies: Advanced Focus-Variation (SmartFlash 2.0), Vertical Focus Probing, Real3D
Number of measurement points		Single measurement: X: 2160, Y: 2160, X x Y: 4.6 million ImageField: up to 500 million
Positioning Volume X x Y x Z		200x200x180mm = 7,200,000 mm^3
Positioning Volume (R x T)		Optional AdvancedReal3D Rotation Unit: Motorized rotation: 360°/Motorized tilt: -15 to +90°
Coaxial illumination		LED coaxial illumination (color), high-power, electronically controllable; optional wireless white LED ring light illumination
System monitoring		Automatic self-diagnosis due to temperature sensors, internal current and voltage monitoring
ControlServerSF		6 Core, 32GB DDR4, SSD 512GB, Win 10 IoT Enterprise 64-bit, 2x27" Full HD LED Monitor
Sample	Surface texture	Any surface, including polished metals; no preparation required
	Dimensions	Up to 315mm height and 30kg weight (more on request) / 5-axes: Up to 4kg
	Measurable Slope Angle	Advanced Focus-Variation: 87° / Vertical Focus Probing: > 90°

Objectives[1]	**3000 WD8**	**1900 WD30**	**800 WD37**[2]	**800 WD17**	**400 WD30**[2]	**400 WD19**	**150 WD11**	**80 WD4**
Working Distance	8.8mm	30mm	37mm	17.5mm	30mm	19mm	11mm	4.5
Lateral Measurement Range (X,Y)	5.3mm	3.8mm	1.6mm	1.6mm	0.8mm	0.8mm	0.3mm	0.16mm
Measurement Point Distance	2.88µm	1.77µm	0.72µm	0.72µm	0.36µm	0.36µm	0.14µm	0.07µm
Measurement Noise	800nm	80nm	40nm	15nm	20nm	5nm	2nm	1nm
Vertical Resolution	2300nm	250nm	130nm	50nm	80nm	30nm	15nm	10nm

[1] Objectives with longer working distance available upon request. [2] Objective available in special objective configuration.

Resolution and Application Specifications

Objectives	**3000 WD8**	**1900 WD30**	**800 WD37**	**800 WD17**	**400 WD30**[2]	**400 WD19**	**150 WD11**	**80 WD4**
Min Measurable Roughness (Ra)	-	-	0.7µm	0.18µm	0.24µm	0.12µm	0.05µm	0.03µm
Min Measurable Roughness (Sa)	-	-	0.35µm	0.09µm	0.12µm	0.06µm	0.025µm	0.015µm
Min Measurable Radius	20µm	12µm	5µm	5µm	3µm	3µm	2µm	1µm

InfiniteFocusSL / IF-Sensor R25 Cost-Efficient Measurement

IF-Sensor R25

InfiniteFocusSL

- Compact Focus-Variation head with machining centre interfaces for in-line form/roughness measurement
- Measure flanks up to 90°
- Measures large bevel length
- Special coarse drive for easy focusing on the insert

Common for both InfiniteFocusSL and IF-Sensor R25

- Very fast, easy to use, high resolution, traceable and repeatible
- Form and finish measurement on micro structured surfaces
- Robust frame. Intelligent adjustable optimized illumination for hi-res laboratory and production measurements. Insensitive to ambient light, temperature fluctuations and vibrations
- Registered true colour high contrast high depth-of-focus images
- Up to 33mm working distance and 50x50mm FOV
- Measure within seconds. Coaxial laser for intuitive positioning and quick and easy focusing
- For cutting edge tool measurement to quality assurance and surface finish of micro components and hard-to-access surface positions for eg, steep flanks and surfaces on gear tooth root. Miscellaneous export and print options

	InfiniteFocusSL	**IF-Sensor R25**
Measurement Principle	Non-contact, optical, three-dimensional, based on Focus-Variation	
Ring Light Illumination	White LED high-power ring light, 24segments	
Positioning Help	Coaxial laserbeam	
Machine Dimensions W x D x H / Weight	195 x 340 x 485mm / 15kg	134 x 153 x 220mm / 4kg
Measurement Object	Surface topography Ra $\geq$ 0.009µm with λc 2µm; depending on surface structure	

Objectives	**10X**	**20X**	**50X**	**2XSX**	**5XAX**	**10XAX**	**20XAX**	**50XSX**
Min Measurable Radius	5µm	3µm	2µm	20µm	10µm	5µm	3µm	2µm
Measurable Min Wedge / Max Slope Angle	20° / 87°							
Min Measurable Roughness Ra	0.3µm	0.15µm	0.08µm	N/A		0.45µm	0.25µm	0.15µm
Min Measurable Roughness Sa	0.15µm	0.075µm	0.05µm	N/A		0.25µm	0.1µm	0.08µm
Objectives Working Distance	17.5mm	13mm	10.1mm	34mm		33.5mm	20mm	13mm
Lateral Measurement X, Y	2mm	1mm	0.4mm	10mm	3.61mm	2mm	1mm	0.4mm
Lateral Measurement X x Y	4mm²	1mm²	0.16mm²	100mm²	13.03mm²	4mm²	1mm²	0.16mm²
Measurement Point Distance	1µm	0.5µm	0.2µm	5µm	2µm	1µm	0.5µm	0.2µm
Measurement Noise	40nm	20nm	10nm	1240nm	165nm	45nm	25nm	15nm
Vertical Resolution	100nm	50nm	20nm	3500nm	460nm	130nm	70nm	45nm
Vertical Measurement Range	16mm	12mm	9mm	25mm			19mm	12mm
Max Extended FOV	2500mm²		1100mm²	2500mm²				1100mm²
Max Uni-Directional Measurement	50mm							

* Objectives with higher working distance available upon request.

Cobot Collaborative systems enable modern production strategies

CompactCobot

DiskCobot

TurbineCobot

- Combine a collaborative 6-Axis robot with IF-Sensor R25 for hi-resolution, traceable and repeatable measurements
- Tailored to individual application. Programming, measuring and handling of pre-defined measurement programs require no prior metrology knowledge. Manual or automatic mode. Can be integrated into production line.
- DiscCobot to measure turbine discs. ToolCobot to measure tools directly in the machine. CompactCobot, a universal solution applicable in all industries to measure micro structured surfaces of large components

	CompactCobot	**DiscCobot**	**TurbineCobot**
Dimensions H x W x L	0.95 x 0.79 x 1.35m	1 x 1 x 0.9m	1.5 x 0.95 x 2.15m
Machine Weight	400kg	1,500kg	900kg
Additional Axes	N/A	Rotation axis	Rotation table; Lifting axis with 400mm travel range
Max Sample Weight	100kg	150kg	50kg
Operation	Drawer with 10.5" touchscreen	N/A	Sliding drawer with touchscreen
Interface	Hold grid plate for mounting different sample holders	Flexible perforated plate for mounting of grips	Taper50 interface/other options plus flexible perforated plate
Additional Features	Integrated status lights; 4 emergency stops each corner	Laser scanner for additional monitoring of operating range	Height-adjustable casters for flexible use
Robot Type	UR-10		
Specimen Radius	1300mm		
Safety	Collaborative – stops at collision with an object; Certified by TÜV Nord and TÜV Süd		
Axes / Repeatability	6 rotating joints / ±0.1mm		
Operation	Manual coarse positioning of the sensor; Fine positioning precise joystick movement		
Display	Integrated touchscreen to display the live view and 3D view of the measured dataset		
Software Compatibility	AutomationManager: Easy measurement sequence teach-in by adding robot positions, SingleField and ImageField measurement. CADCAM: Virtual planning of measurement sequence on CAD model including simulation of the measurement task.		

Industry 4.0 Support - From Production Measurement to Smart Manufacturing

Production measurements must be highly accurate, fast and easy to use and automatable for fast ROI

Industry 4.0 industrial revolution factory concept connects machines with sensors as a system to visualize the entire production line to control and make decisions on its own for automation and data exchange that include cyber-physical systems, the industrial internet of things (IIOT), cloud computing, cognitive computing and artificial intelligence.

The result is reduced measuring set up time to ensure component and process quality and efficient production by integrating production strategies for self-controlling production.

Measuring sensors are usually optical and tactile. Requirements include Cg and Cgk capability, repeatability, traceability to SI units, good measurement uncertainties, stability in tough environmental conditions, ease of use and of automation, short set-up times, flexibility for redeployment, future-proof easy connection and integration into existing systems and costs.

EdgeMaster Automatic Cutting-Edge Measurement

EdgeMaster

EdgeMasterX

EdgeMasterHOB

- Easy to use traceable micro-structure surface form and finish measurement
- Robust frame; intelligent optimized illumination for hi-res applications. Insensitive to ambient light, temperature fluctuations and vibrations
- Registered true colour high contrast and high depth-of-focus images
- Up to 33mm working distance and 50x50mm FOV
- Coaxial laser for intuitive positioning and quick focusing
- Measures in seconds! – Edges of inserts, drills, millers and other round tools regardless of type, size, material or surface finish

- Specific adaption of Optical Cutting Edge metrology device
- Large 33mm working distance for effortless measurement of cutting edges even in deep recessed areas
- Measures hob cutters at every stage of manufacture, regardless of surface finish or coating

	EdgeMaster / EdgeMasterX	**EdgeMasterHOB Specifications**
Positioning Volume	RL objectives: 50 x 50 x 155mm (Z: 25mm motorized; 130mm manual) SXRL/AXRL objectives: 50 x 50 x 120mm (Z: 25mm motorized; 95mm manual)	Z: 25mm motorized; 92mm manual / Lifting table:120mm manual Rotation table: ±30° manual
Machine Dimensions W x D x H	195 x 340 x 485mm	555 x 400 x 502mm
Machine Weight	15kg	30kg
Max Sample Weight	4kg, more on request	30kg, more on request

EdgeMaster / EdgeMasterX / EdgeMasterHOB Objectives Features

Objectives [1]	**10X**	**20X**	**50X**	**2xSX**	**5xAX**	**10xAX**	**20xAX**	**50xSX**
Working Distance	17.5mm	16mm	10.1mm	34mm	34mm	33.5mm	20mm	13mm
Lateral Measurement X,Y	2mm	1mm	0.4mm	10mm	3.61mm	2mm	1mm	0.4mm
Lateral Measurement X x Y	4mm^2	1mm^2	0.16mm^2	100mm^2	13.03mm^2	4mm^2	1mm^2	0.16mm^2
Measurement Point Distance	1µm	0.5µm	0.2µm	5µm	2µm	1µm	0.5µm	0.2µm
Calculated Lateral Optical Resolution	N/A				2.33µm	1.17µm	0.78µm	N/A
Best Lateral Topographic Resolution					4µm	2µm	1µm	
Measurement Noise	40nm	20nm	10nm	1240nm	165nm	45nm	25nm	15nm
Vertical Resolution	100nm	50nm	20nm	3500nm	460nm	130nm	70nm	45nm
Vertical Measurement Range	16mm	15mm	9mm	25mm	25mm	25mm	19mm	12mm
Accessibility	31°	29°	19°	40°	51°	51°	39°	26°

* For EdgeMasterHOB, only Objectives: 5xAX, 10xAX and 20xAX apply. [1] Objectives with longer working distance available upon request.

EdgeMaster / EdgeMasterX Resolution and Application Specifications

Objectives	**10X**	**20X**	**50X**	**2xSX**	**5xAX**	**10xAX**	**20xAX**	**50xSX**
Min Measurable Radius	5µm	3µm	2µm	20µm	10µm	5µm	3µm	2µm
Min Wedge Angle / Max Slope Angle	20° / 87°							
Min Measurable Roughness Ra	0.3µm	0.15µm	0.08µm	N/A		0.45µm	0.25µm	0.15µm
Min Measurable Roughness Sa	0.15µm	0.075µm	0.05µm			0.25µm	0.1µm	0.08µm
Max Bevel Length	800µm	400µm	160µm	4000µm	2000µm	800µm	400µm	160µm

InfiniteFocus® XL Extra Large Stage

InfiniteFocus® XL1000

Alicona's X-Large InfiniteFocus are used for high resolution, optical 3D measurement of large and heavy components. Max sample travel ranges of 500 x 500mm and 1000 x 1000mm and max weight of up to 200kg, more on request. For automatic defect analysis of large measurement fields or dimensional measurement of laser structured geometries on printing plates. Automation interface allows full auto measurement in production.

	InfiniteFocusXL500	InfiniteFocusXL1000
Measurement Principle	Non-contact, optical, 3D, based on Focus-Variation	
Positioning Volume X x Y x Z	500 x 500 x 100mm	1000 x 1000 x 100mm
Maintenance	Maintenance free	
Coaxial Illumination	white LED coaxial illumination, high-power, electronically controllable	
Ring Light Illumination Option	white LED high-power ring light, 24 segments, wireless, snap-on system	
Dimensions W x D x H / Weight	900 x 1100 x 800mm / 500kg	1680 x 785 x 1700mm / 3080kg
Objectives	2.5x, 5x, 10x, 20x, 50x, 100x	2.5x, 5x, 10x, 20x, 50x, 100x
Ambient Temperature Range	Measurement Instrument: 18 to 28°C; calibrated for: 18 to 22°C (can be calibrated for other temperature ranges); ControlServerHP: 0 to 30°C	
Temperature Gradient	Less than 1°C/h	
Relative Humidity	Recommended: 45% (±5%); Possible: 45% (±15%)	
Power Supply / Consumption	AC 100 to 240V, 50/60Hz / 2000W	
ControlServerHP Dimensions	200 x 485 x 440mm / 19kg	
ControlServerHP Specifications	4-Core, 32GB DDR4, 2TB, Windows® 10 IoT Enterprise, 27" LED Monitor, integrated USB	
Sample Surface Texture	Surface topography Ra above 0.009µm with λc 2µm; depending on surface structure	
Sample Max Height	100mm; more on request	
Sample Max Size / Weight	500mm x 500mm / 10kg	1000mm x 1000mm / 200kg

IF-Profiler Mobile 3D Surface Profilometry

- Flexible, handheld, surface roughness verification near or in production for large and heavy components
- Ergonomic lightweight sensor with mechanically rigid frame
- Flexible position change and fast measurement speed
- Ideal for turbine or rotor blades, steel and body type surfaces

IF-Profiler

Objectives	10X	20X	50X
Sampling Distance	1µm	0.5µm	0.2µm
Min Vertical Repeatability	40nm	20nm	25nm
Max Scan Height (Approx.)	16mm	12mm	9mm
Best Vertical Resolution	100nm	80nm	60nm
Working Distance	17.5mm	13mm	10.1mm
Lateral Measurement X, Y / X x Y	2mm / 4mm^2	1mm / 1mm^2	0.4mm / 0.16mm^2
Min Measurable Radius	5µm	3µm	2µm
Min Wedge Angle / Max Slope Angle	20° / 87°		
Min Measurable Roughness Ra / Sa	0.3µm / 0.15µm	0.24µm / 0.12µm	0.18µm / 0.09µm
Z Travel Range / Illumination	26mm (motorized) / 24 segment LED ring light		
Machine Dimensions W x D x H / Weight	157 x 300 x 344mm / 6.5kg		

IF-PortableRL Mobile High-Resolution Measurement

- Verify measurement fields of up to 50 x 50 x 26mm
- Battery pack for flexible use and mobile positioning
- Large vertical scanning range for various geometry types and forms
- Applications: Plate inspection, asphalt measurement, turbine or rotor blades, 3D measurement of steel & body parts, etc.


Measurement on Racetrack


MobilityCase


Battery Pack


IF-PortableRL

IF-PortableRL	
Positioning Volume X x Y x Z	50 x 50 x 25mm

Objectives	10X	20X	50X	2xSX	5xAX	10xAX	20xAX	50xSX
Numerical Aperture	0.3	0.4	0.6	0.055	0.14	0.28	0.42	0.55
Working Distance	17.5mm	16mm	10.1mm	34mm	34mm	33.5mm	20mm	13mm
Lateral Measurement X, Y	2mm	1mm	0.4mm	10mm	3.61mm	2mm	1mm	0.4mm
Lateral Measurement X x Y	4mm^2	1mm^2	0.16mm^2	100mm^2	13.03mm^2	4mm^2	1mm^2	0.16mm^2
Measurement Point Distance	1µm	0.5µm	0.2µm	5µm	2µm	1µm	0.5µm	0.2µm
Lateral Optical Limiting Resolution	1.09µm	0.82µm	0.54µm	5.93µm	2.33µm	1.17µm	0.78µm	0.59µm
Finest Lateral Topographic Resolution	2µm	1µm	0.64µm	10µm	4µm	2µm	1µm	0.64µm
Measurement Noise	60nm	30nm	20nm	1240nm	165nm	60nm	30nm	25nm
Vertical Resolution	150nm	75nm	50nm	3500nm	460nm	170nm	90nm	70nm
Vertical Measurement Range	16mm	15mm	9mm	25mm	25mm	25mm	19mm	12mm
Measurement Speed	≤1.7 million measurement points/sec							
Accessibility	31°	29°	19°	40°	51°	51°	39°	26°

[1] Objectives with longer working distance available upon request.

Resolution and Application Specifications

Objectives	10X	20X	50X	2xSX	5xAX	10xAX	20xAX	50xSX
Height Step Accuracy (1mm)	0.1%							
Min Measurable Roughness Ra	0.55µm	0.25µm	0.2µm	N/A		0.65µm	0.3µm	0.25µm
Min Measurable Roughness Sa	0.30µm	0.15µm	0.1µm			0.35µm	0.15µm	0.13µm
Min Measurable Radius	5µm	3µm	2µm	20µm	10µm	5µm	3µm	2µm
Min Wedge Angle / Max Slope Angle	20° / 87°							

Measuring Uncertainty

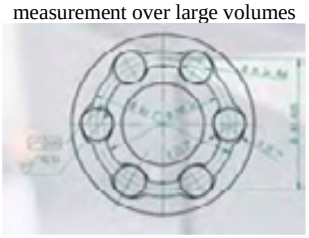
Flatness Deviation	2 x 2mm with 10x objective	U = 0.1µm
Max Deviation of Height Step	Height step 1000µm Height step 100µm Height step 10µm Height step 1µm	$E_{Uni: St: ODS, MPE}$ = 1µm, σ = 0.1µm $E_{Uni: St: ODS, MPE}$ = 0.4µm, σ = 0.05µm $E_{Uni: St: ODS, MPE}$ = 0.3µm, σ = 0.025µm $E_{Uni: St: ODS, MPE}$ = 0.15µm, σ = 0.01µm
Profile Roughness	Ra = 0.5µm	U = 0.04µm, σ = 0.002µm
Area Roughness	Sa = 0.5µm	U = 0.03µm, σ = 0.002µm
Distance Measurement	XY up to 2mm	$E_{Bi: Tr: ODS, MPE}$ = 0.8µm
Wedge Angle	β = 70 to 110°	U = 0.15°, σ = 0.02°
Edge Radius	R = 5µm to 20µm R > 20µm	U = 1.5µm, σ = 0.15µm U = 2µm, σ = 0.3µm

Note $E_{Uni: St: ODS, MPE}$ & $E_{Bi: Tr: ODS, MPE}$ conform to ISO 10360-8.

µCMM Fast Focus Variation Measurements over Large Volumes

µCMM

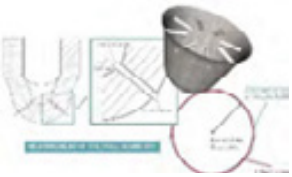
Precise - High accuracy and fast measurement over large volumes



Simple - Measure matte and highly polished surfaces easily with SmartFlash

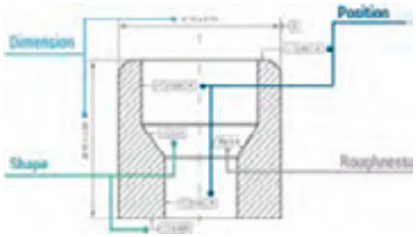
Expandable - 3-Axis to 5-Axis system

Shape and position measurement of injection nozzles



- Combines tactile and optical surface measuring technologies to measure dimension, position, shape and roughness of components with one sensor
- Most accurate purely optical micro CMM. Accuracy within 0.8+L/600µm 1 over the entire measurement volume for measuring small surface details
- Non-contact, optical measurements of matte to polished or mirrored components, plastic, PCD, CFRP, ceramic, chrome, silicon, in one system
- Intuitive usability with single-button solutions, automated measurement sequences and long-term stability ensure consistent measurement
- Wear-free, robust, suitable for production with air-bearing linear drive

Dimension, position, shape and roughness in one system



µCMM	
Measuring Points	Single measurement: X: 1720, Y: 1720, X x Y: 2.95 million. Multi measurement: Up to 500 million
Positioning Volume X x Y x Z	310 x 310 x 310mm
Compressed Air	Maintenance-free with compressed air according to specification, 6 bar
Axes Travel Speed	Max 100mm/s
Coaxial Illumination	LED coaxial illumination (colour), high-power, electronically controllable
Objective Changer	Automatic pneumatic four-place objective changer
System Monitoring	9 temperature sensors (accuracy ±0.1K), 3 vibration sensors, internal current and voltage monitoring, including long term logging, retrievable
ControlServerHP	4-Core, 32GB DDR4, 2TB, Windows® 10 IoT Enterprise, 2x27" LED Monitor
Machine Dimensions W x D x H / Weight	960 x 1109 x 1958mm or up to 2288mm / 1250kg (Machine excluding PC)
Max Sample Dimensions W x H / Weight	680 x 375mm / 30kg, more on request
3D Accuracy [1] (L in mm)	$E_{Uni:Tr:ODS}$ 0.8+L/600µm [2]. $E_{UniZ:St:ODS}$ 0.15+L/50µm [3]
Flatness Deviation Accuracy	1.3mm x 1.3mm with 800A: U = 0.1µm
Profile Roughness Accuracy	Ra = 0.1µm: U = 0.012µm, σ = 0.001µm. Ra = 0.5µm: U = 0.02µm, σ = 0.001µm
Areal Roughness Accuracy	Sa = 0.1µm: U = 0.01µm, σ = 0.001µm. Sa = 0.5µm: U = 0.015µm, σ = 0.001µm
Wedge Angle Accuracy	β = 70° to 110°: U = 0.075°, σ = 0.01°
Edge Radius Accuracy	R = 5µm to 20µm: U = 1.5µm, σ = 0.15µm. R > 20µm: U = 2µm, σ = 0.3µm

[1] Per ISO 10360-8 and VDI 2617. [2] Valid for all Multi Measurements. [3] Valid for single measurements, height step measurements.

Objectives	1500A	800A	400A	150A	80A
Working Distance	23.5mm	17.5mm	19mm	11mm	4.5mm
Lateral Measurement X, Y	2.63mm	1.32mm	0.66mm	0.26mm	0.13mm
Lateral Measurement X x Y	6.91mm²	1.71mm²	0.43mm²	0.06mm²	0.01mm²

Waygate Technologies Overview @ a Glance

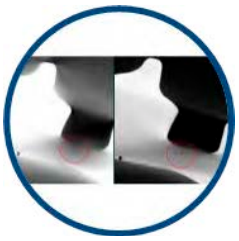
Nanotom M

V|tome|x M300

V|tome|x S240

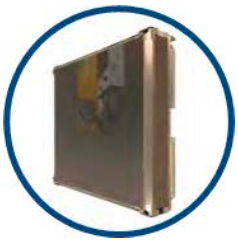
V|tome|x L450

	Nanotom M	V|tome|x M300	V|tome|x S240	V|tome|x L300 | 450	
Applications	Composites, plastics, electronics, bio, geo, metrology	AM, castings, composites, electronics, metrology	Composites, plastics, AM, small castings	AM, castings, composites, bio, geo, metrology	
Advantages	high resolution nano-CT®	Versatile premium precision	Price performance	Maximum flexibility	
X-Ray Tube	Nanofocus 180kV/20W	Micro 300kV/500W Option Nanofocus 180kV/20W	Micro 240kV/320W Option Nanofocus 180kV/20W	Customizable	
Technique	Cone Beam CT	Cone Beam CT with Scatter|correct option	Cone Beam CT	Customizable	
Max CT Scan (h x Ø)	250 x 240mm	400 x 420mm	420 x 400mm	600x900mm	1250x1300mm
Max Sample Weight	3kg	50kg	10kg	50kg	100kg
Min Voxel Size	0.3µm	2µm / 0.5µm nanoCT®	2µm / 1µm nanoCT®	Customizable	
Best Detail Detectability	0.2µm	1µm / 0.2µm nanoCT®	1µm / 0.2µm nanoCT®	0.2µm	1µm



ASC|filter

Up to 2 times faster data acquisition at the same high image quality level



Dynamic 41 digital detector

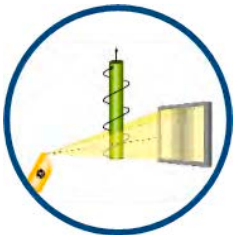
Reduce scan time from 6 minutes to 3 with increased detector sensitivity

Flash!™

Faster, more accurate inspection process for improved productivity, reduced downtime, and results you can trust

Offset|CT

Scan larger parts more accurately with compact systems like Phoenix V\|tome\|x M and Phoenix V\|tome\|x C HS



Helix|CT

Scan longer parts faster, and with better quality

Production|edition collaborative robot

Optional collaborative robot for fully automated high-throughput CT inspection

Waygate Technologies Overview @ a Glance

V|tome|x C450

X|cube 160|225|320

Speed|scan HD

Microme|x / Nanome|x Neo

V|tome|x C450	**X|cube 160|225|320**		**Speed|scan HD**	**Microme|x / Nanome|x Neo**	
Large castings, AM, composites, metrology	AM + castings 2D inspection		Batteries, connectors, complex assemblies, injection moldings	PCB assemblies, electronic components, failure analysis, process and quality control	
Powerful, highly automated	Highly automated, opt. CT		Up to 100% inspection (inline or atline)	Highly efficient and versatile	
Minifocus 450kV/1500W	160kV / 225kV / 320kV		High Performance Speed CT 240kV/100W	Nanofocus 180kV/20W Microfocus 160kV/15W or 180kV/20W	
Fan and/or Cone or Cone with Scatter|correct	2D with CT Option		Fast In-Line CT	2D with CT Option	
500 x 1000mm	300 x 300mm with 16” DDA		200 x 150mm	680 x 635mm	
50kg	100kg	300kg	5kg	10kg	
400µm at 700W, 1000µm at 1500W			0.5mm	2µm *	
25µm	25µm		20µm	Nano-focus 0.2µm details	Micro-focus 0.5µm details

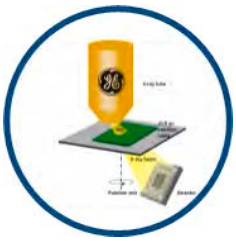
* Image from nano-CT is sharper.

Filter|changer

Perform batch CT scans even of samples differing in size and material with highest quality

Sample|changer

Allows automatic change of different samples, e.g. for longterm overnight batch CT scans in 24/7 operation mode



PlanarCT

Planar CT for microme|x /nanome|x inspections of solder joints and PCBs

Multi|bhc

Significantly reduces streaks, making ares visible and accessible for reliable CT evaluation

3D Speed|ADR

Powerful, highly precise 3D automatic defect recognition algorithms for mass production process optimization

Ruby|plate & True|position

Automatically correct any deviations and maintain conformance with VDI 2630 measurements

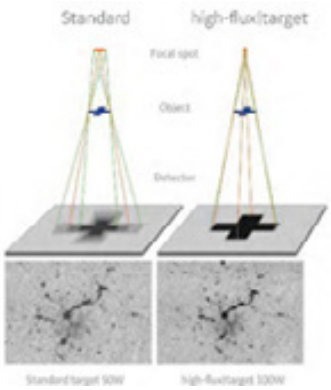
Detectors for High Performing XCT Systems

Dynamic 41|100	Dynamic 41|200
Detector for Premium CT results in less time	Detector for improved inspection throughput
Next generation 410mm x 410mm industrial flat panel detector. Proprietary Endurance™ CsI scintillator improving superior resolution/brightness. New photodiode design - 10x improved efficiency; 2-3 times cycle time increase without quality impact. Optimized for long-term reliability at high-energy use.	
Double resolution 16MP 100µm pixel size for up to 50µm feature detection with minifocus tubes	4MP 200µm pixel size for up to 100µm feature detection even with minifocus X-ray tubes
Reduced inspection times due to increased detector sensitivity, faster frame rates, larger imaging area and adaptive imaging modes. Dynamic range > 10000:1.	
Proprietary dynamic 41 detector exclusively for Waygate Technologies systems customers. Dynamic 41|100 detector as option for Phoenix V|tome|x C, M and L systems and Seifert X|cube.	

DXR500L Static Digital Detector Array	DXR250RT 8” Real-Time Digital Detector Array
307mm x 249mm flat panel detector with 100µm pixel size (7MP). 1.5X virtual enlargement. High-resolution images for detection of subtle features	200mm x 200mm flat panel detector with 200µm pixel size (1MP). Quick full-resolution 30fps image acquisition. 2x virtual enlargement
Endurance™ technology for optimal image quality & lag	
Incorporated temperature controller for stable scans over longer periods, more consistent imaging and fewer calibrations. Dynamic >10,000:1.	
Aerospace, gas turbine castings, wax, ceramics, metrology, science/geology	High throughput castings, pipes, electronics, manipulation systems
DXR detectors exclusively available for Waygate Technologies system customers	

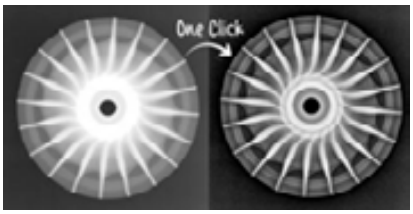
All detector specs per ASTM E2597-07.

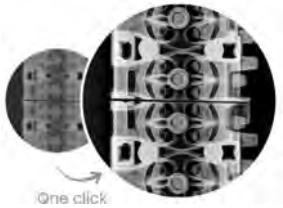
High-flux|target Up to 2X Faster microCT Scans or Doubled Resolution!



- With optimized thermal conductivity for higher power on a smaller focal spot for up to 2 times throughput at the same high resolution
- Provides better CT quality with less noise to improve speed or accuracy
- Option for all Waygate Technologies microfocus X-ray tubes up to 300kV, without impacting geometric magnification properties

Flash!™ Advanced Intelligent Image Processing for new NDT Standards!



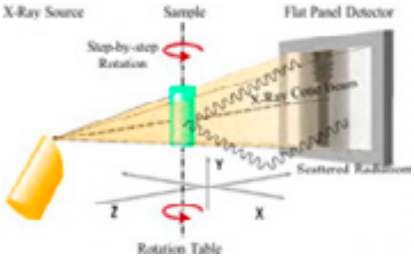


Automotive

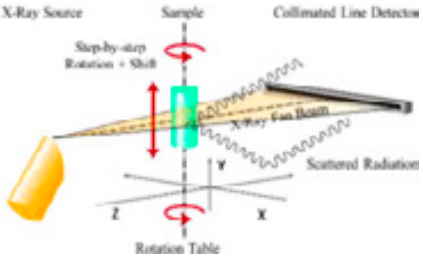
Oil & Gas

- Highest radiographic inspection image quality available
- High- and low-density details clearly visible in one crisp image

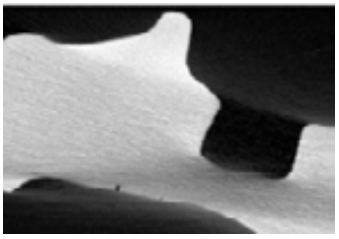
ASC|filter: Adaptive Scatter Correct Filter Unrivalled Image Quality!



Cone beam CT via a high dynamic FPD capturing thousands of slices in parallel generates whole scan volumetric data in one 360° rotation. X-rays not along the source-detector path, falling on the detector array however results in scattered radiation yeilding image artefacts.

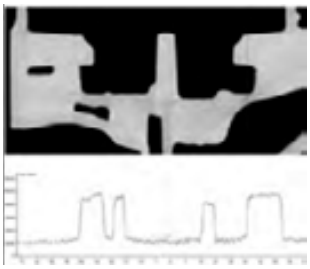


Fan beam CT with a collimated line detector acquires a slice of data a time, without scatter, resulting in high quality images. The sample is vertically shifted, scanned and all results finally combined. This takes time while the manipulator movement introduces dimensional error

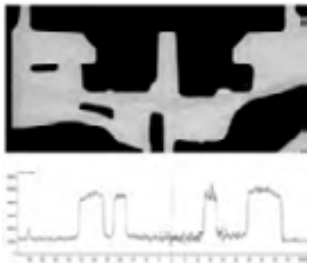


Scatter|correct

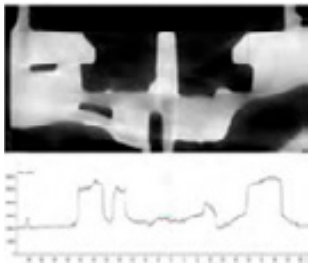
Scatter|correct with asc|filters



Conventional Fan Beam CT (2 hours)



Scatter|correct (9 mins + 1 initial scan)



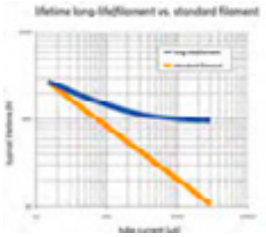
Conventional Cone Beam CT (9 mins)

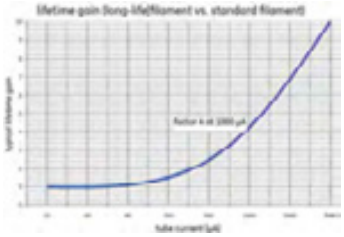
- Must be ordered with your system and factory-installed. Upgradeable on existing Scatter|correct versions.
- Reduced artifacts for best image quality. Fast and easy data evaluation.

Waygate Technologies' proprietary **Scatter|correct** incorporates leading-edge hardware and software advances to significantly correct cone beam scattering, allowing faster high image resolution scanning with quality and accuracy.

For high scattering materials such as steel, aluminum, composites and multi-material samples. Significant productivity gains enabling CT to move from R&D to production automation of serial CT inspections. Requires one-time initial correction (teaching scan) per part type, which is then saved for subsequent scatter-corrected scans. Up to 100 times faster than conventional fan beam CT! Ideal for VDI 2630-1.3 dimensional length metrology.

Long|life filament Up to 10X increased lifetime



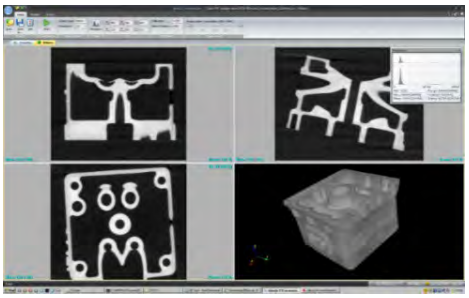


lifetime Long|life filament vs standard conventional filament; increases up to 10 times

Long|life filament

- Standard for all WT x-ray directional type microfocus X-ray tubes up to 300kV (tube current of 3000µA)
- Increased filament operation lifetime at high emission currents; increasing uptime for high through-put scenarios
- Easy-to-change plug-in cathode with pre-adjusted filament: entire change process takes <20min

Phoenix Datos|x Fully Automated CT Data Acquisition Software

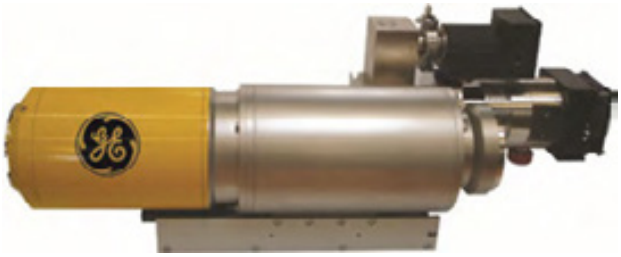


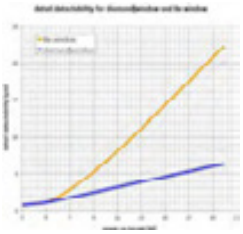
- Up to 14 times faster volume reconstruction for accelerated sample throughput
- Multi GPU based reconstruction
- Click & measure|CT functionality for high throughput
- Flexible functionality and interfaces for Customized CT
- CT system performance monitoring following ASTM 1695 guideline
- Production mode with One-button|CT functionality and intuitive user interface for improved ease of use
- Now available with Flash!™ as an option

Diamond|window for up to 2 times faster hi-res data acquisition

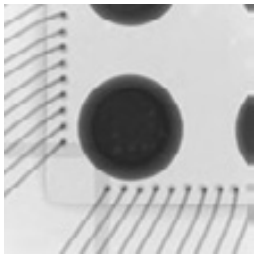
Tube with **Diamond|window**

- Standard non-toxic target for all Phoenix micro- and nano-focus X-ray transmission tubes for 180kV/20W
- Up to 2X faster data acquisition at same hi-res image
- Improved focal spot stability for long term measurement
- Less degradation – increased high-power target life

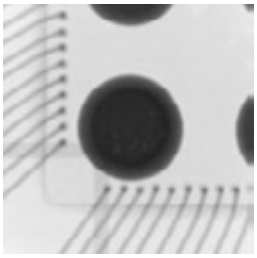




Min Focus-Object-Distance 0.3mm. Max mag of high power nanofocus X-ray tubes increased – Min spot size like W/Be target



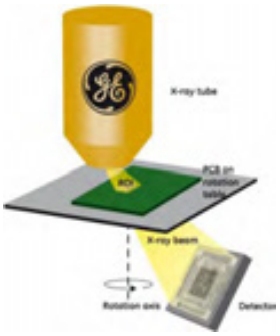
Diamond|window



Conventional Beryllium Window

At higher power, the focal spot has to be wider to avoid the target material melting. The non-toxic, high thermal conductivity CVD Diamond|window solves this for transmission at 180kV power, allowing smaller focal spot or higher resolution image acquisition up to 2 times faster for inspecting small features with high absorbing materials.

PlanarCT Easy 2D Plane and 3D Volume Inspection Module



- For large planar boards (without cutting or fixing) for e.g., complex circuit boards
- 2D slice view for better quality than conventional X-ray with overlaying features
- Excellent image quality and high magnification for wide defect coverage
- Slice and ROI CT volume evaluation in any direction with Datos|x 3D|viewer
- Available with Microme|x and Nanome|x. Upgrade option for already-installed systems

Reconstructed PlanarCT slice or multi-slice view of inspection results of a single plane or a whole package without overlaying from other board areas

Full CT visualization and evaluation of multiple slice volumes of THT solder joint defects with Datos|x 3D|viewer

V|tome|x C450 High Power/Productivity CT with Metrology

V|tome|x C450

- Compact 450kV CT system for production process control
- Max 3D scanning area Ø 500x1000mm
- Crane for efficient handling of heavy samples up to 50kg
- VDI 2630-1.3 dimensional traceability as standard
- One-button|CT fully automates entire CT process chain minimizing human influences for high CT GR&R
- Velo|CT II Accelerated 3D Reconstruction
- Measures size, volume, inclusions density, cavities and internal geometries to optimize production
- Significant productivity advantages for parts qualification
- Ideal for NDT, QA Labs in foundries and 3D metrology
- For automotive, aerospace, additive manufacturing, etc
- Low maintenance and cost of ownership

Automated wall-thickness

One-button|CT

Quick|pick manipulator

	V|tome|x C450	V|tome|x C Scatter|correct / HS
X-Ray Tube	Closed Bipolar Minifocus Tube, 450kV at 700W/1500W	
Focal Spot Size	0.4mm (max power 700W); 1.0mm (max power 1500W)	
Focus Detector Distance FDD	1300mm	1150mm
Voxel Size Range	100 to 146µm	87 to 139µm
3D Geometrical Magnification	1.37 to 2X	1.44 to 2.3X
Spatial CT Resolution	2.5 lp/mm at 130µm voxel resolution referring to ASTM E 1695	
Detail Detectability	Down to ~100µm	
Measurement Accuracy [1]	20+L/100µm	
Datos|x metrology package (Option)	Surface|extraction – automatic generation of surface data | Easy|calib – module for CT system calibration | Calibration|object – 1 calibration tool with certificate	
Cone Beam Flat Panel Detector	Dynamic 41|200 or Dynamic 41|100	
Fan Beam Line Detector Array	16-bit 820mm sensitive width, 2050 pixels, 400µm pitch. Linear subpixel-shift axis for resolution improvement and quality enhancement [2]	
Dual Detector configuration [2]	LDA and Flat Panel Detector, with detector shift and easy switching between both modes	
Granite-Based High Precision Manipulator	2 axes (R,Y) manual Z-Axis (300mm)	3 (R, Y, Z) or 4 (R, Y, Z, XB) in HS base Z-auto or HS quick|pick + detector shift axis
Max 3D Scan Area/Weight	Ø 500 x 1000mm H (Ø 270 x 1000mm H Scatter|correct) / 50kg	Ø 270 x 310mm H / 10kg (rotation unit HS) Ø 100 x 125mm H / 3kg (Quick|pick gripper)
Focus Object Distance	650 to 950mm	500 to 800mm
System Dimensions WxHxD	2310x2750x2870mm excluding console	
System Weight	Approx. 15,000kg	
Datos|x CT Software	Highly automated One-button|CT including modules for CT data and workflow optimization. Use with VG or other 3D evaluation software for 3D metrology, failure or structure analysis	
Filter|changer (Option)	Automated change of up to 4 filters for max flexibility and quality at automated batch CT	
Velo|CT II Package (Option)	For ultrafast volume reconstruction	
Cabinet Crane (Option)	For ergonomic handling of heavy samples up to 50kg	
Barcode Reader (Option)	For easy sample identification	
Radiation Protection	Full protective radiation safety cabinet per German RöV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.	

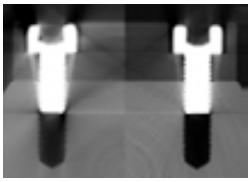
[1] Measured as deviation of sphere distance in tomographic static mode SD(TS) per VDI 2630 guideline. [2] Not available for Scatter|correct and HS configuration.

V|tome|x M Hi-Resolution Microfocus X-Ray CT

Award winning mid-size stabilised cabinet, versatile high power, hi-resolution microfocus XCT with 180kV/20W nanofocus option, ready for VDI 2630-1.3 Dimensional Length Traceability

V|tome|x M

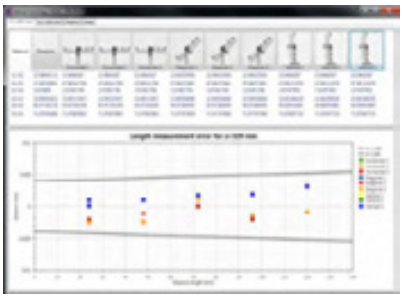
- High power 300kV/500W or 240kV/320W unipolar microfocus tubes with <1µm detail detectability
- Dual nanofocus tube configuration for 180kV/20W option
- Temperature stabilized tube and cabinet
- Metrology|edition: VDI 2630-1.3 traceable certification
- Very high image quality at up to 30fps extremely fast acquisition via Dynamic 41 series detector array
- Long|life filament up to 10x increased lifetime Diamond|window for 2x faster data acquisition

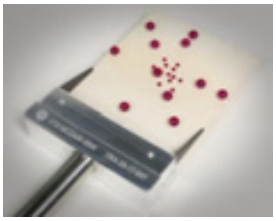


Without (L) / With (R) Scatter|correct screw scan comparison

Ground Breaking Option **Scatter|correct**: Advanced cone beam radiation scatter correction for fan-beam image quality at up to 100x faster cone-beam CT acquisition speeds. Ideal with 400x400mm^2 Dynamic 41 flat panel detectors.

V|tome|x M Metrology|edition (Option) – Measures accurately up to 3.8+L/100µm





True|position / Ruby|plate

Ball Bar CFC with sphere (24, 48, 72, 96 and 120mm L)

Datos|x metrology check to verify VDI 2630-1.3 performance using calibrated artefacts above

Metrology Pack incl. vibration-insulated manipulator, long-term stabilized X-Ray tube with Diamond|window, two calibration test phantoms, Datos|x "Click & Measure CT", "Metrology", Automatic Voxel Calibration (auto-calibrates voxel size for whole travel range of the magnification axis) and ASTM 1965 CT system performance (image monitoring, determination of Modular Transfer Function (spatial resolution) and Contrast Discrimination Function (sensitivity, inverse of CNR) in %).

Production|edition (Option) – Collaborative robot for high-throughput parts handling

The future is now, and it's fast. WT's industrial CT portfolio provides the ease of use, repeatability, and reproducibility needed to reduce scrap caused by defects and ensure productivity and quality. With highly automated systems, minimize the human factor and ensure up to 100% production control!

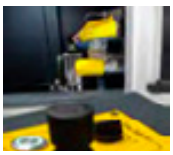
Add-on a collaborative robot to automate sample loading and achieve higher throughput and productivity with reproducibility.

V|tome|x S Compact High Power Micro/Nano-focus XCT Platform

V|tome|x S

- High power 240kV/320W microfocus tube
- Dual configuration ready for 180kV/15W nanofocus option
- Long|life filament for up to 10x increased lifetime
- Temperature stabilized Dynamic 41|200 and large area detector with superior image and result quality with extremely high dynamic range > 10000:1
- High dynamic temperature stabilized DXR detector for fast CT acquisition and brilliant live images (option)
- Diamond|window for 2 times faster data acquisition

NanoCT®



Dual tube configuration

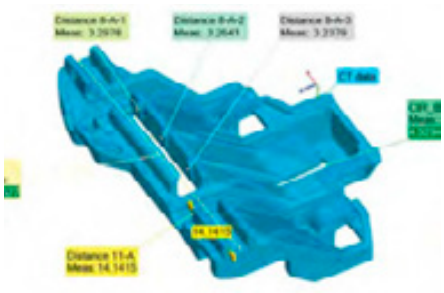
	V|tome|x M300	V|tome|x M240	V|tome|x s 240
X-Ray Tube	Open directional high-power microfocus X-ray tube, closed cooling water circuit. Optional dual tube configuration, for additional nanofocus X-ray tube.		
Microfocus Tube Power	Max 300kV/500W	Max 240kV/320W	
Detector Type	Dynamic 41|200 (4MP) or Dynamic 41|100 (16MP)		DXR S100 Pro, DXR250RT or Dynamic 41|200
Microfocus Min Voxel Size	Down to 2µm/1µm with 41|200 and 41|100 respectively		Down to 2µm
Nanofocus Tube Option	Optional nanofocus tube, max 180kV and 20W. Tube exchange by a push of a button		
Nanofocus Min Voxel Size	Down to 0.5µm (nanofocus). Detail detectability: 0.2µm		
Measuring Accuracy [1]	3.8+L/100µm per VDI 2630-1.3 (Metrology|edition)		N/A
Metrology|edition Option	Datos|x CT package "metrology" + patented 130mm length Ruby|plate phantom for 3x faster, automated verification setup of CT scans with higher measurement accuracy		
Scatter|correct Option	2D fan beam CT with minimized scatter radiation artifacts. Max scan Ø: 260mm, geometric magnification 1.51x to 100x		
Manipulation	Granite based precision 4-axes manipulator		5-axes metal precision manipulator, optimized high stability construction
Focus-Detector-Distance	800mm with 16" detector		800mm/8" FPD; 930mm/16" FPD
Max Sample Ø x Height	360x600mm; up to 500x600mm with limited travel range		260mm Ø x 420mm H
Max 3D Scanning Sample	420mm Ø x 400mm H		
Max Sample Weight	High accuracy CT up to 20kg; Max up to 50kg		10kg
System Dimensions WxHxD	2620x2060x1570mm (D: 2980 with user panel + generator)		2170x1690x1500mm
System Weight	Approx 7960kg		Approx 4550kg
Temperature Stabilization	Active X-ray tube cooling, temperature-controlled cabinet and temperature stabilized detector		Active X-ray tube cooling and temperature stabilized detector
High-flux|target Option	2X faster CT scans or doubled resolution; X-ray inspection power up to 100W		
2D Inspection Bundle Option	Tilt and rotation axes for tilted 2D inspection of samples up to 10kg; Software with Flash!™		
Click&measure|CT	Fully automated CT process chain. Included as standard		Option
Helix|CT & Offset|CT Option	Advanced scanning trajectories for improved scanning volume and data quality; Helix|CT for long part scans with less artifacts; Offset|CT for bigger parts or higher resolution		N/A
Production|edition Option	Fully automated with collaborative robot on request		
Datos|x Software	Phoenix Datos|x 3D computed tomography acquisition and reconstruction software. Different 3D evaluation software packages for 3D metrology, failure or structure analysis on request		
Analysis Software	Various evaluation packages such as Volume Graphics for 3D metrology, failure analysis, porosity, transport phenomena, foam structure, fiber composite, etc. on request.		
Radiation Protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.		

[1] Per VDI 2630-1.3 measured as deviation of sphere distance in tomographic static mode SD (TS), with True|position and Ruby|plate, valid only for Phoenix V|tome|x M Metrology|edition. L: sample length in mm.

Nanotom M High Resolution nanoCT® X-Ray CT

Outstanding nanofocus tube, high dynamic, high-resolution DXR detector and advanced algorithms combine to deliver optimal high image quality with detail detectability down to 200nm

Nanotom M



Measurement of 5 features of injection molded part with CAD variance

Nanotom M	
X-Ray Tube	Proprietary open nanofocus tube, max 180kV/20W output, optimized for long-term stability with internal tube cooling
Target	Diamond|window. Other materials, e.g. molybdenum on request
Filament	Tungsten hairpin, pre-adjusted plug-in cartridges for fast and easy exchange
3D Geometrical Magnification	1.4 to 300x
Best Detail Detectability	0.2µm
Minimum Voxel Size	0.3µm
Detector	Temperature stabilized high dynamic DXR500L
Pixels/Pixel Size	3072x2400 / 100µm
Manipulation	Granite-based 5-axes manipulator, vibration insulation, precision rotation table on air bearings
Detector Focus Distance	Variable from 200 to 600mm
Max CT Sample Size/Weight	240mm Ø x 250mm H / 3kg
Sample Travel Length Y/Z	250mm/400mm
Rotation	0° to 360° x n
System Dimensions / Weight	1980mm W x 1600mm H x 925mmmm D / Approx. 1900kg
3D Metrology Bundle Option	Temperature stabilized cabinet, high accuracy direct measuring system, Calibration|object, Datos|x module packages “metrology” and “Click & measure|CT”
Datos|x Software	Phoenix Datos|x 3D computed tomography acquisition and reconstruction software. Different 3D evaluation software packages for 3D metrology, failure or structure analysis on request.
Analysis Software	Various evaluation packages such as Volume Graphics for 3D metrology, failure analysis, porosity, transport phenomena, foam structure, fiber composite, etc. on request.
CT Reconstruction	Phoenix Datos Velo|CT high-speed (up to 6 GPUs)
Advanced Sample Manipulation Options	Manual XY highly accurate positioning table, tensile & compression testing stage system, coolstage specimen cooling unit. Or Motorized XY-table with two linear axes
Radiation Protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.

NanoCT® – Closest to Synchrotron X-Ray CT

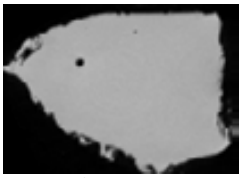


Image from nanotom m

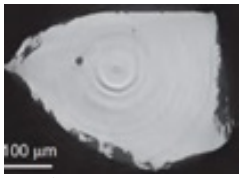
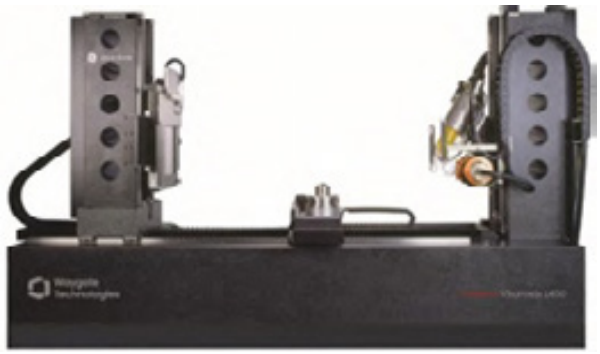


Image from ESRF Synchrotron

Nanotom M detects minute details with optimized image quality; making it an accessible alternative to limited-availability synchrotron facilities for materials science, micro-engineering, electronics, life sciences, geosciences, etc.

V|tome|x L300 / L450 Large Size Customizable XCT

V|tome|x L300



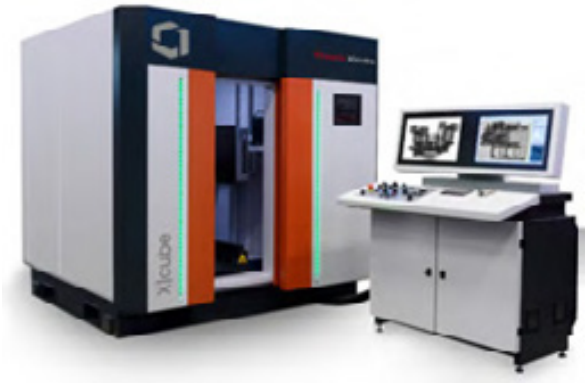
V|tome|x L450

- High-mag unipolar 300kV tube for evaluating high absorbing steel parts and large aluminium castings
- Option: 180kV/20W high-power nanofocus X-ray tube
- 3D Metrology package for dimensional measuring
- Easy switch between 2D and XCT
- Micro and Nano mode with details down to 1µm
- Optimised metal-ceramic bipolar 450kV/1500W minifocus tube for sharp scans of high absorbing parts
- Long|life filament option
- Fast CT via temperature stabilized Dynamic 41 detector at up to 30fps

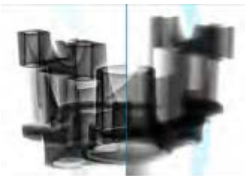
	V|tome|x L300	**V|tome|x L450**
Max Tube Voltage / Output	300kV / 500W	450kV / 1500W
Detail Detectability / Min FOD [1]	Down to 1µm	Down to 2µm
Min 3D Voxel Resolution [2]	2µm	
2D Geometric Mag	1.25 to 238x	1.25 to 400x
3D Geometric Mag	1.25 to 187x	1.25 to 242x
Max Object Size / Weight	600mm H x 500mm Ø / 50kg	1000mm H x800mm Ø / 100kg
Manipulator Type	Granite-based 6-axes manipulation unit	
Detector	16” Dynamic 41|200 (4MP) or in combination with Line Detector Array	
2D X-Ray Imaging	Yes	
3D CT	Yes	2D / CT switch
Datos|x Software	Phoenix Datos|x 3D computed tomography acquisition and reconstruction software. Different 3D evaluation software packages for 3D metrology, failure or structure analysis on request.	
System Size	4100x2600x2960mm	6500x3500x4300mm
System Weight	22,000kg	65,500kg
Radiation Protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.	

[1] Focus Object Distance. [2] Proportionate to object size.

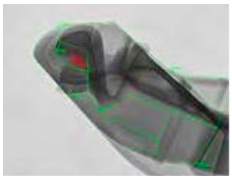
X|cube Real-Time X-Ray and CT Inspection System



X|cube



Flash!™



semi ADR auto defect recognition

- Real-time 2D inspection of precision plastic, ceramics, metals and alloy components, castings, welds and AM parts used in the automotive, aerospace and oilfield industries.
- Detect hidden defects for in-time production decisions
- Modular ergonomic design, high dynamic detectors and advanced Flash!™ (option) for enhanced superior image and reliable accurate inspections
- 3D Computed Tomography option
- Optional Semi-Automatic Defect Recognition for production decisions
- High throughputs, simple workflow, easy servicing with 24/7 intuitive X-Touch®, reduced human error and maintenance costs for reliable, efficient X-ray inspections
- Available in Compact and XL sizes for a wide inspection range with both manual and fully automated X-ray options

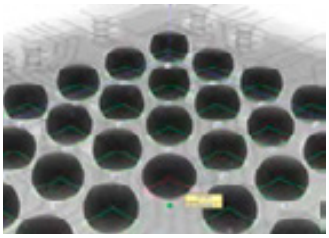
X|cube	Compact			XL	
Energy (Max)	**160kV**	**225kV**	**320kV**	**160kV**	**225kV**
Max Sample Size [1] Ø x H	600 x 900mm			800 x 1500mm	
Max Sample Height	1150mm	1150mm	930mm	1585mm	
Max Sample Weight [2]	150kg		300kg	100kg	
Cabinet Size LxWxH in mm	2650x2155x2360		2540x2230x2400	2850x2155x2885	
Cabinet Weight	5350kg		10,500kg	6600kg	
Control Panel Weight	350kg				
Horizontal Motion Across Beam	650mm max		660mm max	850mm max	
Max External Loading Position	90mm		150mm	90mm	
Max Horizontal Motion Mag Axis	850mm		620mm	1050mm	
Focus Detector Distance FDD	800 to 1000mm		800 to 1150mm	1000 to 1200mm	
Max Vertical Motion	900mm		950mm	1500mm	
Max Tilt / Max Rotation	±45°/n x 360°				
2D Software	VISTAPLUS Integrated image optimization live real-time display with dedicated detectors				
System Control	X|touch panel for fast and easy set-up of inspection routines by teach-and-learn procedures				
Control / Drives	Hardware PLC for PC independent/Fanuc servo drives				
Detector Options	DXR 250RT for real-time inspection and very fast CT scans; DXR 500L for particularly high-resolution applications and DXR 250 for a large active area				
Flash!™ Option	Proprietary live image optimization for easier visual defect detection in castings or weldings				
X-Ray Tube Options	Various mini and macro focuses, as well as various high-power X-ray tubes				
Software Options	EZ Compare with ASTM reference image catalogue, semi-ADR for semi-automatic defect recognition (pass/fail final decision by operator), Rhythm Export Module with DICONDE file export to GE Rhythm Platform, and automatic ASTM image quality evaluation				
Computed Tomography Add-on	All required hardware and software components for combined 2D/3D operation				
CT Scan Range	Max 160mm Ø x 160mm height with DXR 250RT 8”x8” detector				
Min Voxel Size	Up to 100µm, depending on the sample size and detector pixel pitch				
Connection Values / Capacity	3N PE 400/230V 50/60Hz, 35A (160+225kV), 50A (320kV), TN-S/-CS network / ≈16kVA[3]				
Earthing	Separate earthing for X-ray device and high-voltage generator (< 2Ω) with at least 6mm²				
Means of Transport	Complete X-ray protection cabinet / Control panel (on pallet) with fork lift truck				
Ambient Conditions IEC 60601-1	10 to 40°C, air pressure 700 to1060hPa operating humidity 25 to 85% non-condensing				
Radiation protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J (coming soon).				

[1] Longer workpieces are possible, this involves the workpiece being reloaded and inspected. [2] Depends on the loading position. [3] Depends on the applied X-ray tube. [Note] The inspection volume that can be X-rayed varies according to the total wall thickness and the material density.

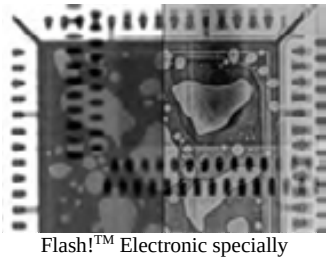
X|aminer Easy to Use Entry-Level High-Quality Electronics X-Ray Inspection

X|aminer

- Unlimited-life 160kV/20W microfocus tube with optional 3D CT even for high absorbing components
- Newest superior resolution DXR S85 detector with improved scintillator technology for higher inspection efficiency and better image quality
- High contrast CMOS FPD option for improved inspections
- Comprehensive fast, intuitive software with Live CAD overlay
- Automated real X-ray sample map for easy orientation on top, bottom and even inside samples
- Anti-collision sample protection feature
- Economical, small footprint



Open BGA ball with live CAD overlay and FLASH!™ image optimization



Flash!™ Electronic specially optimized for electronics application

	X|aminer
X-Ray Tube	Low maintenance open microfocus tube, transmission head, 170° cone angle, collimated, Tungsten target rotatable for multiple use.
X-Ray Detectors	Option 1: Waygate Technologies DXR S85 1536 x 1536 pixel CsI detector Option 2: High contrast 1536 x 864 pixel CMOS detector
Geometric Magnification	>2100X
Total Magnification	>91000X
Best Detail Detectability	0.5µm
Max. tube voltage / power	160 kV/20 W
Filament	Tungsten hairpin, pre-adjusted in plug-in cartridges for fast and easy exchange in <20mins
Manipulator	High precision vibration-free synchronized 5 axes manipulation
Max Inspection Area /Sample	410x410mm / 510x510mm
Max Sample Weight	5kg
ovhm – Oblique View Rotation	Adjustable view angle up to 70° n x 360°
Control	Manual Joystick or mouse control and Automatic CNC mode
Manipulation Aids	sample X-ray mapping, click'n-move-to function, click'n-zoom-to function, automatic isocentric manipulator movement, active anti-collision system
System Dimensions / Weight	1800x1900x1430mm (WxHxD) (D without console and demountable back extension) / 2050kg
Radiation Protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.
Software Configuration (Option)	*X|act BGA check strategy*: automated CAD based analysis of BGA solder joints. *X|act PTH check strategy:* automated CAD based analysis of PTH solder joints. *QFP|module*: automated QFP solder joint evaluation. *QFN|module*: automated inspection of QFN / MLF solder joints. *PTH|module*: automated pin-through-hole solder joint evaluation. *X|act review*: visual interface for rework and failure indication. *FLASH!™*: Waygate's exclusive image optimization technology. Now Flash!™ Electronics optimized specially for electronics application available
CT (Option)	Available as an option for easyfixCT
Barcode scanner	Manual bar code reader: for product identification
Tilt / Rotate Unit Option	Tilt ±45° and rotate n x 360° samples up to 2kg
Positioning aid (Option)	Laser crosshair
Rotation PCB Holder Option	Max Board 310x310mm
XY Table Option	510x510mm inspection area without rotation and OVHM

Microme|x / Nanome|x neo Hi-Res Micro/Nanofocus X-Ray Inspection

Microme|x neo / Nanome|x neo

- Temperature stabilized digital DXR detector w active cooling (high dynamic live imaging)
- 180kV/20W high-power micro- /nanofocus tube with up to 0.5µm/0.2µm detail detectability respectively
- X|act CAD based µAXI programming and inspection
- Diamond|window for 2 times faster data acquisition
- Flash!™ (option) for faster, more reliable failure detection.
- CT Upgrade Option for 3D scans within 10 seconds
- PlanarCT easy 2D Slice and 3D Volume Inspection

CT of USB flash drive

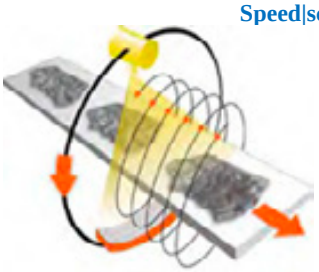
Brilliant DXR-HD live imaging

	Nanome|x neo 180	**Microme|x neo 180**	**Microme|x neo 160**
X-Ray Tube	nanofocus 180kV/15W	microfocus 180kV/20W	microfocus 160kV/20W
	Low maintenance open tube with unlimited lifetime, transmission type, 170° cone angle, collimated, target rotatable for multiple use		
Target	Diamond|window for up to 2 times faster data acquisition		Al Window, Optional Diamond|window
X-Ray Detector	High dynamic 200µm pixel resolution detector DXR250RT or Large size 100µm pixel resolution detector DXR S100 Pro		Superior 85µm pixel resolution detector DXR S85 or 75µm pixel res. CMOS detector
Geometric Magnification	DXR250RT: Max 1970x; DXR S100 Pro: Max 2185x		Max 1970x
Total Mag 27" Monitor/2K	DXR250RT: Max 36,800x; DXR S100 Pro: Max 40,700x		DXR S85: Max 84,800x; CMOS: Max 96,000x
Best Detail Detectability	0.2µm	0.5µm	
Filament	Tungsten hairpin, pre-adjusted in plug-in cartridges for fast and easy exchange		
Manipulator	high-precision vibration-free synchronized 5-axes manipulation		
Max Inspection Area	460x360mm, 610x510mm without rotation table		
Max Sample Size / Weight	680x635mm / 10kg		
ovhm – Oblique View Rotation	continuously adjustable view angle up to 70°, rotation 0° to 360°		
Control	Manual Joystick or mouse control and CNC		
Manipulation Aids	sample X-ray mapping, click'n-move-to/-zoom-to functions, automatic isocentric manipulator		
Positioning Aid	laser crosshair		Optional laser crosshair
Anti-Collision System	may be deactivated for maximum magnification (tube touching the sample)		
System Dimensions / Weight	2160x1958x1590mm DxHxW without control console. (Transport width 1770mm) / 3250kg		
Dose Reduction	Dose|manager, with Shadow|target, inside the X-ray tube, enables real-time dose monitoring and up to 60% dose reduction for radiation protection of sensitive inspection samples.		
Image Processing Software	*Phoenix X|act*: inspection software comprising image enhancement, measuring functions, and fast automated CAD-based programming for automatic inspection. *BGA|module*: Intuitive view based BGA solder-joint evaluation including automatic wetting analysis. *VC|module*: Intuitive view based voiding calculation including multiple die attach voiding evaluation capability.		
Software Options	*Flash!™* image optimization. *PlanarCT module*: Non-destructive 2D slice and 3D volume board evaluation including 3D|viewer software		
Hardware Options	Tilt (± 45°)/ rotate (n x 360°) unit for samples up to 2kg. Manual bar code reader.		
CT Options	*Datos|x*: volume acquisition / reconstruction for 2D/3D *CT* (via precision rotation unit). Max geometric mag: 100x. Best voxel resolution: 2µm (depends on sample size and tube type)		
Radiation Protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.		

Speed|scan CT64 Automated High-Speed Production XCT

Speed|scan CT64

- Productivity gains via quantitative 3D automated defect recognition and dimensional control
- Faster product ramp up times and reduced rejects
- Up to 100% production control of large castings
- 64-channel data acquisition and patented quick-slide manipulator for rapid sample throughput (scans cylinder head in 15secs); hundred times faster than fan beam CT 3D inspection
- Optimized ease of use due to high automation
- Low Total Cost of Ownership



Fast gantry-based helix CT multi-line technology from Medical CT knowhow, leverages a high-performance X-ray tube and very-high sensitivity multi-line detector to scan work pieces continuously with low scattering artefacts. A high-speed automatic helix gantry with X-ray tube and multi-line detector (up to 64 channels) rotates around the work piece forwarded on a conveyor belt at precise calibrated speed. The proprietary high-speed 3D evaluation algorithms then construct the high-quality images and the evaluation results.

3D automated defect recognition (3D Speed|ADR)

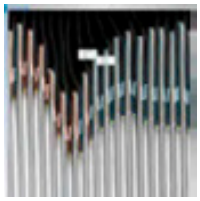
Speed|scan CT64	
Inspection Concept	Manual loading, operator-based or robot-based fully automated inspection with automated 3D failure detection Speed|ADR and 3D dimensional control for statistical process control
Max Sample Size / Weight	~600 Ø x900mm; Max Scan Ø ~ 500 Ø x ~888 to 979mm / 50kg
Penetration Length	Allows inspection of Al gear cases and engine blocks depending on part geometry
Min Detectable Defect Size	≥0.5mm³, depending on part size with detail detectability of ≥300µm
3D Metrology	Fast automated CAD nominal/actual analysis and measurement tasks for process control
Scan/Reconstruction/Cycle Speed	10.62 to 61.25mm/s / reconstruction speed up to 75 slices/s inspection / <1min per part
Multi-Line Detector	High dynamic, 64-layer parallel acquisition. The detector embodies the patented HiLight™ material, a ceramic scintillator specially developed for CT applications.
High Performance Rotating Anode X-Ray Tube	Max 140kV, 515mA current, 72kW generator output. Typical inspection parameters: 140kV, 100mA. Ratio between X-ray on and cooling time depends on selected parameters.
CT Gantry	Advanced continually rotating generator, X-ray tube, detector and data acquisition system around the test specimen. Rotation speed adaptable within the range of 0.5 to 1 revolutions/sec depending on required data quality and specimen throughput rate
Production|edition	Fully automated robot loading/unloading for high throughput inlineCT on request
Dimensions W x D x H / Weight	2500 x 4000 x 2500mm / 13,000kg
Design	Suitable for industrial environment with dust and foreign body protection
Air Condition	Active air conditioning system to safely remove the heat created during the test procedure
Patented quick-slide|manipulator	Speed: 10.62 to 61.25mm/s for data acquisition, up to 1000mm/s for loading/unloading
Control Unit	Operator console with 2 flat screen monitors close to the system to facilitate speedy loading and unloading by the operator. Touch panel for visualization of PLC / control
3D Data Analysis and Visualization	Automated DICOM image transfer to analysis station. CT visualization – 3D detection and classification of pores and inclusions (GE Speed|ADR). Dimensional control: Wall thickness determination and Actual/nominal CAD comparison via VGStudio MAX
Software User Level	Create and modify 3D inspection programs on- or off-line. Inspector for semi- or fully-automated analysis. VG Approval for interactive visualization and review of results.
Radiation Protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.

Speed|scan HD 100% Inline High-Speed microCT for Production

Speed|scan HD

- Fully automated high-speed inline CT system for production process control and optimization with >20 years of industry-proven technology
- Large sample size inspections up to 100% of production volume
- Full 3D production control for electronic, automotive, and medical device applications, including batteries, connectors, injection moldings, and complex assemblies
- Fully automated part handling and CT innovations enable 24/7 Speed|scan HD operations at exceptional voxel resolutions down to 25µm
- Advanced AI-based battery anode overhang analysis as well as automatic defect recognition (ADR) for pass/fail decisions and fully automated CT workflows
- Proprietary, rugged microfocus X-ray tube (Inline|edition, 240kV/100W) designed for production environment
- Automated filter|changer for increased flexibility (up to 10 different hardware filters)
- Dynamic41|200p+ X-ray detector for long-term stability and reliability at industrial high-energy use in production, delivers up to 10 times more efficiency and sensitivity than advanced technology 200µm pixel detectors.
- Dual manipulator shortens inspection cycles, reducing loading/unloading wait times

Automated filter|changer



AI-based automated defect recognition (ADR)

Dual manipulator

Speed|scan HD	
X-Ray Tube Type	Open directional high-power 240kV/100W microfocus tube with closed cooling water circuit
3D Geometrical Magnification	8X
Detail Detectability / Voxel size	Down to 20µm / Min 25µm
Detector type / Focus Detector Distance	Temperature stabilized Dynamic 41|200p+ large area detector with superior image and result quality, 410x410 mm, 200µm pixel size, 2036x2036 pixels (4MP), extremely high dynamic range > 10000:1 / 800mm. Optional Dynamic 41|100 large area detector with superior image and result quality, 410x410mm, 100µm pixel size, 2048x2048 pixels (16MP), extremely high dynamic range > 10000:1
Max Sample Size / Weight	150mm Ø x 200mm / 5kg
Dimensions WxDxH / Weight	~2310x2200x2055mm (without external components) / 7250kg
Maximum Focus Object Distance	500mm
Temperature Stabilization	Active X-ray tube cooling | temperature stabilized detector
Production|edition	Fully automated robot-based workflows
Software	Phoenix Datos|x 3D computed tomography acquisition and reconstruction software. WT proprietary Automated defect recognition (ADR) software with a focus on battery overhang detection. Barcode/matrix code reader for part identification. Optional 3D evaluation software packages available for 3D metrology, failure analysis, and structural analysis
Options	48 GB network attached NAS storage with in air-conditioned PC rack with optional uninterruptible power supply; 2 calibration objects for enhanced accuracy; Click & Measure CT for fully automated CT process chain; Dual-stage manipulation for faster part handling; Flash!™ provides outstanding image enhancement on 2D images; Filter|changer with up to 10 filters hosted for automatic filter setting adjustment during part mix scanning
Radiation protection	Full protective radiation safety cabinet per German StrSchG/StrSchV, French NFC 74 100 and US Performance Standard 21 CFR Subchapter J.

XYZAX Line-Up of High Productivity Made-In-Japan CMMs

mju NEX

AXCEL

SVF NEX

Accretech's XYZAX CMMs looks back 50 years to when Tokyo Seimitsu launched the DCM-600A, Japan's first computerised CMM in 1969. Since then, Accretech's CMMs have become household names and is largely used in the automotive and precision engineering industries.

The XYZAX line up comprises the high productivity AXCEL series with sizes from 7/7/5 to 12/25/10, operating at high speed, low vibration and high accuracies with a full range of Zeiss and Renishaw sensors and probes; the ergonomic MJU available in two compact sizes with greatly reduced air and energy consumption, and the sturdy and time-tested SVF manual CMM series.

All models are produced in Tsuchiura (near Tsukuba science city, home to Japan's high-technology research) for conservative, under-stated high quality of manufacturing and reliability.

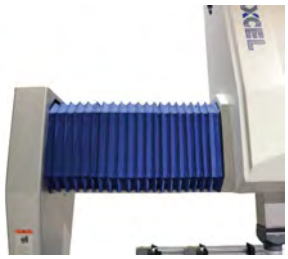
Accretech means accretion of the best technologies from all over the world into a complete, versatile and capable system. This is what customers find in all Accretech metrology equipment!

XYZAX AXCEL High Productivity CMM

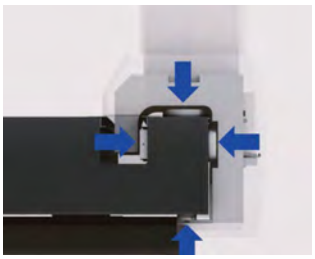
AXCEL

- Sizes from 7/7/5 to 12/25/10. E_0 MPE = 1.8+3L/1000µm at 18–22°C for all sizes from 7/7/5 to 10/15/8
- Expanded temperature operation at 16 – 26°C and 15 – 30°C (option) with climate-stabilised worktable structure
- Higher speed with low vibration and improved accuracy:
  - o New drive mechanism increases speed by 64% and acceleration by 35% compared to previous models
  - o New bridge structure with Y- and torsion-direction 3.8X and 1.5X increased rigidity than previous models
  - o 4-direction Y-Axis guide support air pads, reducing runout and vibration at probe tip
- Air Saver function reduces running costs. Option LED illumination of worktable below the X-Axis guide
- Air anti-floor vibration unit for Z ≥ 800mm sizes; option for Z ≤ 600mm by attaching a base cover
- Accretion of best of world technologies with Renishaw and Zeiss probe heads and sensors


New Highly Rigid Bridge



X-Axis temperature guide cover

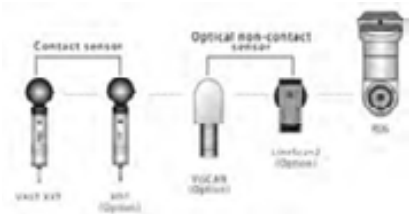

4-direction Y-Axis air bearings


Open Y-Axis guide reduces heat

XYZAX AXCEL High Performance CMM

XYZAX AXCEL RDS – Zeiss Probe Systems

Zeiss RDS-C5 head with 5° rotary increments ±180° horizontal/vertical for 5184 orientations. Auto-calibration routine by probing 12 specified positions. Supports VAST XXT, XDT, LineScan2 and ViSCAN probe choices. Popular CALYPSO software.



Attach various probes to meet a vast range of measurement needs

Auto-change probe with option rack, magazine, probe socket, etc.

VAST XXT Probe

XDT Probe (Option)

LineScan2 (Option)

ViSCAN (Option)

- Very low meas. force 0.01 to 0.13N scanning probe
- Smallest 0.3mm Ø probe
- Wide ±3mm deflection minimizes collision impact

- Wide ±3mm deflection range
- Extensions to 150mm axial and 65mm horizontal
- Uses XXT adaptor plate and joints for auto-styli change

- Fast line laser acquisition of surface point cloud data for inspection and R/E
- 3 range/accuracy models

- For image measurement from many different angles
- Use manually or CNC
- For small holes or grooves and soft or thin workpieces

XYZAX AXCEL PH – Renishaw Probe Systems

PH10T + motorized indexing probe head with TP200

TP200 compact, higher accuracy, longer life strain-gauge probe

PH10T+/TP200B & PH1/TP20

Proven Renishaw PH10T/M+ heads; 7.5° rotary increments; air supply not needed; wide range of Renishaw probes including TP20, TP200, TP200B. Use with CALYPSO or XYANA2000 software (for PH20 infinite orientation revolving probe head).

ACR200/MCR20 auto change rack for Renishaw styli modules

Extension bars; Autojoint fitting Ø 25mm with connection repeatability: 1µm at stylus tip, 50mm from autojoint

Effective length	D1	D2	Weight
400mm	Ø 25mm	Ø 14mm	104g
450mm	Ø 25mm	Ø 13mm	112g

Carbon fibre extension bars PAACF (A-1051-0513 and A-1051-0394) respectively

XYZAX AXCEL Specifications Table

XYZAX AXCEL RDS/PH		**7/5/5**	**7/7/5**	**9/6/6**	**9/10/6**	**9/15/6**	**10/10/6**	**10/12/6**	**10/15/6**
Measuring Range X		650mm	650mm	850mm	850mm	850mm	1000mm	1000mm	1000mm
Measuring Range Y		500mm	700mm	600mm	1000mm	1500mm	1000mm	1200mm	1500mm
Measuring Range Z		480mm		600mm					
Measuring Length Scale		Linear Scale							
Min Display Value		0.01µm							
Measurement Accuracy [1]		Common for Z = 480mm and 600mm models							
		RDS/XXT				**PH10T+/TP200**			
E_0	18 – 22°C	1.8+3L/1000µm							
	16 – 26°C	1.8+4L/1000µm							
	15 – 30°C [2]	1.8+5L/1000µm							
E_{150}	18 – 22°C	2.3+3L/1000µm							
	16 – 26°C	2.3+4L/1000µm							
	15 – 30°C [2]	2.3+5L/1000µm							
$R_{0, MPL}$		1.3µm				1.5µm			
$P_{FTU, MPE}$		1.8µm				2.0µm			
MPE_{THP} at T=75s		2.9µm				N/A			
Guidance System for Each Axis		Air bearings							
Table Material		Gabbro							
Table Usable Width (X)		1050mm					1200mm		
Table Usable Depth (Y)		1400mm	1600mm	1500mm	1900mm	2400mm	1900mm	2100mm	2400mm
Table Height from Floor		600mm							
Table Flatness		JIS Class 1							
Table Clamping Screw		M10 threaded hole							
Max Workpiece Height		670mm		790mm					
Max Workpiece Weight		600kg	800kg		1000kg	1500kg	1000kg	1200kg	1500kg
Drive Max Acceleration/Deceleration		2300mm/s^2							
Drive Variable Speed Range		Auto measurement mode 0.01 – 700mm/s (Stepless control) Joystick and manual mode (Automatic measurement) 0 – 120 (Stepless control)							
Drive Measuring Speed		Joystick and manual mode (Automatic measurement) 0 – 5mm/s							
Temperature Changes		1.0°C/hr, 2.0°C/day (at 18 – 22°C and 16 – 26°C) | 2.0°C/hr, 5.0°C/day (at 15 – 30°C [2])							
Temperature Gradient		1.0°C/m (at 18 – 22°C, 16 – 26°C & 15 – 30°C [2])							
Air Supply / Working Pressure		0.49 to 0.69MPa / 0.39MPa							
Air Consumption		55Nℓ/min							
Power Supply		Single phase AC 100 to 240V±10% (factory pre-set). Grounding required.							
Power Consumption		1210W					1350W		
Machine Width x Height		1462 x 2339mm		1716 x 2578mm			1866 x 2578mm		
Machine Depth		1450mm	1650mm	1550mm	1950mm	2450mm	1950mm	2150mm	2450mm
Machine Weight		1610kg	1800kg	2100kg	2550kg	3150kg	2850kg	3100kg	3450kg
Machine Height at Transport [3]		1940mm		2220mm					

[1] Evaluation methods are per current JIS B7440-2, -4 and -5 (ISO 10360-2, -4 and -5).
$E_{0, MPE}$, $E_{150, MPE}$, $R_{0, MPL}$ and $P_{FTU, MPE}$ with stylus tip dia. Ø 5, length: 50mm for RDS; tip dia. Ø 4, length: 20mm for PH10.
MPE_{THP} using stylus with tip dia. Ø 3, length: 50mm for RDS.

[2] Adapting to temperature condition 15 – 30°C is an Option for PH models.

[3] Z-Axis is folded down for transport. Please provide adequate allowances for passageways and lifting/support equipment used.

XYZAX AXCEL Specifications Table

XYZAX AXCEL RDS/PH		10/10/8	10/12/8	10/15/8	12/15/10	12/20/10	12/25/10
Measuring Range X		1000mm			1200mm		
Measuring Range Y		1000mm	1200mm	1500mm	1500mm	2000mm	2500mm
Measuring Range Z		800mm			1000mm		
Measuring Length Scale		Linear Scale					
Min Display Value		0.01µm					
Measurement Accuracy [1]		Common for Z = 800mm models			Common for Z = 1000mm models		
		RDS/XXT	**PH10T+/TP200**		**RDS/XXT**	**PH10T+/TP200**	
E_0	18 – 22°C	1.8+3L/1000µm			2.2+3L/1000µm	2.4+3L/1000µm	
	16 – 26°C	1.8+4L/1000µm			2.2+4L/1000µm	2.4+4L/1000µm	
	15 – 30°C [2]	1.8+5L/1000µm			2.2+5L/1000µm	2.4+5L/1000µm	
E_{150}	18 – 22°C	2.3+3L/1000µm			2.7+3L/1000µm	2.9+3L/1000µm	
	16 – 26°C	2.3+4L/1000µm			2.7+4L/1000µm	2.9+4L/1000µm	
	15 – 30°C [2]	2.3+5L/1000µm			2.7+5L/1000µm	2.9+5L/1000µm	
$R_{0, MPL}$		1.3µm	1.8µm		2.2µm	2.4µm	
$R_{FTU, MPE}$		1.8µm	2.4µm		2.5µm	3.0µm	
MPE_{THP} at T=75s		2.9µm	N/A		3.8µm	N/A	
Guidance System for Each Axis		Air bearings					
Table Material		Gabbro					
Table Usable Width (X)		1270mm			1470mm		
Table Usable Depth (Y)		2000mm	2200mm	2500mm		3100mm	3600mm
Table Height from Floor		630mm					
Table Flatness		JIS Class 1					
Table Clamping Screw		M10 threaded hole					
Max Workpiece Height		1000mm			1200mm		
Max Workpiece Weight		1000kg	1200kg	1500kg			1000kg
Drive Max Acceleration/Deceleration		2300mm/s^2					
Drive Variable Speed Range		Auto measurement mode 0.01 – 700mm/s (Stepless control) Joystick and manual mode (Automatic measurement) 0 – 120mm/s (Stepless control)					
Drive Measuring Speed		Joystick and manual mode (Automatic measurement) 0 – 5mm/s					
Temperature Changes		1.0°C/hr, 2.0°C/day (at 18 – 22°C & 16 – 26°C) | 2.0°C/hr, 5.0°C/day (at 15 – 30°C [2])					
Temperature Gradient		1.0°C/m (at 18 – 22°C, 16 – 26°C & 15 – 30°C [2])					
Air Supply / Working Pressure		0.49 to 0.69MPa / 0.39MPa					
Air Consumption		85Nℓ/min			90Nℓ/min		
Power Supply		Single phase AC 100 to 240V±10% (factory pre-set). Grounding required.					
Power Consumption		1500W					
Machine Width x Height		1930 x 3015mm			2180 x 3415mm		
Machine Depth		2050mm	2250mm	2550mm	2550mm	3150mm	3650mm
Machine Weight		3800kg	4100kg	4600kg	5200kg	6300kg	7600kg
Machine Height at Transport [3]		2450mm			2750mm		

[1] Evaluation methods are per current JIS B7440-2, -4 and -5 (ISO 10360-2, -4 and -5).
$E_{0, MPE}$, $E_{150, MPE}$, $R_{0, MPL}$ and $P_{FTU, MPE}$ with stylus tip dia. Ø 5, length: 50mm for RDS; tip dia. Ø 4, length: 20mm for PH10.
MPE_{THP} using stylus with tip dia. Ø 3, length: 50mm for RDS.

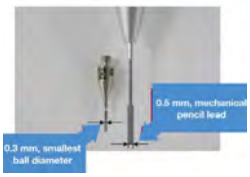
[2] Adapting to temperature condition 15 – 30°C is an Option for PH models.

[3] Z-Axis is folded down for transport. Please provide adequate allowances for passageways and lifting/support equipment used.

MJU NEX Low Maintenance Ergonomic CMM

mju NEX with integrated PC

- In popular 5/8/4 and 5/5/4 compact sizes
- 2.2+4L/1000µm at 18–22°C with PH10T+/TP200 probe
- 75% reduced air consumption and 73% savings on power due to using one air bearing hybrid guideways
- 40% reduced footprint and 37% lighter L-shaped bridge
- Smallest Ø 0.3mm stylus ball; 0.01µm res linear scales
- Max acceleration: 1732mm/sec^2
- User-friendly, productivity savings; quick ROI
- Calypso or XYANA object-oriented software
- Allows flexible workpiece changes and measuring tasks
- Applications: Replaces fixed, complex manual gages



Energy saving hybrid guideway

L-shape highly rigid low mass/vibration cast-iron bridge

V-shape Y-Axis reduce bimetal contact with granite table

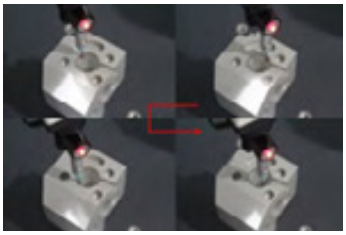
mju NEX		**5/5/4**			**5/8/4**	
Measuring Range X x Y x Z		510 x 460 x 410mm			510 x 760 x 410mm	
Measuring Length Scale		Linear scale system				
Min Display Value		0.01µm				
Measurement Accuracy [1]		Common for all mju NEX models				
		PH1/TP20	**PH10/TP20**	**RTP20**	**PH10T/TP200B**	**PH1/TP200B**
E_0	18 – 24°C	2.7+L/250µm		2.7+L/150µm	2.2+L/250µm	
E_{150}		3.2+L/250µm		N/A	2.7+L/150µm	
R_0		1.8µm		2.0µm	1.4µm	
R_{FTU}		2.7µm		3.3µm	2.5µm	
Guidance System for Each Axis		Air bearings				
Table Material/Flatness/Clamping Screw		Gabbro / JIS Class 1 / M10 internal screw				
Table Dimensions W x D x H		700 x 900 x 725mm			700 x 1150 x 725mm	
Max Workpiece Height / Weight		520mm / 200kg				
CNC Speed / Max Acceleration		0.01 to 433mm/s (Stepless control) / 1732mm/sec^2				
Joystick and Manual Speed Range		(Automatic measurement) 0 to 120mm/s (Stepless control)				
Joystick and Manual Fine Feed Speed		(Automatic measurement) 0 to 5mm/s				
Air Supply / Working Pressure		0.40 to 0.69MPa / 0.30MPa				
Air Consumption		10Nℓ/min				
Power Supply / Consumption		Single phase AC 100V±10%. Grounding required. / 801W				
Machine Dimensions W x D x H		1145 x 1256 x 2170mm			1100 x 1536 x 2170mm	
Machine Weight		660kg			920kg	

[1] Evaluation methods are per current JIS B7440-2, -4 and -5 (ISO 10360-2, -4 and -5).
$E_{0,MPE}$, $E_{150,MPE}$, $R_{0,MPL}$ and $P_{FTU,MPE}$ with stylus tip dia. Ø 4, length: 20mm. TP20 and RTP20 – LF Module. TP200B – SF Module.

MJU NEX J *NEW!* Highly Accurate Manual Measurement

mju NEX J with integrated PC

- Newly-developed operation box with compact hand-held size and double-thumb stick for easy positioning and precise measurement
- Same excellent features of mju NEX such as the smallest footprint in its class, significant reductio of air and power consumption by the hybrid guide structure equipped with high-rigidity linear guides in X, Y (right) and Z axes and air bearings in Y axis (left), high environmental adaptability by installing dustproof covers in X and Y axes and Z axis scale in the Z axis column
- Auto-probing function provides probing at a constant measurement speed and force, making accurate and stable measurement possible
- Upgrading to CNC possible on site – to efficiently support the creation of measurement plan and automatic measurement when mass production of future workpieces and inspection of workpieces with the large amount of lots are required



Automatic hole inner diameter measurement

Auto Probing

mju NEX J		**5/5/4**	**5/8/4**
Measuring Range X x Y x Z		510 x 460 x 410mm	510 x 760 x 410mm
Measuring Length Scale		Linear scale system	
Min Display Value		0.01µm	
Measurement Accuracy[1] E_0		2.9+L/250µm	
Guidance System for Each Axis		Air bearings	
Table Material/Flatness/Clamping Screw		Gabbro / JIS Class 1 / M10 internal screw	
Table Dimensions W x D x H		700 x 900 x 725mm	700 x 1150 x 725mm
Max Workpiece Height / Weight		520mm / 200kg	
Max Acceleration/Deceleration		606mm/sec^2 / 1039mm/sec^2	
Variable Speed Range/Measuring Speed		Manual Mode: 0.5 to 121mm/sec / 5mm/s	
Temperature Changes		1.0°C/hr, 2.0°C/day (at 18 – 22°C)	
Temperature Gradient		1.0°C/m (at 18 – 22°C)	
Air Supply / Working Pressure		0.49 to 0.69MPa / 0.30MPa	
Air Consumption		10Nℓ/min	
Power Supply / Consumption		Single phase AC 100V±10%. Grounding required. / 550W	
Machine Dimensions (with data processing unit)	WxDxH	1805 x 1920 x 2170mm	1805 x 2200 x 2170mm
	Weight	620kg	880kg

[1] Testing and evaluation methods are per current JIS B7440-2:2013 (ISO 10360-2:2009) with stylus tip dia. Ø 4mm, length: 20mm.

SVF NEX Proven and Trusted Manual CMM

SVF NEX

- In popular 4/4/3, 6/5/3, 8/6/6/ and 8/10/6 sizes
- AI Function for enhanced efficiency
- Lightweight, surface-hardened aluminium alloy X-guide and Z-Axis, reduces fatigue even in long operating hours
- High-Rigidity Table with Surface Guides on Both Sides
- Rack cabinet for data processor resulting in 30% smaller footprint than existing model
- Workpiece, calibration ball and tablet PC set on the table reduces eye movements and increases efficiency
- Standard Touchscreen Colour LCD Monitor with XYANA2000 simplified object-oriented software

Knob-based Smooth Fine Feed

Z-Axis Terminate Switch standard

- PH1 manual positioning head 360° horizontal ±115° vertical rotation at 15° pitch both direction with TP20 probe

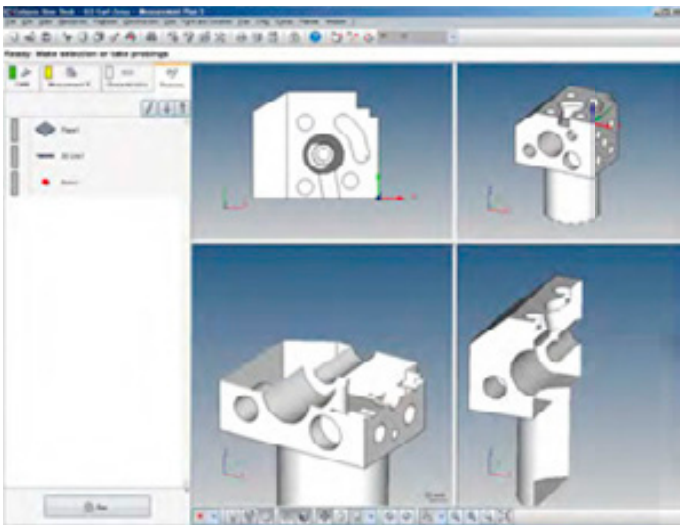
TP20 auto-probe change module. 5 or 6-way kinematic trigger; 4 force modules

MH20i Manual Indexable Probe Head with repeatable orientation 2-Axis indexing

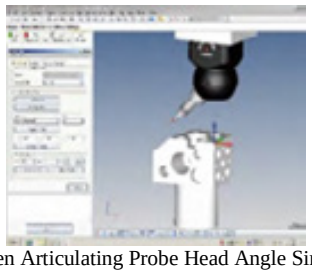
SVF NEX	4/4/3	6/5/3	8/6/6	8/10/6
Measuring Range X x Y x Z	400 x 350 x 300mm	600 x 500 x 300mm	800 x 600 x 600mm	800 x 1000 x 600mm
Measuring Length Scale	Linear scale system			
Min Display Value	0.01µm			
E_0	3.0+4L/1000µm	4.0+5L/1000µm	5.4+5.5L/1000µm	
Guidance System for Each Axis	Air bearings			
Table Material / Flatness	Gabbro / JIS Class 1			
Table Clamping Screw	M10 internal screw			
Table Usable Width x Depth	600 x 895mm	800 x 1045mm	1000 x 1250mm	1000 x 1750mm
Table Height from Floor	760mm			
Max Workpiece Height	450mm		750mm	
Max Workpiece Weight	300kg	400kg	600kg	800kg
Probe Balance	Max 1kg (Intervals of 200g)			
Air Supply / Working Pressure	0.3 to 0.69MPa / 0.27MPa		0.4 to 0.69MPa / 0.39MPa	
Air Consumption	40Nℓ/min			
Power Supply / Consumption	Single phase AC 100V±10%. Grounding required. / 500VA			
Machine Dimensions W x D x H	990x895x2105mm	1190x1045x2105mm	1490x1250x2705mm	1490x1750x2705mm
Machine Height at Transport [1]	1780mm		2080mm	
Machine Weight	580kg	770kg	1200kg	1700kg

[1] Z-Axis is folded down for transport. Please provide adequate allowances for passageways and lifting/support equipment used.

CALYPSO Powerful Versatile CMM Operations

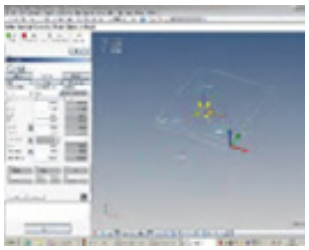


- CAD kernel for unmatched operability
- 3 AI automatic algorithms for element recognition (patented), coordinate system setting and measuring plane recognition – for points, straight lines, flat surfaces, spheres, symmetrical points, circles, cylinders, cones, ellipses, square and long holes
- Auto Collision-Free Measuring Path Generation with safety/supplementary safety planes per number of measuring points and probing return distance
- Flexible, Customisable Report Formats including colour scale evaluation of roundness
- Geometric Division Evaluation for Flatness, Roundness and Straightness
- Actual Point Memory – Difference of flatness measurement result – allows re-calculation by selecting any points to be used
- Error Plotting for display of evaluation of each point of circles and contours at any intervals of points
- Geometric Element Preview, Navigation for Measurement Procedures, Diverse Edit, Calypso Macro, Standard Simple-to-Use Off-Line Teaching, etc.
- Optional Programs: Table File Output, Statistics, TESCHART Plus: Inspection Chart Generation Program, Basic Reporter, Stylus Simulation, List Calibration, EDM Module, Hole Pattern Best Fit, Pipe Evaluation Function, DMIS Compatible System, Parameter Coded Measurement, Free Form Curved-Surface Evaluation
- Optional Interfaces: IGES 2D/3D, VDA 2D/3D, STEP 3D, DXF 2D, PMI and FTA direct processing or native interfaces: ParaSolid, CATIA V4, CATIA V5, ProEngineer, UniGraphics, Inventor and SolidWorks

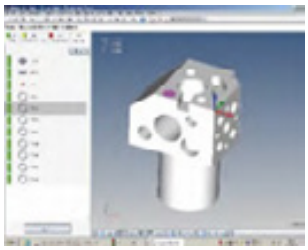


On-screen Articulating Probe Head Angle Simulation

Automatic Stylus Calibration



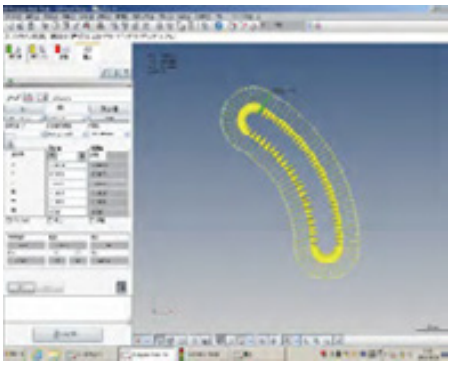
Geometric Element Preview



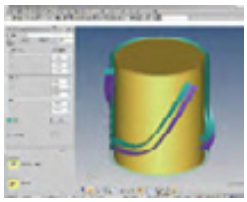
Interchange of Icons

Calypso Auto Run Function

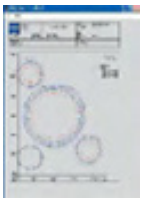
Calypso Curve Option for 2D and 3D curves: curve slope, length, form, cam throw, surface area, etc., for crank/camshafts, turbine blades etc.



Calypso-CURVE



Cylindrical Cam Measurement



Expanded Plot Option

Blade Pro: Turbine Blade Evaluation Option

Form Data ASCII Input/Output Option

TESCHART Plus Optional Inspection Chart Generation Program

TESCHART PLUS

- Import measurement results into Excel and create inspection charts
- Set measurement procedures easily. Re-use the layout once an inspection chart is created in Excel sheet
- New DB function for storing database results as well as searching/referencing past results

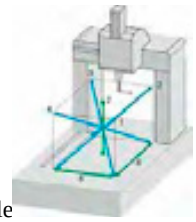
XYANA smart® General Purpose Measuring Software for Manual CMM

- For highly reliable measurement with mju NEX J and SVF NEX
- Intuitive user interface supporting both touch input and key-in
- Reduce duration of preparation and measurement with functions such as AI for automatic geometric feature judgement, voice guidance, coordinate system assist, automatic inner hole diameter measurement, etc.
- Eliminate factors that may negatively affect measurement results in advance to prevent breakdown and shipment of defective products with alerts
- Support for accurate measurement that reflects the actual conditions

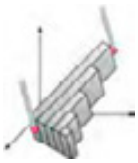
ISO 10360 and JIS B7440 Maximum Permissible Error (MPE) include consideration of material standard calibration uncertainty, alignment method uncertainty, reference sphere form deviation and all other material factors including measuring uncertainty.

Volumetric Length Indication Error E_0 and **E_{150}** (ISO 10360-2)

A step, block or other artefact gage is used with a total of 105 length dimensions - 5 gauges of varying lengths measured 3 times from 7 different directions within the CMM's measuring range. E_0 is the maximum difference between the standard calibration value and the measured values, and must be within E_{150}. For E_{150} 5 length gauges have to be measured 3 times in the YZ- or XZ plane with opposite styli, mounted 150mm off the Z spindle axis

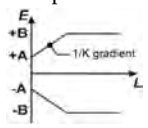


7 positions example



E_O

E_{150}

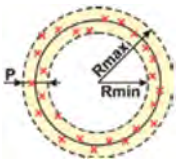


MPEE = ± [A + L/K ≤ B]

L= measured length in mm. A & K are constants and B the upper limit specified by the manufacturer in µm

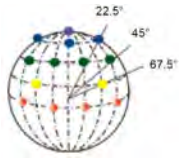
Limit of Repeatability Range R0 MPL (ISO10360-2) - From the E0 test values, for each of the 35 sets of 3 repeated length measurements, the difference between the maximum and minimum of the 3 test values is calculated. If these are equal or less than the specified limits, the CMM has met its specification.

Probing Error P (ISO 20160-2) - Any 25 points approximately evenly distributed are measured on a hemisphere of a test standard sphere of Ø 10-50mm, and the least squares method center position is calculated. The distance R from this sphere center location to the 25 measured points is calculated. Probing error P is the difference between the maximum value and the minimum value of the distance of the 25 locations R (R max-R min). Test judgment verifies that this probing error P is less than the MPEP specified by the manufacturer, considering measuring uncertainties, expressed in µm units.

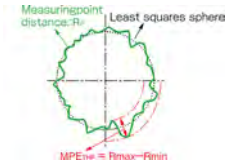


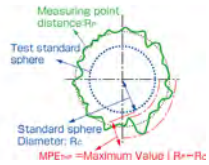
Probing Target Contact Points

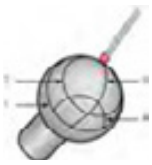
- 1 point at pole determined by styli shaft direction
- 4 evenly spaced points 22.5º below the pole
- 45º below the pole: 8 evenly spaced points rotated 22.5º from the previous group
- 67.5º below the pole: 4 evenly spaced points rotated 22.5º from the previous group
- 90º below the pole (equator): 8 evenly spaced points rotated 22.5º from the previous group



Scanning Probing Error THP (ISO 10360-4) - A Ø 25mm test standard sphere is scanned at four sections with measuring pitch of 0.1mm and the least squares method center position is calculated. The distance R from this sphere center location to all of the measured points is calculated and scanning probing error **THP** is (1) the difference between the maximum and minimum values of the distance of the locations R (R_{max}-R_{min}); or (2) the maximum absolute value of the difference between all distances R and half the corrected diameter of the test standard sphere. Both of the above scanning probing errors **THP** must be within the THP specified by the manufacturer. Time for scanning test is in seconds. A precision sphere has to be scanned with 4 defined lines. THP is the range of all radii. THP = $R_{max} - R_{min}$ = sphere form, scanning.







Scanning Section

- Desirable slope angle α: 45º
- Sect 1: Equator
- Sect 2: Shifted 8mm parallel to Section 1
- Sect 3: From the equator, passing through the pole
- Sect 4: Shifted 8mm parallel to Section 3
- Sections 2 and Sections 3 and 4 are perpendicular

Single stylus form error PFTU (ISO 10360-5) - Any 25 points approximately evenly distributed are measured on a hemisphere of a test standard sphere of Ø 10 to 50mm, and the least squares method center position is calculated. The distance R from this sphere center location to the 25 measured points is calculated. **PFTU** is the difference between the maximum and minimum values of the distance of the 25 locations R ($R_{max} - R_{min}$). This **PFTU** must be within the PFTU specified by the manufacturer, considering measuring uncertainties, expressed in µm units. A precision sphere has to be measured with 25 probings. PFTU is the range of all radii. PFTU = $R_{max} - R_{min}$ = sphere form.

PFTU

ROUGHNESS & CONTOUR Line Up at a Glance!

Classification	Model	Measure Functions		Detector Type					Specifications			
		Roughness	Contour	Roughness: Analog	Contour: Analog	Contour: Digital	Integrated: Analog	Integrated: Digital	Detector Stroke Z	Contour Detector Indication Accuracy Z	Detector Resolution Z	Tracing Driver Straightness Accuracy X
Roughness	S NEX 001	O	-	O	-	-	-	-	1000µm	-	0.1-20nm	0.05+L/1000µm
Contour	S NEX 030	-	O	-	-	O	-	-	60mm	±1.5+|2H|/100µm	0.04µm	1µm/100mm (2µm/200mm)
	S NEX 040									±0.8+|2H|/100µm	0.02µm	
Combined Roughness/ Contour	S NEX 031	O	O	O	-	O	-	-	S NEX 031combines NEX 001 + NEX 030. Refer to those specs			
	S NEX 041								S NEX 011combines NEX 001 + NEX 040. Refer to those specs			
Integrated Hybrid Roughness/ Contour	S NEX 100	O	O	O	-	O	-	-	5mm	±1.0+|2H|/100µm	Roughness: 1-100nm, Contour: 0.015µm	0.05+L/1000µm
	S CREST	O	O	-	-	-	-	O	13mm	±0.2+|H|/1000µm	0.31nm	0.05+3L/10000µm
Roughness	S1400G	O	-	O	-	-	-	-	800µm	-	0.4-10nm (0.1nm) [1]	0.05+1.5L/1000µm
	S Touch 550	O	-	O	-	-	-	-	1000µm	-	0.1-1.25nm	
	S Touch 50											0.3µm/50mm
	S Touch 35/40/45	O	-	O	-	-	-	-	370µm	-	0.7nm	-
	handysurf+ 35/40/45											
Contour	C1600G	-	O	-	O	-	-	-	50mm	±0.25% Full scale	0.1-1µm	1µm/100mm 2µm/200mm
	C2600G				-	O				±0.8+|4H|/100µm	0.025µm	
Combined Roughness/ Contour	S1800G	O	O	O	O	-	-	-	S1800G combines S1400G and C1600G. Refer to those specs			
	S2800G				-	O			S2800G combines S1400G and C2600G. Refer to those specs			

[1] When high-magnification pickup is used.

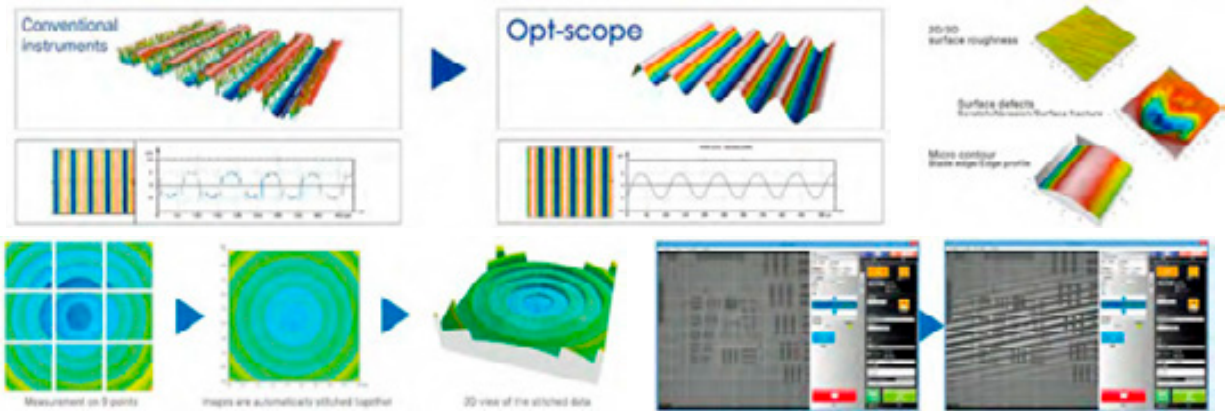
OPT-SCOPE *NEW!* Non-Contact Versatile Roughness Evaluation

Opt-scope R

Opt-scope R200

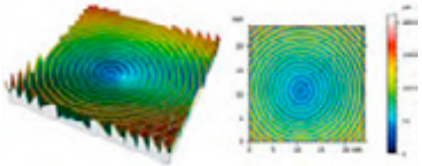
Opt-scope Rex

- Proprietary Peak Detection Algorithm of white interference fringe (DEAP) cum high-resolution of PSI (Phase Shifting Interferometry) with wide range of VSI (Vertical Scanning Interferometry)
- High-speed camera with new high-speed dedicated algorithm DEAP2 makes the Opt-scope 6 times faster compared with previous models
- Fast, comprehensive 3D surface texture and profile measurements of superfine surfaces and machined components
- Non-contact measurements, hundreds of times faster than styli instruments
- Quick measurement with original white light interferometer
- EDR function that uses two different amounts of light in one scan to obtain accurate and complete measurement of surfaces with strong brightness contrast
- Continuous measurement and stitching with the optional electric stage to conduct measurement beyond the field of view for analysis as a single piece of measurement data
- Non-contact, highest resolution, and wide range 3D evaluation of grinding stones, needle pins and blades and various workpieces
- Applications include fine roughness, scratches, abrasion, grinding stone edges and cemented carbide tips
- Compliant with ISO 25178-2 and JIS B 0681-2 3D Surface Texture Parameters

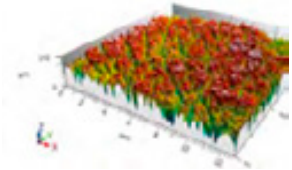


Continuous measurement and stitching functions

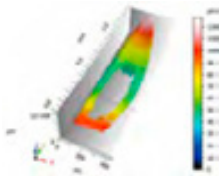
After applying the Autofocus function



Advanced Contour Analysis



Grain Analysis

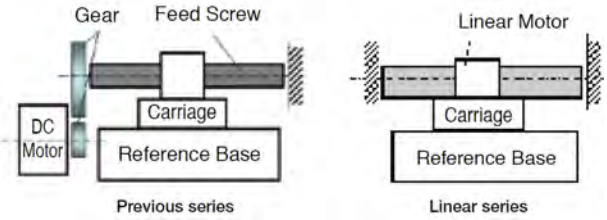


Fine Roughness Evaluation – Tip of injection needle

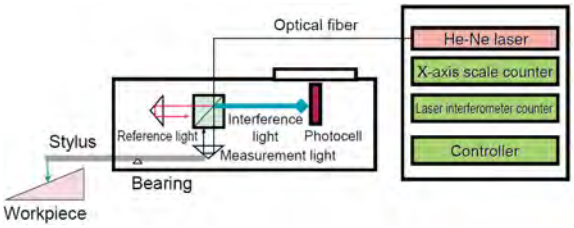
SURFCOM CREST Highest Accuracy and Speed

SURFCOM CREST

- Highly stable laser interferometer optical path with wide Measurement range Z: 13mm and X: 200mm
- Resolution to 0.31nm at 13mm Z-Axis measuring range!
- Dynamic range: resolution ratio of 42000000:1! Allows contour profiles and hidden fine surfaces to be evaluated in one trace
- Linear motor drive for high speed movement with low vibration for high accuracy stable measurement at high magnifications
- Tilting Unit Model – Surfcom Crest-T with up to 45° motorized tilting unit also available



Linear Motor Drive (patented)



Sensor Structure

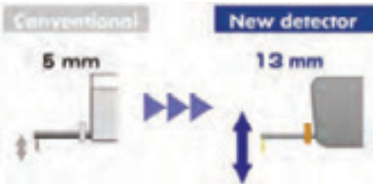
Z-Axis Measuring Range	13mm/50mm; 26mm/100mm
Z-Axis Accuracy	±(0.2+H/1000) µm (where H=Measuring Height in mm)
Z-Axis Resolution/Scale Sensor	0.31nm for 50mm arm/Highly stable Optical Path Laser Interferometer
X-Axis Range	200mm
X-Axis Indication Accuracy	±(0.2+L/1000) µm (where L=Measuring Length in mm)
X-Axis Resolution/Sensor	0.54nm/Optical Diffraction Scale
Straightness Accuracy [1]	(0.05+3L/10,000) µm (where L=Measuring Length in mm)
System Noise [1,2]	Ra ≤ 2nm/0.4mm; Rz ≤ 10nm/0.4mm
System Form Error [1,3]	Pt ≤ 0.1µm (Ø 30mm or smaller)
Max Permissible Radius [1,4]	≤±0.1µm (Ø 30mm or smaller)
Max Permissible Distance [1,5]	≤±(1+L/150) µm where L: measuring length in mm
Max Permissible Angle [1,6]	≤ ±0.5min (±45°)
Z Column Up-Down Speed	Up to 200mm/s
X Measurement/Movement Speed	0.03 to 3mm/s (roughness); 0.03 to 20mm/s (contour)/0.02 to 60mm/s max
Drive Unit Tilt	±45° (T type)
Stylus Characteristics	Replaceable Diamond stylus; 0.75mN measuring force; 2µm radius (50mm arm) with retract function
Power Supply	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz.
Air Supply / Consumption	Supply Pressure: 0.45 to 0.7MPa, Working Pressure: 0.4PA / Max 8ℓ/min
Machine Dimensions WxDxH / Weight	1405 x 1050 x 1851mm / 700kg

[1] With DM84145 standard accessory. [2] 0.03mm/s, Gaussian filter: λc=0.08mm, λs=2.5µm. [3] ±45°, 0.3mm/s, LSC, Gaussian filter: λs=0.08mm.
[4] ±45°, 0.3mm/s, Gauge uncertainty included. [5] 0.3mm/s, Gauge uncertainty included. [6] Length of one sloop side: 5mm or more, 0.3mm/s, Gauge uncertainty included.

SURFCOM NEX *IMPROVED!* Hybrid / Roughness / Contour Metrology

- World-first dual sensor hybrid detector: combines wide-range high-accuracy and narrow-range high resolution sensors for simultaneous roughness and contour measurement (Patented)
- Newly developed wide-range hybrid detector with 13mm Z-axis measurement range (2.6 times wider than conventional detectors)
- Patented high-accuracy linear motor tracing driver minimizes vibration which improves actual values to unmatched levels
- Patented newly-developed column design enables extremely high-speed driving for shorter tact time
- Operation panel with new override dial for real-time control of the driving speed
- Highest Z Indication Accuracy in class: ±(1.0+2H/100)µm
- Contour Detector incorporates linear drive with temperature correction system providing guaranteed 20°C±5°C range
- Quick-change arm with auto-recognition (Patent Pending)
- Z-axix measurement range expanded to 60mm (±30mm)
- T-shaped continuous upward/downward measurement stylus
- Manual gear and linear measurement connection automatic cut-off mechanism during measurements to preserve linear motor low vibration characteristics for high operability and accuracy

SURFCOM NEX



Newly developed wide-range hybrid detector

Wide-range hybrid detector

Freely combine and change detectors

Measure ultra-low vibration and operate at 20±5°C

System for Roughness, Contour or Hybrid Detectors, Driver Unit and Measuring Stands

Detector Selection

Hybrid dual sensor detector

- Measures roughness and contour concurrently
- Indication accuracy: ±(1.0+|2H|/100)µm; Measuring range (Z-Axis): 13mm (standard stylus)

Contour detector

- General purpose detector with new high-precision scale
- Simple replacement with Quick-change arm; Upward/downward measurement option
- Indication accuracy: ±(1.5+|2H|/100)µm; Measuring range (Z-Axis): 60mm

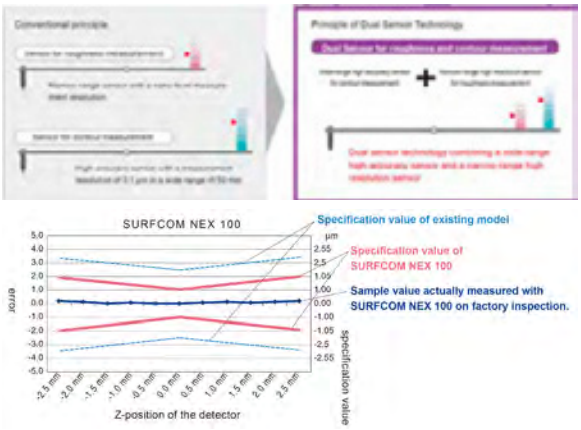
High-accuracy contour

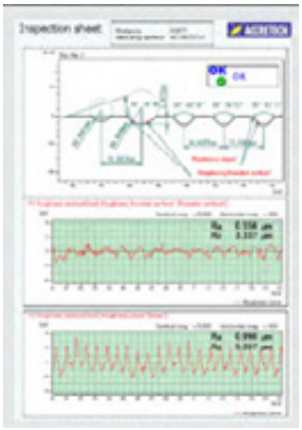
- High accuracy detector with new laser diffraction linear scale for full-range measurement resolution of 0.02µm; Indication accuracy: ±(0.8+|2H|/100)µm; Measuring range (Z-Axis): 60mm
- Auto measuring force adjustment mechanism over 60mm Z-Axis measurement range and quick-change arm mechanism; Upward/downward measurement option

Roughness Pickup

- High magnification wide-range measurements
- 14mm outer diameter; 1000µm measurement range; 500,000 times max measurement magnification
- For pickup upward measurement (with the auto-stop function) and horizontal trace measurements.

Hybrid Dual Sensor Detector

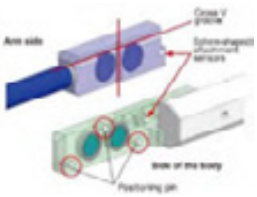




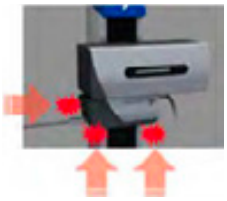
Contour Detectors


Attaching 100mm High rigidity offset arm


Attaching lower offset arm attachment


Quick Change Arm


T-shaped stylus


Safety mechanism against detector collision


Optional Attachment for quick change arm

Roughness Detector

Measurement range of 1000µm in the Z direction


Auto stop possible for upward measurements

SURFCOM NEX DX2/SD2 Specifications

SURFCOM NEX		-12	-13	-14	-15	-22	-23	-24	-25
X-Axis Tracing Driver Sensing Method		Linear scale							
X-Axis Measuring Range		100mm				200mm			
Z-Axis Column Up/Down Stroke in mm		250	450		650	250	450		650
Straightness Accuracy	Hybrid Detector with Dual Sensor Technology	0.05+1.0L/1000µm with LH=50mm stylus 2(0.05+1.0/1000)µm with LH = 100mm stylus							
	High-Accuracy Contour Detector	0.8µm/100mm				2.0µm/200mm			
	General-Purpose Contour Detector								
	Pickup for Roughness Measurement	0.05+1.0L/1000µm (L: Measuring L in mm)							
X-Axis Indication Accuracy / Resolution		±0.8+1.0L/100µm or ±0.8+3.0L/200µm / 0.016µm							
X-Axis Moving / Measuring Speed		0.03 to 100mm/s / 0.03 to 30mm/s							
X-Axis Tilt Angle		±15º (Optional tilting device)							
Measuring Stand Column Max Travel Speed / Base Material		CNC 50mm/s; Joystick 50mm/s / Gabbro							

	Hybrid Detector with Dual Sensor Technology (E-DT-CR14B)
Z-Axis Measuring Range	13mm (LH=50mm stylus), 26mm (100mm stylus)
Roughness Sensing Method	High accuracy scale
Roughness and Contour Resolution	0.9 (Full range) (LH=50mm stylus) 1.8 (Full range) (LH=100mm stylus)
Indication Accuracy (H: Measuring Height in mm)	±1.0+2H/100µm (LH=50mm stylus) ±1.5+2H/100µm (LH=100mm stylus)
Stylus Characteristics for Roughness & Contour	DM84071 (LH=50mm, Standard arm),
	Replaceable 2µm radius / 60° Cone, Diamond, 0.75mN
Stylus Characteristics for Contour	DM48775 (LH = 100mm, 2x arm)
	Replaceable 25µm radius / 24° Cone, Cemented Carbide, 4mN
Common Functions	Downward Measurement/Collision Detection Safety/Retract function

	High-Accuracy Contour Detector	**General-Purpose Contour Detector**
Z-Axis Measuring Range	60mm	
Contour Measurement Sensing Method	Laser optical diffraction scale	High Accuracy Scale
Contour Measurement Range / Resolution	0.02nm (Full range)	0.04nm (Full range)
Indication Accuracy (H: Measuring Height in mm)	±0.8+|2H|/100µm	±1.2+2H/100µm at 20±2°C ±1.5+2H/100µm at 20±5°C
Contour Functions	Down/Up Measurement / Collision Detection Safety / Retract Function	
Stylus Characteristics for Contour (DM45505)	Replaceable 25µm radius / 24° Cone, Cemented Carbide	
	2 to 30mN (Set with ACCTee)	10 to 30mN (Manual Adjustment)

	Pickup for Roughness Measurement (E-DT-SS01B)
Z-Axis Measuring Range	1000mm
Roughness Sensing Method	Differential inductance
Roughness Measuring Range / Resolution	6.4 to 1000µm / 0.1 to 20nm
Roughness Functions	Down/Up Measurement / Upper Safety Limit
Stylus Characteristics for Roughness (DM43801)*1	Replaceable 2µm radius / 60° Cone, Diamond, 0.75mN

Common Specifications

Power Supply / Consumption	Single phase AC 100 to 240V. Grounding required. 50/60Hz. / Max 930VA
Air Supply / Working Pressure / Consumption	0.45 to 0.7MPa / 0.4MPa / 0.1ℓ/min (Max. 10ℓ/min)
Air Supply Port Position	Main body lower left (DX2) Main body back side (SD2 with anti-vibration table)
Air Supply Connecting Port	One-touch pipe joint for tubes with Outer Diameter Ø6mm
Accuracy Guaranteed Operation Temperature *2 *3	20±5°C
Operating Temperature / Storage Temperature	15 to 30°C / 5 to 40°C
Operation Guarantee / Storage Humidity	40 to 80% / 80% or lower (without condensation)

[1]Excluding when using roughness pickup. [2]Guaranteed accuracy is excluding deformation of workpiece, caused by temperature change. [3]Indication accuracy (vertical) with general-purpose contour detector is variable depending on temperature range. Notes Power and air supply and connecting hose required before the delivery. Power Supply (type D grounding) required. Guaranteed accuracy temperature limit is ±0.5°C/hour and 0.1°C/measurement time. Specifications may change without any notice due to product modifications.

SURFCOM NEX DX2 Type External Specifications

DX2 Type		Main Unit Dimensions			Table	Column	Measuring range		Base		Weight (kg)		
In mm unless indicated		Width W1	Depth D1	Total Height H1	Height H2	Height H3	X-Axis	Z-Axis	Width W2	Depth D2	Main unit	Total Weight [1]	Max Load
DX2	12	960	800	1489	855	634	100	250	700	450	277	290	82
	13			1689		834		450			284	297	75
	14	1261		1689		834		450	1000		407	420	95
	15			1909		1054		650			421	434	81
	22	960		1489		634	200	250	700		284	297	75
	23			1689		834		450			291	304	68
	24	1261		1689		834		450	1000		414	427	88
	25			1909		1054		650			428	441	74

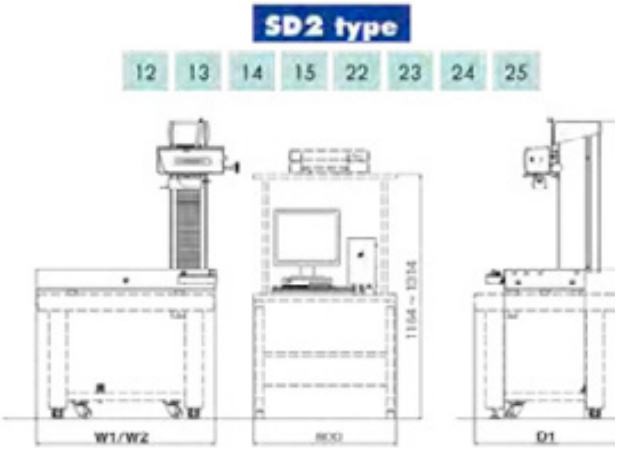
[1] Includes PC, driver unit and monitor.

SURFCOM NEX SD2 Type External Specifications

DX2 Type		Main Unit Dimensions			Table	Column	Measuring range		Base		Weight (kg)		
In mm unless indicated		Width W1	Depth D1	Total Height H1	Height H2	Height H3	X-Axis	Z-Axis	Width W2	Depth D2	Main unit	Total Weight [2]	Max Load [3]
SD2	12	700	636	1452	818	634	100	250	700	450	119	132/217	81
	13			1652		834		450			126	139/224	74
	14	1000	780	1675	841	834		450	1000		206	219/442	54
	15			1895		1054		650			220	233/456	40
	22	700	636	1452	818	634	200	250	700		126	139/224	74
	23			1652		834		450			133	146/231	67
	24	1000	780	1675	841	834		450	1000		213	226/449	47
	25			1895		1054		650			227	240/463	33

[2] Left values: includes PC, driver unit and monitor. Right values: includes PC, driver unit, monitor and optional accessories (anti-vibration table, stand, rack) [3] Max Load is the value with optional anti-vibration table).

DX

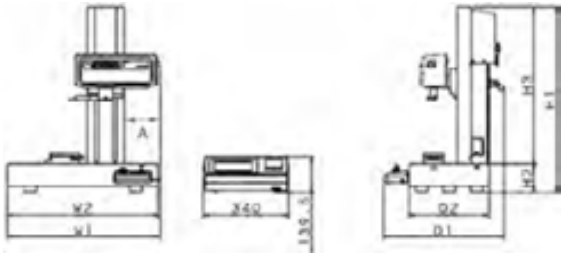


SD

Surfcom Touch 550 Ergonomic Roughness Measurement

Surfcom Touch 550

- Electric column for high accuracy and size variation
- 1mm Z Range and 0.1nm min. resolution skid-less measurement
- Roughness/waviness even on undulating stepped or round surfaces can be evaluated in one trace
- Easy levelling/zeroing before measurement
- Modularly combine granite bases and columns to accommodate your workpiece height and X-Axis drive range requirements



Surfcom Touch 550	-11	-12	-13	-14	-21	-22	-23	-24
Z-Axis Measuring Range	±500µm							
X-Axis Measuring Range	100mm				200mm			
X-Axis Straightness Accuracy	0.05+1.5L/1000µm							
X-Axis Measurement Speed	0.03, 0.06, 0.15, 0.3, 0.6, 1.5, 3, 6 / 0.05, 0.1, 0.2, 0.5, 1, 2, 5mm/s (switching)							
X-Axis Moving Speed	Up to 3mm/s (with Touch amplifier); Up to 6mm/s when using the joystick.							
Pickup Sensing Type	Differential Inductance							
Pickup Measurement Method	Skidless/Skid (Option)							
Pickup Z Direction Resolution	0.0001µm/±40µm, 0.00125µm/±500µm							
Stylus Characteristics	2µm radius, 60° Cone, Diamond, 0.75mN (DM43801)							
Machine Max Width W1	610mm			1000mm	670mm			1000mm
Machine Max Depth D1	481mm			586mm	481mm			586mm
Machine Max Height H1	667mm	738mm	938mm	963mm	667mm	738mm	938mm	963mm
Machine Column Height	552mm	623mm	823mm		552mm	623mm	823mm	
Column Travel Range	250mm		450mm		250mm		450mm	
Base Width W2	600mm			1000mm	600mm			1000mm
Base Depth D2	317mm			450mm	317mm			450mm
Base Height	115mm			140mm	115mm			140mm
Column Set (Position A)	140mm			240mm	140mm			240mm
Machine Weight	89kg	95kg	104kg	209kg	94kg	100kg	109kg	214kg
Measurement Stand Column Moving Speed	N/A (Manual)	To 3mm/s with Touch panel; to 10mm/s with joystick			N/A (Manual)	To 3mm/s with Touch panel; to 10mm/s with joystick		
Measurement Stand Base Size in mm	600x317			1000x450	600x317			1000x450
Measurement Stand Base Material	Granite							
Measurement Stand Max Load [1]	48kg	42kg	33kg	48kg	43kg	37kg	28kg	43kg
Power Supply / Consumption	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz. / Max 110VA							
Dimensions W x D x H / Weight	Amplification Indicator: 340 x 214.5 x 139.5mm / Approx. 4.1kg							
Standard Accessories	Roughness specimen E-MC-S24C, leveling adjustment table E-AT-S02A, touch pen E-MA-S112A, print paper E-CH-S25A, instruction manual, SupportWare II							

[1] This max load is when using the optional antivibration table (E-VS-S57B for -11/12/13/21/22/23 system, and E-VS-R16B for -14/24 system).

Surfcom Touch 50 Portable Roughness Measurement

Optional compact stand for tall workpieces or jigs

Surfcom Touch 50

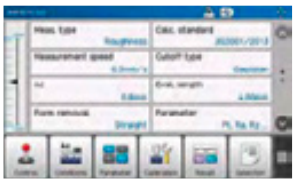
- Compact tracing driver with 50mm X-Axis/vertical range and 0.3µm/50mm straightness accuracy precision
- Versatile hi-res pickup plus styli for deep, long, small holes or round surface
- Wide Z range to 1mm and 0.0001µm min. resolution skid-less measurement
- Roughness/waviness on undulating, stepped or round surfaces in one trace
- Easy pre-measurement levelling/zeroing
- Handy-type tracing driver for measuring on vertical, ceilings or narrow areas

Surfcom Touch 50	
Measuring Range Z Direction	±500µm (total 1,000µm or 1mm)
Measuring Range X Direction	50mm
Tracing Driver Evaluation Length	0.1 to 50mm
Tracing Driver Straightness Accuracy	0.3µm/50mm
Tracing Driver Measurement Speed	0.15, 0.3, 0.6, 1.5, 3 / 0.05, 0.1, 0.2, 0.5, 1mm/s (Switching)
Pickup Sensing Type	Differential inductance
Pickup Measurement Method	Skidless/Skid (Option)
Pickup Z Direction Resolution	0.0001µm/±40µm, 0.00125µm/±500µm
Stylus Characteristics	2µm radius, 60° Cone, Diamond, 0.75mN (DM43801)

Built-in Battery with AC adaptor	3-hour full charge for ≈ 600 measurements
Power Supply / Consumption	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz. / Max 80VA
Dimensions W x D x H / Weight	Printer Model: 320 x 167 x 44mm / Approx. 4.2kg
	No Printer Model: 252 x 167 x 44mm / Approx. 3.8kg
Standard Accessories	Roughness specimen E-MC-S24C, touch pen E-MA-S112A, printing paper E-CH-S25A [1], instruction manuals, SupportWare II

[1] For models with printer only.

Z-Axis measurement range to 1,000µm (for Surfcom Touch 550 and 50 only)



Intuitive screen for condition setting, calibration, measurement and analysis

Multi-language support

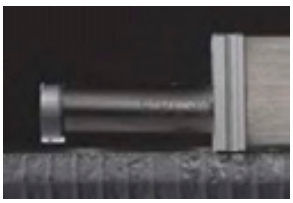
Easy user's guide

USB/micro USB ports as standard equipment

Measurement results can be printed quickly

Ultra-Portable Roughness **handysurf+ / Surfcom Touch 35/40/45**

35 (Standard type)



40 (Retract type)

45 (transverse trace-type)

- Widest in class 370µm Z measuring range with 0.0007µm max resolution over the entire range
- Choice of tracing drivers for various measurements:
  - 35 (standard) for horizontal, inclined, vertical and ceiling surfaces
  - 40 (retraction type) raises pickup before or after measurement to avoid damage to stylus/pickup
  - 45 (horizontal tracing) transverse trace: pickup moves sideways in narrow crankshaft pins and journals, etc.
- Library of replaceable pickups for small or extremely small holes, deep grooves, etc.

Drive	**-35**		**-40**		**-45**
Tip Radius	**5µm**	**2µm**	**5µm**	**2µm**	**5µm**
Measuring Range Z	-210 to +160µm				
Drive Range	X Direction 16mm				Y Direction 16mm
Tracing Driver Type	Standard		Retraction		Horizontal Tracing
Tracing Driver Evaluation Length	0.2 to 16mm				0.2mm to 4.0mm
Tracing Driver Measurement Speed	0.5, 0.6, 0.75, 1.0mm/s				0.6mm/s
Pickup Sensing / Measurement	Differential Inductance / Skid				
Pickup Z Resolution	0.0007µm over range -210 to 160µm				
Pickup Model	E-DT-SM10A	E-DT-SM49A	E-DT-SM10A	E-DT-SM49A	E-DT-SM39A
Pickup Stylus Measurement Force	4mN	0.75mN	4mN	0.75mN	4mN
Pickup Stylus Tip Radius	5µm	2µm	5µm	2µm	5µm
Pickup Stylus Tip Angle	90° cone	60° cone	90° cone	60° cone	90° cone
Pickup Stylus Tip Material	Diamond				

Choice of Processors

Surfcom Touch 35/40/45

Handy-type driver can be attached

- Calibration table E-WJ-S1045A, roughness specimen E-MC-S24C, touch pen E-MA-S112A, printer paper E-CH-S25A, SupportWare II V-type nosepiece E-WJ-S536A are included
- Easy to calibrate without driver height/inclination adjustment

handysurf+

Compact, versatile. Detachable display and tracing driver.

- USB port for small printer, USB memory stick and PC
- 2.4-inch color LCD. 6 buttons UI for intuitive operations. Multiple analysis functions. 10 sets measurement data stored

	Surfcom Touch 35/40/45	**handysurf+**
Built-in battery with AC adaptor	3-hour full charge for ≈ 600 measurements	4-hour full charge for ≈ 1000 measurements
Power Supply	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz.	
Power Consumption	Max 80VA	Max 10W
Dimensions W x D x H / Weight	320 x 167 x 44mm / 2kg (Printer Model) 252 x 167 x 44mm/ 1.6kg (No Printer)	184.5 x 68 x 57.4mm / Approx. 500g

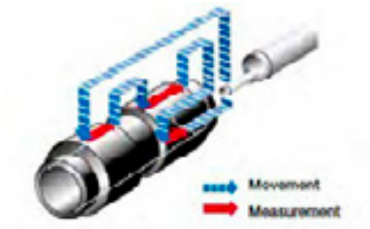
Surfcom Touch / handysurf+ Panel

		Surfcom Touch	handysurf+
Analysis Definition Standards		Comply with JIS2013/2001, JIS1994, JIS1982, ISO1997/2009, ISO13565, DIN1990, ASME2002/2009, ASME1995, CNOMO	
Profile Curve Analysis		Pa, Pq, Pp, Pv, Pc, PSm, PΔq, PPc, Psk, Pku, Pt, Pmr(c), Pmr, Pδc, Rz82, TILTA, AVH, Hmax, Hmin, AREA, Rmax, Rz, Sm, Δa, Δq, λa, λq, Lr, Rsk, Rku, Rk, Rpk, Rvk, Mr1, Mr2, Vo, K, tp, tp2, Hp	Pt, Rmax, Rz, Rk, Rpk, Rvk, Mr1, Mr2, Vo, K, tp
Roughness Curve Analysis		Ra, Rq, Rz, Rv, Rc, Rt, RSm, RΔq, Rsk, Rku, Rmr(c), Rmr, Rδc, Rz94, R3z, RΔa, Rλa, Rλq, Ry, Lr, Sm, S, tp, tp2, PC, RPc JIS, RPc ISO, RPc EN, Pc, PPI, Rp, Rmax, Rz.I, RS, Rmr2, Mr1, Mr2, Rpk, Rvk, Rk, Vo, K, A1, A2, Rpm, Δa, Δq, Htp	Ra, Rq, Rz, Rv, Rc, Rt, RSm, RΔq, Rsk, Rku, Rmr(c), Rmr, Rδc, Rz94, R3z, RΔa, Ry, Sm, S, tp, PC, RPc JIS, RPc ISO, RPc EN, Pc, PPI, Rp, Rmax, Mr1, Mr2, Rpk, Rvk, Rk, Vo, K, A1, A2, Rpm, Δa, Δq, Htp
Motif Analysis		R, Rx, AR, W, Wx, AW, Rke, Rpke, Rvke, NCRX, NR, CPM, SR, SAR, Wte, NW, SAW, SW, Mr1e, Mr2e, Vo, K	
Waviness Profile Curve Analysis (for Surfcom Touch 550/50 only)		Wa, Wq, Wt, Wp, Wv, WSm, WPc, Wsk, Wmr(c), Wmr, Wδc, Wz, Wc, Wku, WΔq, WEM, WEA, WE-a, WE-q, WE-p, WE-v, WE-Sm, WEC-q, WEC-m, WEC-p, WEC-v, WEC-Sm	N/A
Evaluation Curve Analysis	For all models	Profile Curve, Roughness Curve, ISO13565 Special Roughness Curve, Roughness motif curve, Waviness motif curve, Upper envelope waviness curve	
	Extra for 550/50	Filtered Waviness Curve, Waviness Profile Curve, Rolling Circle Waviness Curve	
Characteristics Graph Analysis		Abbot curve, Amplitude density function, Power graph	Bearing area curve, Amplitude distribution curve
Filter Type		Gaussian, 2RC (phase compensation), 2RC (non-phase compensation)	
Filter Cutoff Value λc		0.08, 0.25, 0.8 and 2.5mm (all models)	
		8 and 25mm (extra for Surfcom Touch 550 and 50)	
Filter Cutoff Value λs		None, 2.5, 8, 25µm	None, 2.5, 8µm
Amplifier Display		7-inch color liquid crystal touch panel	2.4-inch color liquid crystal panel
Amplifier Data Output		USB connector – 2 (model without printer) / 1 (model with printer), 1 Micro USB	1 USB memory connector, 1 Micro USB communication connector
Printer		Integrated for 550; optional integrated or external for 50 and 35/40/45	Optional external printer
Printer Output (models with printer)		Thermal recording paper width: 58mm (recording width: 48mm)	
Amplifier Language		Japanese, English, Chinese, Korean, Thai, Malay, Vietnamese, Indonesian, German, French, Italian, Czech, Polish, Hungarian, Turkish, Swedish, Dutch, Spanish, Portuguese	

SURFCOM 1400G Conventional Robust Roughness Measurement

SURFCOM 1400G

- Patented AI auto-selects roughness measuring conditions
- Teaching function to automate repeat measurements and generation of final reports
- Special film thickness step/area, wear volume calculation (superimposed profile area) and LCD glass substrate (special waviness) evaluations
- Re-perform analysis with different measurement standards, evaluation range and removal of data from a notch
- 3DF X-Y table upgrade option
- Expands to Surfcom 1800G by adding contour detector



Teaching function memorizes and automates a series of measurements at multiple locations and generates reports

Surfcom 1400G		-11	-12	-13	-14	-21	-22	-23	-24
Z-Axis Measuring Range		800µm							
X-Axis Measuring Range		100mm				200mm			
Tracing Column Up-Down Stroke		250mm		450mm		250mm		450mm	
Resolution / Range		0.02µm to 0.0004µm (0.0001µm) [3] / 800µm range to 25µm range (6.4µm range) [3]							
X-Axis Tracing Driver Indication Accuracy		±(1+2L/100) µm (L: Measuring length in mm)							
X-Axis Resolution		0.1µm							
X-Axis Tracing Driver Straightness Accuracy		0.05+1.5L/1000µm (L = measuring length in mm)							
X-Axis Tracing Driver Sensor		Moiré striped scale				Linear scale			
X-Axis Measurement Speed		0.03, 0.06, 0.15, 0.3, 0.6, 1.5, 3, 6mm/s (8 speeds)							
Z-Axis Column Up-Down Speed		N/A	10mm/s (3mm/s) [1]			N/A	10mm/s (3mm/s) [1]		
Detector Sensing Method		Differential Transducer							
Stylus Characteristics		Changeable, Roughness: 2µm radius, 60° Cone angle, Diamond; Waviness: 800µm radius, ruby ball, 0.75mN. One of each stylus provided as standard.							
Table Dimensions in mm		600x317			1000x450	600x317			1000x450
Max Part Weight with Anti-Vibration Table	E-VS-S57B/S58B	48kg	42kg	33kg	N/A	43kg	37kg	28kg	N/A
	E-VS-S45A	50kg	40kg	30kg	98kg	50kg	40kg	30kg	93kg
	E-VS-R16B	50kg	40kg	30kg	48kg	50kg	40kg	30kg	43kg
	E-VS-R21B	50kg	40kg	30kg	100kg	50kg	40kg	30kg	100kg
Machine Width [2]		2000mm			2300mm	2000mm			2300mm
Machine Depth [2]		1000mm							
Machine Height [2]		1700mm		1900mm		1700mm		1900mm	
Machine Weight		115kg	120kg	130kg	235kg	120kg	125kg	135kg	240kg
Power Supply / Consumption		Single phase AC 100V±10%. Grounding required. 50/60Hz. / 710VA							

[1] Joystick operation.

[2] Optional stand, anti-vibration table and computer rack incl. in dimensions.

[3] Using high-magnification pickup.

CONTOURECORD 2600G/1600G High-Accuracy Contour Metrology

- ≤1µm contour accuracy for 5mm Z-Axis displacement!
- Display of measured parameters and geometric deviation
- Profile Synthesis for stylus angle range analysis limitations
- Peak and Valley function detects max workpiece point by tracing with the stylus, simplifying alignment
- Contour evaluation of high accuracy non-spherical lenses, optical fiber connectors, ball screws, precision parts
- Add roughness detector to become Surfcom 2800G/1800G

SURFCOM 2600G

Dimension line display function

Peak and Valley function

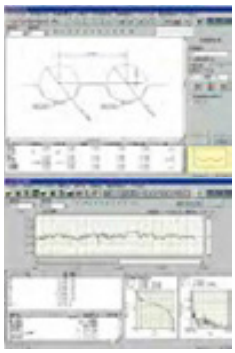
Print data sheet

Contourecord 2600G/1600G		-11	-12	-13	-14	-21	-22	-23	-24
Z-Axis Measuring Range		50mm							
X-Axis Measuring Range		100mm				200mm			
Tracing Column Up-Down stroke		250mm		450mm		250mm		450mm	
C1600G Z-Axis Scale Indication Accuracy		±0.25% (full scale)							
C1600G Contour Resolution		0.1µm/5mm range, 0.4µm/20mm range, 1µm/50mm range							
C1600G Contour Sensor		Differential transducer							
C2600G Z-Axis Scale Indication Accuracy		±(0.8+2H/100) µm (H: Measuring height in mm)							
C2600G Contour Resolution		0.025µm/Full range							
C2600G Contour Sensor		Laser Optical Diffraction Scale							
X-Axis Tracing Driver Indication Accuracy		±(1+2L/100) µm (L: Measuring length in mm)							
X-Axis Resolution		0.04µm							
X-Axis Tracing Driver Straightness Accuracy		1µm/100mm				2µm/200mm			
X-Axis Tracing Driver Sensor		Moiré striped scale				Linear scale			
X-Axis Measuring Speed		0.03, 0.06, 0.15, 0.3, 0.6, 1.5, 3, 6mm/s (8 speeds)							
Z Column Up-Down Speed		N/A	10mm/s (3mm/s) [1]			N/A	10mm/s (3mm/s) [1]		
Stylus Characteristics		Replaceable, 25µm radius, conical carbide, 30mN with retract function							
Measuring Direction Orientation		Pull-Push and Up-Down directions, Max following angle: 77°							
Table Dimensions in mm		600x317			1000x450	600x317			1000x450
Max Part Weight with Anti-Vibration Table	E-VS-S57B/S58B	41kg	35kg	26kg	N/A	35kg	29kg	20kg	N/A
	E-VS-S45A	50kg	40kg	30kg	91kg	50kg	40kg	30kg	85kg
	E-VS-R16B	50kg	40kg	30kg	41kg	50kg	40kg	30kg	35kg
	E-VS-R21B	50kg	40kg	30kg	100kg	50kg	40kg	30kg	100kg
Machine Width		2000mm			2300mm	2000mm			2300mm
Machine Depth x Height		1000 x 1700mm		1000 x 1900mm		1000 x 1700mm		1000 x 1900mm	
Machine Weight		115kg	125kg	130kg	235kg	125kg	130kg	140kg	245kg
Power Supply / Consumption		Single phase AC 100V±10%. Grounding required. 50/60Hz. / 380VA							

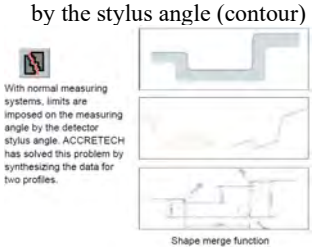
[1] Joystick operation.

SURFCOM 2800G/1800G Combi Roughness-Contour Metrology

- S2800G/1800G combines C2600G/1600G with S1400G!
- Patented roughness AI automatically sets measuring conditions and executes measurement. Contour AI auto-recognizes points, lines and circles. Dimension lines can be drawn with measured parameters and geometric deviation
- Auto-operation log stores drive unit and column movements and analysis procedures for CNC playback measurement



Built-in Shape Merge eliminates analysis range limitation created by the stylus angle (contour)



SURFCOM 2800G

Surfcom 2800G/1800G Model		-11	-12	-13	-14	-21	-22	-23	-24
Z-Axis Measuring Range		50mm							
X-Axis Measuring (Pickup Drive) Range		100mm				200mm			
Tracing Column Up-Down Stroke		250mm		450mm		250mm		450mm	
Roughness Measuring Range		800µm range to 25µm range (6.4µm range with high mag pickup)							
Roughness Resolution		0.02µm to 0.0004µm (0.0001µm with high mag pickup)							
S1800G Z-Axis Scale Indication Accuracy		±0.25% (full scale)							
S1800G Contour Resolution		0.1µm/5mm range, 0.4µm/20mm range, 1µm/50mm range							
S2800G Z-Axis Scale Indication Accuracy		±(0.8+2H/100)µm (H: Measuring height in mm)							
S2800G Contour Resolution		0.025µm/Full range							
X-Axis Indication Accuracy / Resolution		±(1+2L/100)µm / 0.04µm							
Tracing Driver Straightness Acc Roughness		0.05+1.5L/1000µm (L: Measuring Length in mm)							
Tracing Driver Straightness Acc Contour		1µm/100mm				2µm/200mm			
Tracing Driver Sensing Method		Moiré Striped Scale				Linear Scale			
Tracing Driver Measuring Speed		0.03, 0.06, 0.15, 0.3, 0.6, 1.5, 3, 6mm/s (8 speeds)							
Z-Axis Column Up-Down Speed		N/A	10mm/s (3mm/s joystick)			N/A	10mm/s (3mm/s joystick)		
Differential Transducer Detector Used		S1800G Roughness and Contour, S2800G Roughness							
Laser Optical Diffraction Scale Used		S2800G Contour							
Roughness Stylus Characteristics		Replaceable, 2µm radius, 60° Cone, Diamond Waviness: 800µm radius, ruby ball, 0.75mN							
Contour Stylus Characteristics		25µm radius, 24° Conical super-solder, 30mN with retract function (2 provided)							
Measuring Direction Orientation		Pull-Push and Up-Down directions, Max following angle: 77°							
Table Dimensions in mm		600x317			1000x450	600x317			1000x450
Max Part Weight with Anti-Vibration Table	E-VS-S57B/S58B	40kg	34kg	25kg	N/A	34kg	28kg	19kg	N/A
	E-VS-S45A	50kg	40kg	30kg	90kg	50kg	40kg	30kg	84kg
	E-VS-R16B	50kg	40kg	30kg	40kg	50kg	40kg	30kg	34kg
	E-VS-R21B	50kg	40kg	30kg	100kg	50kg	40kg	30kg	100kg
Machine Width		2000mm			2300mm	2000mm			2300mm
Machine Depth		1000mm							
Machine Height		1700mm		1900mm		1700mm		1900mm	
Machine Weight		120kg	125kg	135kg	240kg	125kg	135kg	140kg	245kg
Power Supply / Consumption		Single phase AC 100V±10%. Grounding required. 50/60Hz. / 710VA							

SURFCOM C5 Automated Production Floor Surface Roughness

SURFCOM C5 Type C

Current Engine Production Roughness Measurement

Cylinder Block/Head, Cam/Crank Shaft, Connector Rod

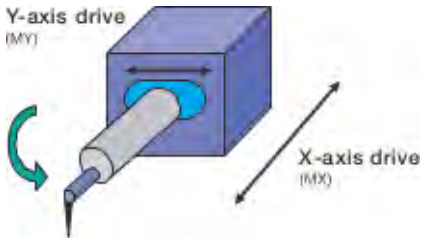
By Portable Texture Measuring

Problems: - 1) not universal; 2) high result variation - difficult to record judgement; 3) subject to human errors

SURFCOM C5 Type S

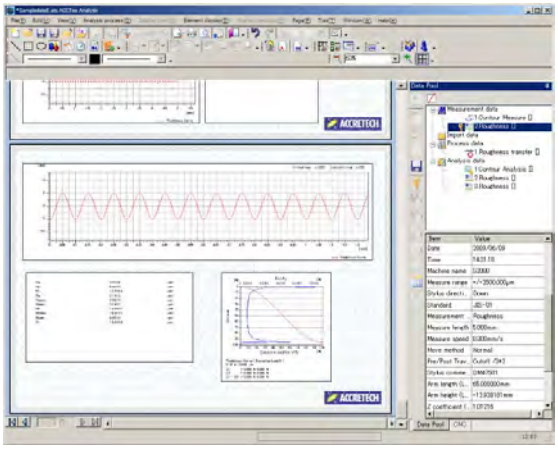
Surfcom C5 solves the problems at once!

- Measurement efficiency by multi-axis control
- Integrated sensor rotating mechanism in all orientations
- X-/Y-Axis tracing drivers (200/30mm) integrated into a single structure (Patented)
- Low-vibration linear motor drive (X-Axis)



Surfcom C5	
Z-Axis Measuring Range	1000µm
X-Axis Measuring Range	200mm
Tracing Column Up-Down Stroke	500mm (resolution 0.1µm)
X-Axis Tracing Driver Travel Range	200mm (resolution 0.1µm)
Y-Axis Column Cross-Feed Travel Range	800mm (resolution 0.1µm)
Y-Axis Pickup Tracing Driver Travel Range	50mm (resolution 0.1µm)
Pickup Rotation Angle / Measuring Force	0°, 90°, 180°, 270° / 0.75mN
Tracing Driver Straightness Accuracy	X-Axis: 0.5µm/200mm / Y-Axis: 0.5µm/50mm
Sensing Method	Z-Axis Detector: Differential inductance X-Axis Tracing driver Optical diffraction scale
Roughness Standards, Parameters, Evaluation Curves, Graphs, Tilt Correction, Filters, Cut-Off, Data Points, Vertical/Horizontal Mag.	**See ACCTEE Roughness Measurement Software**
Z-Axis Column Up-Down Speed	100mm/s max
X-Axis Tracing Driver Measurement Speed	0.03mm/s to 3mm/s (roughness meas.), 0.03mm/s to 20mm/s (waviness meas.)
Y-Axis Measurement Speed	0.03mm/s to 3mm/s
X / Y-Axis Tracing Driver Movement Speed	Max 100mm/s for both
Stylus Characteristics	Replaceable, 2µm radius, Diamond, 0.75mN (with standard pickup)
Power Supply /Consumption	Single-phase AC 100 to 240V±10%. Grounding required. 50/60Hz. / 1000VA
Air Supply	0.45 to 0.7MPa, One-touch pipe joint for tubes with Outer Diameter Ø 8mm
Weight	2000kg

ACCTEE for Integrated Roughness Measurement



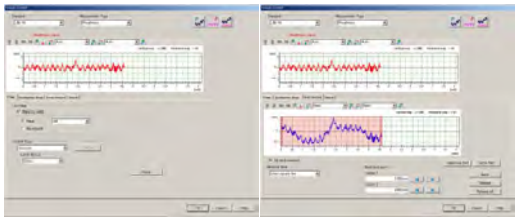
Easy to Use – All Operations in Document Screen!

- Integrated for Roughness, Contour and Roundness metrology
- Intuitive Operability and Analysis in one result sheet!
- Edit, add, re-analyse and re-measure per different ISO/JIS standards or evaluation ranges; or remove data from a notch!
- Instrument and configuration set-up wizards for different measurements, calibration, checking styli and parameters

Self-Diagnosis Auto Pass/Fail Judgement under 16% JIS2001 Rule

AI: Can specify parameters, analysis/optimum measurement condition

Pickup sensitivity calibration by depth, magnification or ref specimen

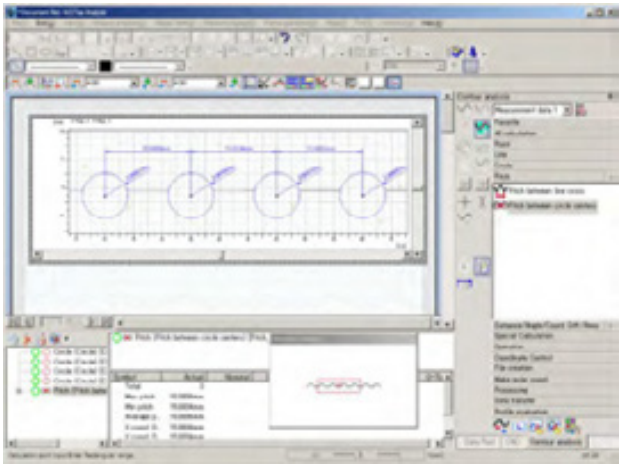


Change Analysis Conditions with Preview Function

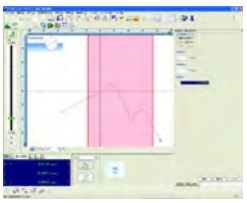
Roughness Peak and Valley Detection Function detects and automatically shifts the stylus to the max point

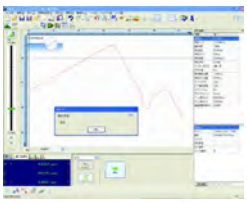
ACCTee Roughness Measurement and Analysis Program	
Roughness Standards	JIS-2013/-2001/-1994/-1982, ISO-1997/-1984, DIN1990, ASME1995, CNOMO
Roughness Parameter	Ra, Rq, Ry, Rp, Rv, Rc, Rz, Rmax, Rt, Rz.J, R3z, Sm, S, RΔa, RΔq, Rλa, Rλq, TILT A, Ir, Pc, Rsk, Rku, Rk, Rpk, Rvk, Mr1, Mr2, VO, K, tp, Rmr, tp2, Rmr2, Rσc, AVH, Hmax, Hmin, AREA, NCRX, R, Rx, AR, NR, CPM, SR, SAR, etc.
Parameter Judgement	Results Displayed via Standard, Average, Max and Min Values and 16% Rule
Roughness Evaluation Curve	Profile, roughness, waviness (filtered, filtered center line, rolling circle, rolling circle center line), ISO13565-1 (DIN4776) roughness, roughness/waviness motif and envelope waviness
Surface Characteristic Graph	Bearing Area Curve, ISO13565-2, Power Spectrum, Amplitude/Peak Height Distribution, Auto Correlation, Wear-Out Amount Analysis (2 arbitrary), Overlapping Analyses (≤ 10 curves)
Form Removal/Tilt Correction	Least square straight line, circle and oval, n-Dimension Polynomial (n=2 to 9), spline, robust (spline), arbitrary or first or latter half or both ends of setting range for all options
Filter Type	Gaussian phase compensating, 2RC phase compensating/non-compensating, spline, robust
Cut-Off Wavelength λc	0.008, 0.025, 0.08, 0.25, 0.8, 2.5, 8, 25, 50mm (9 levels), arbitrary from 0.001mm
Cut-Off Ratio λs	1/30, 1/100, 1/300, 1/1000, arbitrary (from 1/10)
Cut-Off Wavelength λs	0.08, 0.25, 0.8, 2.5, 8, 25, 80μm (7 levels), arbitrary (from 0.05)
Stylus Calibration	Depth specimen (JIS), magnification calibration unit and reference specimen. Max 20 units of stylus calibration information can be registered with calibration interval deadline
Data Points	300,000 Max
Vertical Mag Display	Arbitrary value (unit:0.01), automatic, 50, 100, 200, 500, 1K, 2K, 5K, 10K, 20K, 50K, 100K, 200K, 500K, 1000K, 2000K, 5000K, 10,000K times
Horizontal Mag Display	Arbitrary value (unit:0.01), automatic, 1, 2, 5, 10, 50, 100, 200, 500, 1K, 2K, 5K, 10K, 20K, 50K, 100K, 200K, 500K, 1000K times

ACCTEE for Integrated Contour Measurement

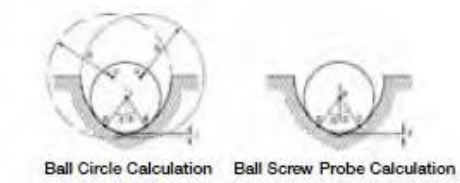


Contour Analysis Result





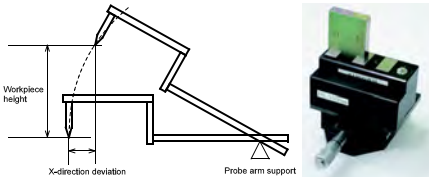
Work Trace Function displays manually traced profile

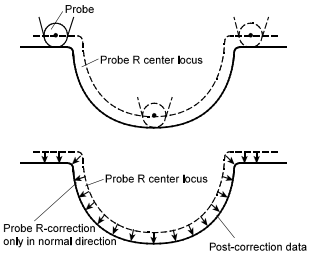


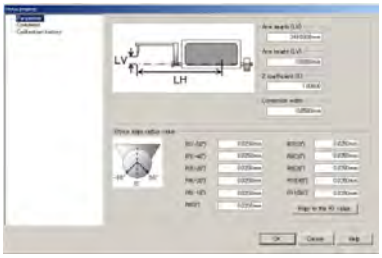
Ball screw Option: Analyse and project measured data in edge direction in groove and line directions

Master Ball Calibration Function (Patented)

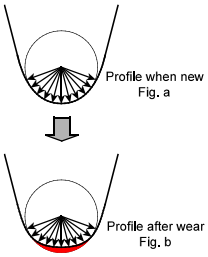
Circle Correction Calculation: As the probe moves in a circular motion vertically around the support, X-Axis error is produced as the probe also moves in the X-Axis direction. This plus the tip R error can be corrected via calibration with a master ball calibration unit.







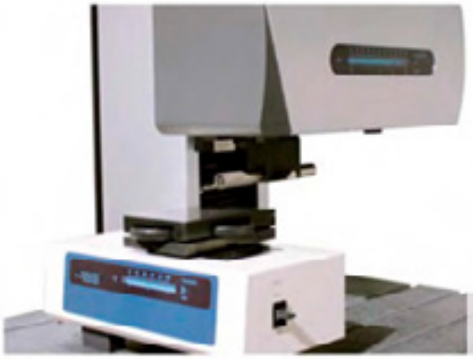
Master Ball Correction Screen



Tip R-Correction for High Accuracy: The R-shape contour probe tip optimally has near-zero roundness. Measurements are taken from its center and offset in the normal direction at 11 dividing points to monitor wear and to compute the offset correction using a proprietary algorithm. An error indicator alerts when the correction value is outside pre-set limits.

ACCTee Contour Profile Measurement Machine and Analysis Program	
AI Function	Automatic distinction of elements (incl. points, straight lines, circles and ovals); of combinations of two elements (point-point, point-straight line, point-circle, point-oval, straight line-straight line, circle-straight line, circle-circle, straight line-oval, circle-oval, oval-oval)
Contour Calculations	Point (cross, mid and contact, peak, valley), line (perpendicular, median, contact, parallel, bisector, virtual), circle (partial, oval, contact, virtual), pitch (between line cross, circle centers), distance, curve length, angle, inter angle (complementary, supplementary), coordinate difference (X, Z, angle, radius, polar coord), level difference (average, max, min), area, calculation (addition, subtraction, multiplication, division, power operation, surplus, absolute value, square root), statistics (average, max, min, std. dev., total sum), over-pin calculation, dimension line display function, calculation result design value collation, mirror inverse, smoothing, form combining (whole composition, partial composition), calculation point repeat function, work trace function, peak/valley function, CNC function, nominal collation, best fit (parallel move, rotary move), nominal value preparation function
Data File I/O	Input of point sequence, text, CSV, IGES, DXF data and Calypso Curve
Coordinate Settings	Zero point (origin) setting for each axis, X-Axis setting, parallel movement, rotary movement
Calculation Support	Infinite cursor, cursor form vertical/horizontal switch, one point micro motion, setting or error band
Stylus Calibration	Automatic calibration and manual calibration by master ball calibration unit. Max 20 stylus calibration information can be registered (deadline of the calibration time can be specified)
Measure Pitch	0.01~1000µm
Data Points	Max 300,000 points
Vertical/Horizontal Mag	Display: Arbitrary value (unit:0.01), automatic and 0.01 - 10,000,000 times

SURFCOM MAP Advanced 3D Roughness Analysis Software



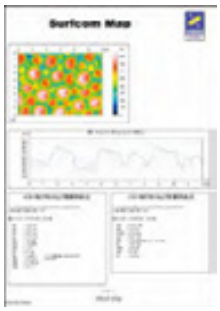
Workpiece Movement Type

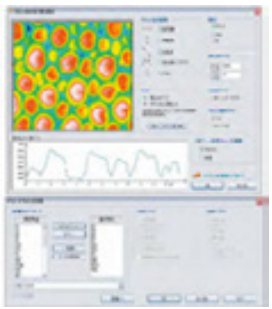
Y-Axis range settable between 50 to 200mm. For CREST / NEX / 2800 / 1800 / 1400 / 2000 / 2900 / 1900 / 1910 / 1500.

Detector Movement Type (Patent Pending)

Small Y-Axis driver installed for performing 3D roughness measurement on large or heavy workpieces without moving them. For NEX / 2000 / 2900 / 1900 / 1910 / 1500.

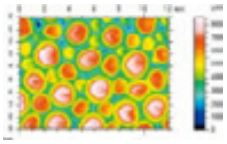
	E-DH-S173B	E-YM-S06B	E-YM-S12B	E-YM-S07B	E-YM-S08B
Drive System	Detector Moves	Workpiece Moves			
Drive Range	13mm	50mm	100mm	150mm	200mm
Min Feed Pitch / Measurement Pitch	0.001mm / 2 to 4001 lines				
Straightness Accuracy	1μm	0.05+3L/1000μm			
Table Dimensions	Handles large heavy parts	80 x 120mm	100 x 120mm	120 x 150mm	150 x 150mm
Max Load		5kg	10kg	5kg	10kg



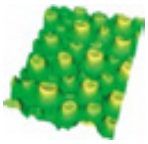


- Most advanced offline 3D roughness analysis software available, combining versatile 3D analysis with simple operation
- More than 20 types of offline analysis
- Wide Range of Visual Representations of Surface Properties
- Object orientated – enables condition modification on the inspection report, enhancing analysis efficiency with automatic recording of analysis procedures

Analysis Functions

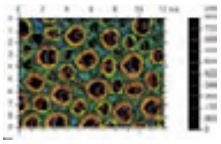


Colour Display

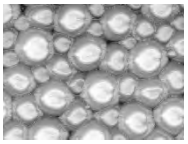


3D Display (Surface)

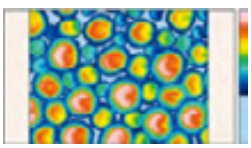
3D Display (Line)



Contour Screen

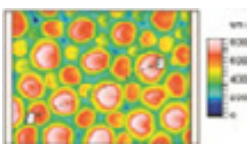


Photograph Display

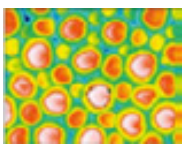


Island Volume

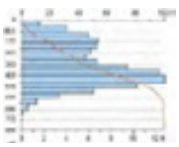
Section Profile Display



Distance & Angle



Hole/Projection Vol



Bearing Area Curve

	Surfcom Series			Opt-Scope	
Analysis Functions	**Premium**	**Expert**	**Standard**	**Premium**	**Opt**
Colour / Contour Line / 3D / Load Curve / Section Profile Display	O	O	O	O	O
Photograph Display / Distance Measurement / Hole and Projection Vol	O	O	X	O	O
Peak distribution	O	O	O	O	X
Island volume	O	O	X	O	X
2D surface roughness analysis	O	X	X	O	O

ROUNDNESS Line Up at a Glance!

Rondcom Model		Method		Style		Detector				Table Specifications			Z-Axis Column			R-Axis	
		CNC	Manual	All-in-one Type	Separate Type	All Position	Standard	Stroke in µm	Offset holder	Max Sample Weight in kg	Rotation Accuracy in µm	Ø Dimensions in mm	Feed Range in mm	Cylindricity/ Rectilinear	Straightness Accuracy in µm	Max Measuring Ø in mm	Feed Range in mm
Crest		O	-	O	-	O	-	±1000	O	65	0.01+3H/10000	340	500	✓	0.05/100mm 0.13/350mm	420	250
NEX 100 / -α	DX	-	O	O	-	O	Δ	±1000	O	30 / 60	0.02+3.2H/10000	235	300	✓	0.10/100mm 0.15/300mm	300 (350) [1]	180
	SD	-	O	-	O	O	Δ										
NEX 200/300 / -α	DX	O	-	O	-	O	Δ	±1000	O	30 / 60	0.02+3.2H/10000	235	300	✓	0.10/100mm 0.15/300mm	300 (350) [1,2]	180
	SD	O	-	-	O	O	Δ										
NEX Rs 200/300 / -α	DX	O	-	O	-	O	Δ	±1000	O	30/ 60	0.02+3.2H/10000	235	300	✓	0.10/100mm 0.15/300mm	300 (350) [1,3]	180
	SD	O	-	-	O	O	Δ										
Touch		-	O	-	O	-	O	±400	-	15	0.04+6H/10000	148	162	-	-	150	160 (±80)
65B		O	-	O	-	O	Δ	±1000	Δ	60	0.01+4H/10000	290	500	✓	0.05/100mm 0.2/500mm	420	220
65A-LH		O	-	O	-	O	Δ	±1000	O	250	0.08+6H/10000	400	900	✓	0.2/100mm 1.0/900mm	580	343
60A		O	-	-	O	O	Δ	±1000	Δ	60	0.02+6H/10000	290	500	✓	0.1/100mm 0.25/500mm	420	220
43C-S		-	O	-	O	Δ	O	±400	-	15	0.02+6H/10000	148	300	✓	0.25/100mm 0.8/300mm	200	100
43C																250	125
41C		-	O	-	O	Δ	O	±400	-	25	0.04+6H/10000	148	300	✓	0.5/100mm 1.5/300mm	250	125
31C													200	-	-		

[1] With optional offset-type detector holder E-DH-RB86A. [2] For R NEX 200/NEX α 200. [3] For R NEX Rs 200/NEX Rs α 200.

Rondcom Model	Method		Detector				Table Specifications					Z-Axis Column		R-Axis	
	CNC	Manual	Standard	PA	Stroke in µm	Offset holder	Max Sample Weight in kg	Rotation accuracy in µm	X Feed range in mm	Y Feed range in mm	Dimensions in mm	Feed range in mm	Straightness accuracy in µm	Max measuring Ø in mm	Feed range in mm
76A	O	-	Δ	O	±500 (arm a) ±1000 (arm b)	-	400	0.04+ 3H/10000	700	200	800x680	1000	0.28/50mm 0.37/100mm 1.32/700mm	500	290
73A	O	-	O	Δ	±800	-	200	0.06	600	120	600x550	1000	0.9/200mm	450	265
Zero1	-	O	X	X	±300	-	X	1	X	X	X	135	1/125mm	950	6
Grande	O	-	O	X	±1000	-	500	0.08+H/1000	X	X	Ø 1650	550	0.15/100mm 0.5/490mm	1650	450

O – Standard accessory; Δ – Available as option; ✓ – Possible.

RONDCOM NEX *IMPROVED!* High Productivity Fully CNC Roundness

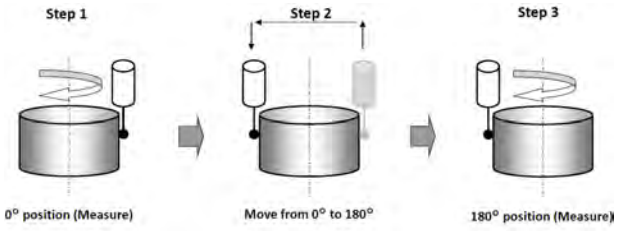
- High Rotation Accuracy: 0.02+3.2H/10000µm
- Measures Roundness, Diameter and Roughness with one system
- Automatic switching of measurement direction and force with the AFD (Automatic Force adjustment Detector)
- Labour-saving optional XY-Axis automatic stage allows many workpieces on the stage to be measured at once, minimizing operator effort and reducing measurement task time.
- Patented offset type detector holder
- Auto-centering/-tilting/-leveling functions
- R-Axis taper following function – measures taper angle and straightness even if it exceeds the detector range
- Spiral cylindricity measurement function
- Patented diameter measurement function – Opposite Pair Method
- R-Axis ceramic arm is light weight and highly rigid – hard to be affected by room temperature changes and maintenance free
- Larger Ø 235mm table and centering range ±5mm

RONDCOM NEX

Automatic Force adjustment Detector

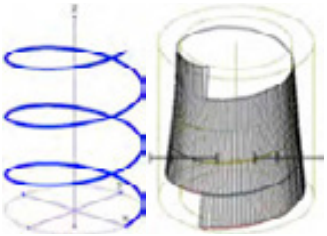
XY-Axis Automatic Stage

3 Measuring Functions in 1

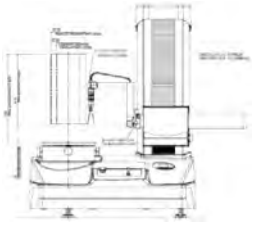
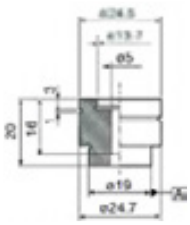
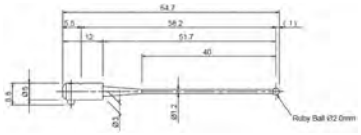


Patented diameter measurement – Opposite Pair Method

R tracking during measurement



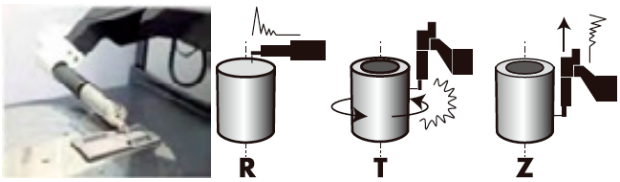
Spiral cylinder measurement

Accessories for Diameter Measurement Capability			
Model with External View	 E-DH-RB09A	 E-MG-R88A	 EM46000-S864
	Facing Dia. Measurement Holder	Diameter Master	Stylus
Notes	OD ≤ Ø 100mm. Require horizontal feed coupling E-DH-RB08A	OD Ø 24.5mm; ID Ø 13.7mm	Recommended for Dia. Measurement

RONDCOM NEX Rs High Productivity Roundness / Roughness

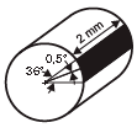
Features (in addition to Rondcom NEX features)

- Integrated High Accuracy Roughness measurement in R/T/Z axes
- Lead Twist measurement option
- T angle scale – High 0.0001° resolution angle scale for roughness measurement
- Low speed drive motor – (R/Z:0.1mm/s, T:0.01/min)
- Air bearing with low vibration



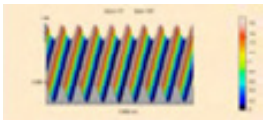
High accuracy roughness measurement in R-, T- and Z-axes

Lead twist measurement option



0.5°pitch (720 lines)

5°pitch (72 lines)



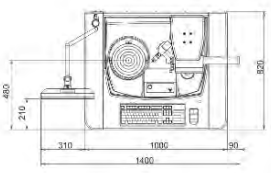
RONDCOM NEX RS

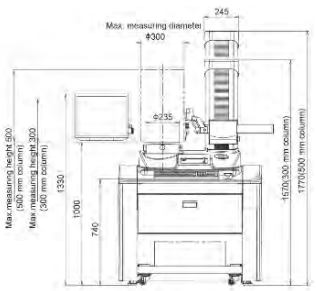
RONDCOM NEX α / NEX Rs α For Eccentric and Heavy Parts

RONDCOM NEX α

- Measures up to 60kg workpieces at high accuracy
- Unique compact highly rigid low-vibration air bearing spindle supporting heavy workloads

Measuring crankshaft using designated jig tool





RONDCOM NEX / NEX Rs / NEX α / NEX Rs α Specifications

Models and Size	100				200				300			
Standard or Deluxe	SD		DX		SD		DX		SD		DX	
RONDCOM NEX (-11, -12) [1]	11	12	11	12	11	12	11	12	11	12	11	12
RONDCOM NEX α (-21, -22)	21	22	21	22	21	22	21	22	21	22	21	22
Alignment	Manual				CNC							
Offset Type Detector Holder	Manual								CNC			
Max Measuring Diameter Range	Outer diameter: 300mm (350mm) [4] Inner diameter: 360mm (410mm) [4]								Outer diameter: 300mm Inner diameter: 360mm			
R-Axis Radial Feed Range	180mm											
Z-Axis Up-Down Feed Range in mm	300	500	300	500	300	500	300	500	300	500	300	500
Max Loading Diameter	Ø 580mm											
Max Measuring Height in mm	300	500	300	500	300	500	300	500	300	500	300	500
Max Measuring Depth	150mm [2]											
Rotational Radial / Axial Accuracy [3]	0.02+3.2H/10000µm / 0.02+3.2R/10000µm											
Z-Axis Straightness Accuracy	0.10µm/100mm											
	0.15µm/300mm for -11/-21 models; 0.23µm/500mm for -12/-22 models											
R-Axis Radial Straightness Accuracy	R-Axis: 0.7µm/180mm											
Z-Axis/T-Axis Flatness Accuracy	0.7µm/300mm for -11/-21 models; 1.0µm/500mm for -12/-22 models											
R-Axis/T-Axis Squareness Accuracy	1.0µm/150mm											
R-Axis Scale Indication Accuracy	(0.5+L/180 + 2L⊿ T/100)µm L = travel distance (mm) ⊿T: temperature difference between standard condition (20°C) and environmental temperature (°C).											
θ-Axis Rotational Measuring Speed	1 to 10/min; Rs: 0.01 to 1/min (roughness measurement)											
Z-Axis Up-Down Measuring Speed	0.5 to 10mm/s; Rs: 0.1 to 1.5mm/s (roughness measurement)											
R-Axis Radial Measuring Speed	0.5 to 10mm/s; Rs: 0.1 to 1.5mm/s (roughness measurement)											
θ-Axis Rotational Movement Speed	max. 20/min											
Z-Axis Up-Down Movement Speed	5 to 60mm/s											
R-Axis Radial Movement Speed	5 to 30mm/s											
Table Diameter / Centering / Tilt Range	Ø 235mm / ±5mm / ±1°											
Max Load	30kg (NEX / NEX Rs); 60kg (NEX α / NEX Rs α)											
Standard Detector E-DT-R120B	30 to 100mN, ±1000µm range, Inner/outer Ø switching, front/over travel, safety stop											
Standard Stylus EM46000-S302	Ø 1.6mm stylus ball, 53mm length, Cemented Carbide											

[1] NEX-11 (Max. loading mass 30kg, 300mm column), NEX-12 (Max. loading mass 30kg, 500mm column), NEX -21 (Max. loading mass 60kg, 300mm column), NEX -22 (Max. loading mass 60kg, 500mm column).

[2] Check for limitations arising from the measurement diameter and combination of detector and stylus.

[3] Per JIS B 7451-1997. H = height of measurement point from the upper table surface, and R = distance from the table rotational center in mm.

[4] With optional measurement diameter extension offset-type detector holder E-DH-RB86A.

Standard for NEX Rs α 200/300

Low Force Detector E-DT-R168C	4mN measuring force; linear range ±400µm
Roundness Stylus 010 2505	Ø 1.6mm ball diameter, 26.5mm length, ruby
Roughness Stylus 010 2501	SR5 (90° cone), 26.5mm length, diamond

RONDCOM NEX / NEX Rs / NEX α / NEX Rs α Specifications

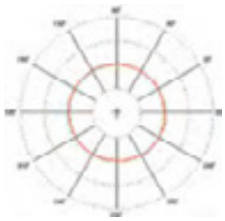
Models and Size	100				200				300			
Standard or Deluxe	SD		DX		SD		DX		SD		DX	
RONDCOM NEX (-11, -12) [1]	11	12	11	12	11	12	11	12	11	12	11	12
RONDCOM NEX α (-21, -22)	21	22	21	22	21	22	21	22	21	22	21	22
Number of Sampling (point)	See **ACCTEE Roundness Measurement Software**											
Digital Filter												
θ-Axis Rotational Direction Lowpass												
θ-Axis Rotational Direction Bandpass												
Z-Axis Rectilinear Direction Lowpass												
Roundness Evaluation of Form Error												
Rotational Direction Measuring Items												
Rectilinear Direction Measuring Items												
Analysis Processing Function	Notch function (level, angle, cursor), combination of roundness evaluation methods, nominal value collation, cylinder 3D profile display (line drawing, shading, contour line), real-time display, profile characteristic graph display (bearing area curve, amplitude distribution function, power spectrum), CNC automatic measuring function, automatic centering/ tilting adjustment function (except for NEX 100)											
Display Items	Measuring conditions, measuring parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.											
Installation Width	720mm		1400mm		720mm		1400mm		720mm		1400mm	
Installation Depth	580mm		820mm		580mm		820mm		580mm		820mm	
Installation Height NEX in mm	895	1095	1570	1770	895	1095	1570	1770	895	1095	1570	1770
Installation Height NEX α in mm	900	1100	1570	1770	900	1100	1570	1770	900	1100	1570	1770
Installation Height NEX Rs in mm	N/A				920	1120	1595	1795	920	1120	1570	1570
Installation Height NEX Rs α in mm					925	1125	1595	1795	925	1125	1595	1795
Machine Weight NEX in kg	180	190	330	340	180	190	330	340	180	190	330	340
Machine Weight NEX α in kg	200	210	350	360	200	210	350	360	200	210	350	360
Machine Weight NEX Rs in kg	N/A				180	190	330	340	180	190	330	340
Machine Weight NEX Rs α in kg					200	210	350	360	200	210	350	360
Power Supply	Single phase AC 100 to 240V. Grounding required. 50/60Hz.											
Power Consumption	NEX, NEX α: Approx. 530VA / NEX Rs, Nex Rs α: Approx. 630VA											
Air Supply	NEX, NEX Rs: 0.35 to 0.7MPa / NEX α, NEX Rs α: 0.45 to 0.7MPa											
Working Pressure	NEX, NEX Rs: 0.3MPa / NEX α, NEX Rs α: 0.4MPa											
Air Consumption	NEX, NEX Rs: 30Nℓ/min / NEX α, NEX Rs α: 40Nℓ/min											
Air Supply Connecting Port	One-touch pipe joint for tubes with Outer Diameter Ø 8mm hose											
Operating Temperature	10 to 30°C											
Guaranteed Accuracy Temperature	20±2°C											

RONDCOM CREST Ultra-high accuracy

- World's highest radial direction rotation accuracy 0.01+3H/10000µm and axial direction rotation accuracy 0.02+3R/10000µm
- New driving and guiding mechanism (Patent Pending)
- Higher accuracy diameter measurement by automatic crowning function, higher accuracy straightness/taper angle measurement by R-Axis tracking and higher accuracy spiral Cylindricity measurement
- Z/R/T-Axis roughness measurement and Lead Twist measurement option

Option to Auto switch between roundness/roughness measurement

Opposed diameter measurement (Patented)



No. 1 accuracy in the world

Excellent User Operation Panel

Rondcom CREST	
Max Measuring Diameter	420mm (OD) / 480mm (ID)
R-Axis Radial / Z-Axis Up-Down Feed Range	250mm / 520mm
Max Workpiece Diameter / Height	490mm / 500mm
Radial / Axial Rotation Accuracy [1]	0.01+3H/10000µm / 0.02+3R/10000µm
Z-Axis Up-Down Straightness Accuracy	0.05µm/100mm / 0.13µm/350mm
R-Axis Radial Straightness Accuracy	0.2µm/200mm
Z-Axis/T-Axis Parallelism Accuracy	0.5µm/350mm
R-Axis/T-Axis Squareness Accuracy	0.3µm/200mm
R-Axis Radial / Z-Axis Scale Indication Accuracy	0.3+L/1000µm / 0.5+L/1000µm
T-Axis Rotation Measuring Speed	1~10 (rotation meas.), 0.01~1 (roughness meas.)
R-Axis Radial / Z-Axis Up-Down Measuring Speed	0.5~10 (linear motion meas.), 0.03~1.5 (roughness meas.)
T-Axis Rotation Movement Speed	Max 20
R-Axis Radial Movement Speed	50 (Auto movement), 5~50 (Jog operation)
Z-Axis Up-Down Movement Speed	70 (Auto movement), 5~50 (Jog operation)
Table Diameter / Centering / Tilt Range	340mm / ±5mm / ±1°
Max Load	65kg
Machine Dimensions W x D x H	2240 x 2010 x 1940mm (L-shape) / 2750 x 1250 x 1940mm (I-shape)
Machine Weight	1350kg (Measuring Unit) / 100kg (Data Processor)
Power Supply / Consumption	AC 100 to 240V±10%. Grounding required. 50/60Hz. / Approx. 820VA
Air Supply / Working Pressure / Air Consumption	0.45 to 0.7MPa / 0.4MPa / Approx. 54Nℓ/min
Air Supply Connecting Port	One-touch pipe joint for tubes with Outer Diameter Ø 8mm tube
Operation Environment	10~30°C (Operating Temp.); 20±1°C (Accuracy Guaranteed Temp.)

[1] Per JIS B 7451-1997. H = height of measurement point from upper table surface and R = distance from table rotational center in mm.

RONDCOM 65B Ultra-High Accuracy CNC Roundness

RONDCOM 65B

- Highest Rotation Accuracy in Class: 0.01µm
- Centering and tilting within 60 secs – for fast total measuring time
- Robust high accuracy and high rigidity structure
- Gabbro with minimal susceptibility to age-related deterioration, used in column, base and arm, guarantees top-class high accuracy over time
- Patented Offset type detector holder option enables various workpieces to be measured easily without interference from the R-Axis arm
- Switch easily between outside diameter and top flatness measurements just by tilting the detector holder

Offset Type CNC Detector Holder (Patented)

Rondcom 65B	**Standard Model**	**High Column Model**
Measuring Method	CNC and Manual	
Max Measuring Diameter / Loading Diameter	420mm / 680mm	
R-Axis Right-Left / Z-Axis Up-Down Feed Range	220mm / 500mm	220mm / 800mm
Max Measuring Height (same for OD and ID)	500mm	800mm
Max Measuring Depth (Throat height)	150mm	
	(limited by measuring diameter and detector-stylus combination)	
Radial Rotation Accuracy [1]	0.01+4H/10,000µm	
	(H: Height from table top to measuring point in mm)	
Axial Rotation Accuracy [1]	0.03+4R/10,000µm	
Up-Down Straightness Accuracy (Narrow Range)	0.05µm/100mm	0.1µm/100mm
Up-Down Straightness Accuracy (Wide Range)	0.2µm/500mm	0.5µm/800mm
R-Axis Radial Straightness Accuracy	0.5µm/200mm	
Z-Axis Up-Down Parallelism Accuracy	1.5µm/500mm	
R-Axis Radial Parallelism Accuracy	0.5µm/200mm	
R-Axis Scale Indication Accuracy	(2+L/220)µm (where L = Moving Length in mm)	
θ-Axis Rotational Speed	2/min to 10/min (At moving: Max 20/min)	
Z-Axis Up-Down Measuring Speed	0.6mm/s to 6mm/s (At moving: Max 30mm/s)	
R-Axis Radial Measuring Speed	0.6mm/s to 6mm/s (At moving: Max 20mm/s)	
Z-Axis/R-Axis Auto-Stop Accuracy	±5µm	
Rotary Table Outside Diameter	Ø 290mm	
Rotary Table Centering / Tilt Range	±5mm / ±1o	
Rotary Table Load	60kg	
Stylus Characteristics	30 to 100mN (variable) measuring force, Ø 1.6mm carbide ball, 53mm length	
Number of Sampling	14400 points / rotation	
Measurement Magnification	50 to 100K	
Special Function	Offset Type CNC Detector Holder Option	
Display Colour Monitor / Items	17” LCD / Measuring conditions and parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.	
Recording System	Colour or Laser Printer	
Power Supply / Consumption	AC 100V to 240V. Grounding required. 50/60Hz. / Approx. 800VA	
Air Supply / Working Pressure / Consumption	0.5 to 0.7Mpa / 0.4Mpa / 49Nℓ/min	
Machine Dimensions W x D x H / Weight	1740 x 875 x 1755mm / 810kg	1740 x 875 x 2075mm / 930kg

[1] Per JISB7451-1997.

RONDCOM 60A High Accuracy CNC Roundness

RONDCOM 60A

- High Rotation Accuracy of 0.02µm
- High-Accuracy Air Bearings for Z-, R- and θ-axes
- Gabbro in column, base and R-Axis for top-class accuracy
- World's highest throughput (within 60s for alignment)
- Detector with Overload Safety Function in all orientations
- Offset Type Detector Holder Option (Patented) – for measurement without interference from R-Axis arm
- Air Type Anti-Vibration Table Option
- Fully Automatic Measurement via ACCTEE Teach Mode

Fully automatic detector holder option

Inside diameter roundness measurement

Rondcom 60A	Standard	High Column
Measuring Method	CNC and Manual	
Max Measuring Diameter / Loading Diameter	420mm / 680mm	
R-Axis Right-Left / Z-Axis Up-Down Feed Range	220mm/500mm	220mm/800mm
Max Measuring Height (same for OD and ID)	500mm	800mm
Radial Rotation Accuracy [1]	0.02+6H/10,000µm (H: Height from table top to measuring point in mm)	
Up-Down Straightness Accuracy (Narrow Range)	0.1µm/100mm	0.2µm/100mm
Up-Down Straightness Accuracy (Wide Range)	0.25µm/500mm	0.6µm/800mm
R-Axis Radial Straightness Accuracy	0.5µm/200mm	
Z-Axis Up-Down Parallelism Accuracy	1.5µm/500mm	
R-Axis Radial Parallelism Accuracy	0.5µm/200mm	
R-Axis Scale Indication Accuracy	(2+L/200)µm (where L = Moving Length in mm)	
θ-Axis Rotational Speed	2 to 10/min (At auto centering/tilting: 6/10/20/min)	
Z-Axis Up-Down Measuring Speed	0.6mm/s to 6mm/s (At moving: Max 30mm/s)	
R-Axis Radial Measuring Speed	0.6mm/s to 6mm/s (At moving: Max 20mm/s)	
Z-Axis/R-Axis Auto-Stop Accuracy	±5µm	
Rotary Table Outside Diameter	Ø 290mm	
Rotary Table Centering / Tilt Range	±5mm / ±1o	
Rotary Table Load	60kg	
Stylus Characteristics	30 to 100mN (variable) meas. force, Ø 1.6mm carbide ball, 53mm length	
Filter, θ-Axis Rotational / Z-Axis Rectilinear Cut-off values and Measuring Items, Form Error Roundness Evaluation, Analysis Processing	See **ACCTEE Roundness Measurement Software**	
Display Magnification	50 to 100K	
Special Function	Offset Type CNC Detector Holder Option	
Display Colour Monitor / Items	17" LCD / Measuring conditions and parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.	
Recording System	Colour or Laser Printer	
Power Supply / Consumption	AC 100 to 240V±10%. Grounding required. 50/60Hz. / Approx. 800VA	
Air Supply / Working Pressure / Consumption	0.5 to 0.7Mpa / 0.4Mpa / 49Nℓ/min	
Machine Dimensions W x D x H / Weight [2]	1974 x 924 x 1950mm / 500kg	1974 x 924 x 2250mm/ 520kg

[1] Per JISB7451-1997. [2] Excludes anti-vibration table, rack.

RONDCOM 43C/41C/31C Desktop Manual Roundness

RONDCOM 43C

RONDCOM 41C

- Bar Graph aids Centering/Tilting Adjustment
- High-precision straightness column for 43C/41C with high column option and R43C-S for small, high-accuracy workpieces. R31C not equipped with straight Z column but can still do coaxiality and concentricity measurements of center point deviation
- Integrated ACCTee / Compact, space saving / Energy-efficient high precision static-pressure air bearings (θ-Axis)

	R43C-S	**R43C**	**R41C**	**R31C**
Measuring Method	Manual			
Max Measuring Diameter / Loading Diameter	200mm / 400mm	250mm / 400mm		
R-Axis Right-Left Feed Range	100mm	125mm		
Z-Axis Up-Down Feed Range Standard	300mm			200mm
Z-Axis Up-Down Feed Range High Column	N/A		500mm	N/A
Max Measuring Height Standard	300mm			200mm
Max Measuring Height High Column	N/A		500mm	N/A
Radial Rotation Accuracy [1]	0.02+6H/10,000µm		0.04+6H/10,000µm	
Up-Down Straightness Accuracy Standard	0.25µm/100mm, 0.8µm/300mm		0.5µm/100mm, 1.5µm/300mm	N/A
Up-Down Straightness Accuracy High Column	N/A		0.5µm/100mm, 2.5µm/490mm	N/A
R-Axis Radial Straightness Accuracy	0.2µm/10mm)	N/A		
Z-Axis Parallelism Accuracy Standard	1.5µm/300mm		3µm/300mm	N/A
Z-Axis Parallelism Accuracy High Column	N/A		1µm/100mm	N/A
R-Axis Radial Parallelism Accuracy	0.3+0.1L/10µm	N/A		
θ-Axis Rotational Speed	6/min			
Z-Axis Up-Down Measuring Speed	0.6, 1.5, 3, 6mm/s (At moving: 15mm/s max)			5mm/s
R-Axis Radial Measuring Speed	0.6, 1.5, 3, 6mm/s	5mm/s		
Z-Axis/R-Axis Auto-Stop Accuracy	±5µm			
Rotary Table Outside Diameter	Ø 148mm			
Rotary Table Centering/Tilt Range	±2mm / ±1°			
Rotary Table Load	15kg		25kg	
Stylus Characteristics	±400µm range, 70mN meas. force, Ø 1.6mm carbide ball			
Stylus Length	54.5mm	15.5mm		
Filter, θ-Axis Rotational / Z-Axis Rectilinear Cut-Off values, Measuring Items, Form Error Roundness Evaluation and Analysis	See **ACCTEE Roundness Measurement Software**			
Display Colour Monitor / Items	17” LCD / Measuring conditions and parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.			
Recording System	Colour or Laser Printer			
Power Supply / Consumption	AC 100 to 240V±10%. Grounding required. 50/60Hz. / Approx. 600VA			
Air Supply / Working Pressure / Consumption	0.35 to 0.7MPa / 0.3Mpa / 30Nℓ/min			
Dimensions (Standard) W x D x H / Weight [2]	1800 x 1000 x 1800mm / 130kg		1800 x 1000 x 1700mm / 120kg	
Dimensions (High Column) WxDxH / Weight [2]	R41C only: 1800 x 1000 x 1900mm / 140kg			

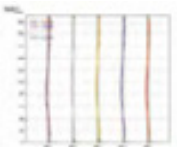
[1] Per JISB7451-1997. [2] Excluding options.

RONDCOM 73A CNC Detector Rotating Roundness

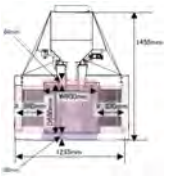
RONDCOM 73A

- Compact Footprint, Lighter, Energy Saving!
- Highest 0.06µm Rotation Accuracy in its class: at Rotation Speed of 4/min
- Z-Axis Straightness Accuracy 0.9µm/200mm; Parallelism: 0.9µm/100mm
- Z-Axis Stroke: 1015mm; Max Loading: Ø 900mm
- 120mm Y-Axis Stroke efficiently measures crankshafts and eccentric holes
- Detector with Overload Safety in all orientations
- 265mm R-Axis Feed Range avoids need to change detector position
- Able to use wide range of detectors and accessories
- Safety Device and Auto Balancing on R-Axis
- Auto-Centering, -Tilting and -Levelling. CNC measurements via ACCTEE
- Edge Detection Measurement Option automatically recognizes edge-to-edge distance and sets measuring length at a rectilinear measurement
- Calibration Wizard aids operators to perform calibration easily
- Self-Diagnosis Function displays error messages and countermeasures

Rotation accuracy 0.06µm at 4/min rotational speed



High Z-Axis straightness & parallelism accuracy



Space-saving Design

	Rondcom 73A			
Measuring Method	CNC			
Max Measuring Diameter	450mm			
Max Measuring Height	1015mm (standard detector); 630mm (620mm long shaft measuring tool)			
Feed Range	X-Axis Right-Left	Y-Axis Forth-Back	Z-Axis Up-Down	R-Axis
	600±300mm	120±60mm	1000mm	265mm
Table Dimensions W x D / Load	600 x 550mm / 200kg			
Workpiece Position CG / Table Tilt Range	Within Ø 200mm of Table / 2° (±1°)			
X / Y / R Axes Drive Speed	Max 30mm/s			
Radial Rotation Accuracy	0.06µm (standard detector); 0.6µm (620mm long shaft measuring tool)			
Axial Rotation Accuracy (Meas. Radius: 50mm)	0.2µm (standard detector); 0.4µm (620mm long shaft measuring tool)			
θ-Axis Rotational Speed	1 to 6/min (at measuring), Max 10/min			
Z-Axis Straightness Accuracy	0.9µm/200mm (standard detector)			
Z-Axis Up-Down Parallelism Accuracy	0.9µm/100mm			
Z-Axis Up-Down Measuring Speed	0.6 to 6mm/s (Max 30mm/s)			
Standard Configuration and Accessories	Measuring unit, Table, Air bearing and rotation clampers, detector holder E-DH-R550A, Detector E-DT-R244A, Stylus 0194412, Master ball E-MG-R01B (sphericity: 0.05µm), controller, operation box, mobile stand			
Filter, θ-Axis Rotational / Z-Axis Rectilinear Cut-Off values and Measuring Items, Form Error Roundness Evaluation, Analysis Processing	See **ACCTEE Roundness Measurement Software**			
Display Colour Monitor / Items	17” LCD / Measuring conditions and parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.			
Recording System	Colour or Laser Printer			
Machine Dimensions W x D x H / Weight	1235 x 1455 x 2500mm / 1500kg (Measuring Unit) 800 x 800 x 1400mm / 100kg (Control Unit)			
Table Surface Height	760mm			
Power Supply / Consumption	AC 100V to 240V±10%. Grounding required. 50/60Hz. / Approx. 1kVA			
Air Supply / Working Pressure / Consumption	0.35 to 0.7Mpa / 0.3Mpa / 30Nℓ/min			
Air Supply Connecting Port	One-touch pipe joint for tubes with Outer Diameter Ø 8mm hose			

RONDCOM 76A CNC Detector Rotating Roundness

Full Air Bearing Granite **RONDCOM 76A**

- Highest Rotation Accuracy in class: 0.1µm
- Column Straightness Accuracy: 1.3µm/700mm with 700mm long shaft measuring tool
- Air Bearings for X-, Y-, Z- and θ-axes
- Gabbro in column and base for top-class accuracy
- Fully Automatic 7-Axis Control
- XY Table and R-Axis Straightness Accuracy for parallelism evaluations of cylinder block bores
- Max Driving Speed: 100mm/s for efficiency
- ACCTEE fully automatic multiple workpieces meas
- Automatic Part-Program Call Function Option

Crankshaft

Cylinder block

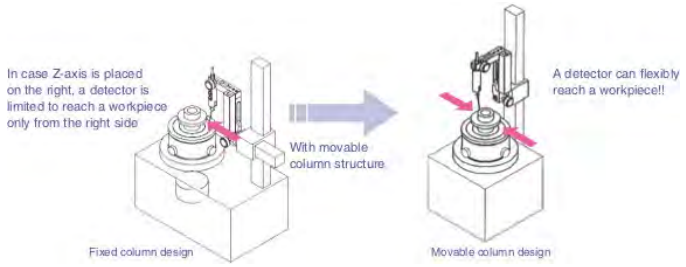
	Rondcom 76A			
Measuring Method	CNC and Manual			
Max Measuring Diameter / Loading Diameter	500mm / 980mm			
Feed Range	X-Axis Right-Left	Y-Axis Forth-Back	Z-Axis Up-Down	R-Axis
	700mm	200mm	1000mm	290mm
Radial Rotation Accuracy [1]	0.04+3H/10,000µm, 0.097µm (H=189), 0.13µm (H=314), 0.26µm (H=736)			
Axial Rotation Accuracy [1]	0.1+8R/10,000µm, 0.14µm (R=50), 0.18µm (R=100), 0.22µm (R=150)			
Angle Resolution Rotation Accuracy	0.025°			
Z-Axis Up-Down Straightness Accuracy	0.2+8L/10,000 x 1+S/1000µm			
R-Axis Radial Straightness Accuracy	0.5+L/300µm, 0.83µm (L=100), 1.47µm (L=290)			
X-Axis / Y-Axis Table Straightness Accuracy	X: 0.5µm/100mm, 1.6µm/700mm / Y: 0.5µm/100mm, 0.6µm/200mm			
X-Axis / Y-Axis / Z-Axis Position Display Res.	0.001mm			
Z-Axis and θ-Axis Parallelism Accuracy	0.8µm/200mm			
R-Axis Radial Parallelism Accuracy	1.0µm/200mm			
R-Axis Diameter Measuring Accuracy	3+5 (L+S)/1000µm			
θ-Axis Rotational Speed	2/min to 4/min (At automatic centering: 10/min)			
Z / X / Y / R Axes Measuring Speed	0.6mm/s to 10mm/s (At moving: Max 100mm/s)			
Auto-Stop Accuracy	±5µm (5mm/s or less)			
Table Dimensions W x D / Load	800 x 680mm / 200kg			
Table Centering / Tilt Range	(1/3 or less of measuring diameter) / ±1°			
Stylus Characteristics	±500µm range, 130mN meas. force, R0.25mm sapphire (Arm a) ±1000µm range, 65mN meas. force, R0.25mm sapphire (Arm b)			
Filter, θ-Axis Rotational / Z-Axis Rectilinear Cut-Off values and Measuring Items, Form Error Roundness Evaluation, Analysis Processing	See **ACCTEE Roundness Measurement Software**			
Display Magnification	50 to 100K, Auto, Measuring Magnification			
Display Colour Monitor / Items	17” LCD / Measuring conditions and parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.			
Recording System	Colour or Laser Printer			
Power Supply / Consumption	AC 100V to 240V±10%. Grounding required. 50/60Hz. / Approx. 1kVA			
Air Supply / Working Pressure / Consumption	0.5 to 0.7Mpa / 0.4Mpa / 160Nℓ/min			
Machine Dimensions W x D x H / Weight	2200 x 2050 x 3200mm / 6700kg (Measuring Unit) 800 x 800 x 1400mm / 100kg (Control Unit)			

[1] Per JISB7451-1997. For Accuracy Specifications, H: Height from mounting surface top stylus in mm; R: Radial length from center to stylus tip in mm. L: Measuring length in mm; and S: Height from mounting surface to stylus tip in mm.

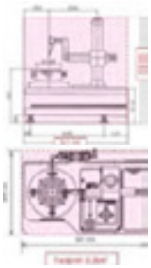
RONDCOM TOUCH Affordable Compact Roundness

- Compact Design and Small Footprint (Nearly Portable)!
- Only 320x410mm WxD (0.13m^2 footprint); 500mm height!
- Measures workpieces up to Ø 150mm and 15kg weight!
- Movable Column Design (Patented):
  - R-Axis can be moved from side to side
  - Z-Axis column can be moved from side to side
  - Flexibility to reach workpieces from both right and left sides
- Windows® Tablet with ACCTee software:
  - Measure anywhere on the shop floor
  - All necessary icons on one screen plus alignment assist function
  - Wireless and USB communications
- Automatic Detection of Gear Tooth Tip
- Very simple, quick setup

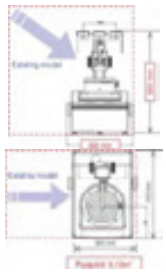
RONDCOM TOUCH



Movable column allows detector access from both sides



Conventional Model



Rondcom Touch

Rondcom Touch	
Measuring Method	Manual
Max Measuring Diameter / Loading Diameter	150mm / 240mm
R-Axis Right-Left / Z-Axis Up-Down Feed Range	Manual ±80mm / 162mm
Max Measuring Height	160mm
Radial Rotation Accuracy [1]	0.04+6H/10000µm (where H is measuring Height in mm)
Axial Rotation Accuracy [1]	0.04+6R/10000µm (where R is measuring Radius in mm)
θ-Axis Rotational Speed	6/min (fixed)
Rotary Table Outside Diameter / Load	Ø 148mm / 15kg
Rotary Table Centering/Tilt Range	Manual ±2mm / ±1° (fixed tilting fulcrum mechanism)
Stylus Characteristics	±400µm range , 70mN meas. force, Ø 1.6mm carbide ball, 17mm length
Data Processor	Windows® Touch Panel Tablet PC with Bluetooth® and USB 2.0 port loaded with ACCTEE R-TOUCH version
Digital Filter	Gaussian, Phase-compensation type 2RC, Spline, Robust (Spline)
θ-Axis Rotational Direction Lowpass	15, 50, 150, 500 peaks/rotation any value in range 15 to 500 peaks/rotation
θ-Axis Rotational Direction Bandpass	15 to 150, 15 to 500 peaks/rotation
Display Magnification	10 to 200K (22 stages), Auto
Roundness Evaluation of Form Error	MZC, LSC, MIC, MCC, N.C.
Rotation Direction	Roundness, flatness, concentricity, parallelism, coaxiality, squareness, thickness deviation, run-out
Analysis Processing Function	Notch function (level, angle, cursor), profile characteristic graph display (bearing area curve, amplitude density, power spectrum), Gear analysis
Special Function	Alignment Assist, Error Judgment, Security by Password
Recording System	Colour Printer Option
Power Supply / Consumption	AC 100V to 240V±10%. Grounding required. 50/60Hz. / Max 50VA
Air Supply / Working Pressure / Consumption	0.3 to 0.7Mpa / 0.25Mpa / 30Nℓ/min
Air Supply Connecting Port	One-touch pipe joint for tubes with Outer Diameter Ø 8mm hose
Machine Dimensions W x D x H / Weight	320 x 410 x 500mm / Approx. 26kg [2]

[1] Per JISB7451-1997; Accuracy guaranteed temperature at 15 – 30°C. [2] Excludes printer and tablet PC.

RONDCOM GRANDE CNC Roundness for Very Large, Heavy Parts

RONDCOM GRANDE

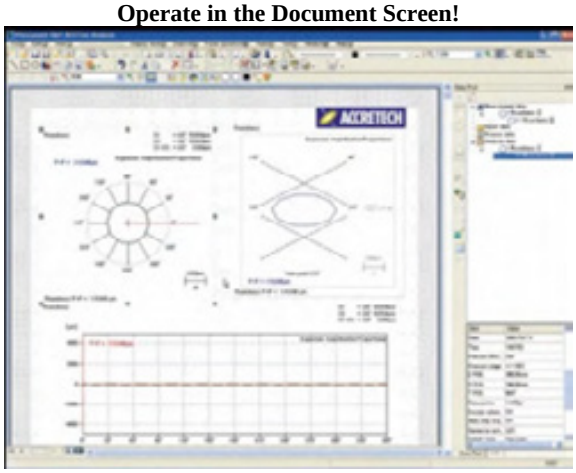
RONDCOM Grande DUO

Features: Incorporates new high precision air bearings. For wind energy generators and very large machine tool bearings. Flexible R-Axis able to also measure roughness and contour.

	Rondcom Grande	**Rondcom Grande Duo**
Measuring Method	CNC	
Max Measuring Diameter / Loading Diameter / Measuring Height	Ø 1650mm / Ø 2100mm / 500mm	
R-Axis Right-Left / Z-Axis Up-Down Feed Range	450mm/550mm	
Radial Rotation Accuracy	0.08+H/1000µm (H: Height from table surface in mm)	
Axial Rotation Accuracy	0.2+R/1000µm (R: Radius from table center in mm)	
Z-Axis Up-Down Straightness Accuracy	0.15µm/100mm, 0.5µm/490mm	
R-Axis Radial Straightness Accuracy	0.1µm/200mm, 2µm/400mm	
Z-Axis Up-Down Parallelism Accuracy	1.8µm/350mm	
R-Axis Radial Parallelism Accuracy	2µm/200mm	
Rotary Table Outside Diameter / Centering / Tilt Range / Load	1650mm / ±10mm / ±0.5° / Max 500kg	
Roughness Contour Up-Down Stroke	N/A	190mm
Roughness Contour Sensing Method		Optical Diffraction Scale
Roughness Contour Resolution		0.54nm
Roughness Contour Straightness Accuracy		0.3+L/1000µm
Permissible Eccentric Weight	10000kg/mm	

ACCTEE for Roundness Metrology

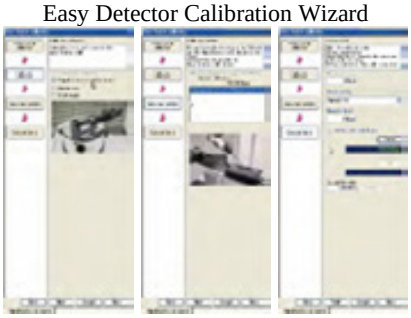
Operate in the Document Screen!



ACCTEE

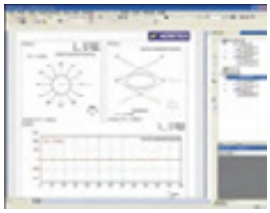
- Easy-to-Use Interface for Leading-Edge Operability
- Easy and Expert Modes
- Detector Calibration Wizard
- Change of Analysis Condition with Preview Function
- Gear Tip Analysis (Patented)
- Straightness Measurement Function with Edge Detection
- Help System. Self-Diagnosis Function

Easy Detector Calibration Wizard



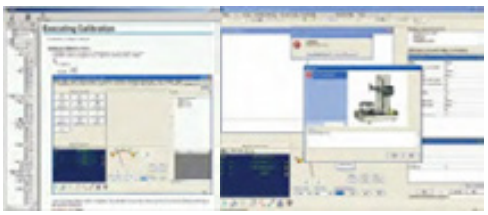
Select calibration artefact (depth/reference specimen or magnification cal unit), input condition ref value, installation method and measurement position to start!

Easy Mode



Expert Mode

Patented Gear Tip Analysis

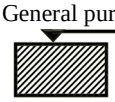
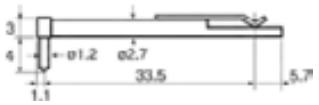
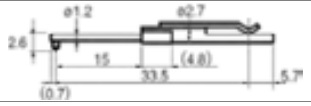
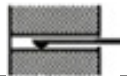
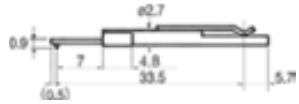
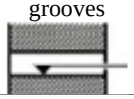
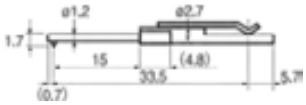
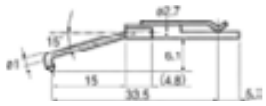
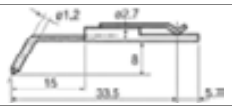
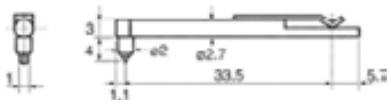
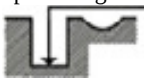
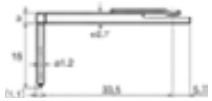
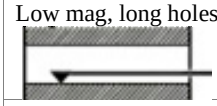
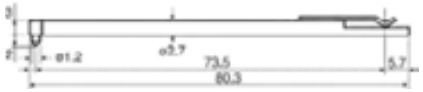
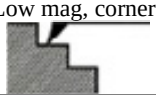
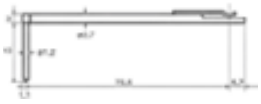
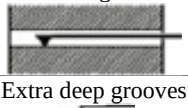
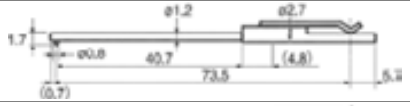
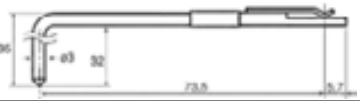


Self-Diagnosis Function

ACCTee Roundness Measurement and Analysis Program	
Digital Filter Types	Gaussian filter, phase compensation 2RC filter, spline and robust (spline) filters
θ-Axis Rotation Direction Cut-Off	Low Pass: 15, 50, 150, 500, 1500, any value from 15 to 1500 peaks/rotation
	Band Pass: 15 to 150, 15 to 500, 15 to 1500 peaks/rotation
Z-Axis Rectilinear Direction Cut-Off	Low Pass: 0.025, 0.08, 0.25, 0.8, 2.5, 8mm, settable in 0.0001mm units
Roundness Evaluation of Profile Error	MZC (min zone circle), LSC (least square circle), MIC (max inscribed circle), MCC (min circumscribed circle), N.C. (no correction), Multiple setting
Rotation Direction Measurement	Roundness, flatness, (+ compound), parallelism, concentricity, coaxiality, cylindricity, squareness, run-out, thickness variation, diameter deviation, radius, partial circle
Rectilinear Direction Measurement	Straightness (Z and R-Axis), diameter deviation, cylindricity, squareness, parallelism
	Also straightness with edge detecting function (for Rondcom 55, 60, 65, 73)
Detector	Polarity and automatic measurement direction distinction function
Master for Detector Calibration	Magnification calibration, block gauge, level difference master can be used
Calibration Support	Sets by the guidance wizard
Number of Sampling Points	14,400 points/rotation
Analysis Processing Functions	Display (2D, 3D, rectilinear expansion, parameters, measuring conditions), centering/tilting support, notch/gear tip analysis (level, angle, cursor), combination of roundness evaluation methods, nominal value collation, 3D cylinder profile display (line drawing, shading, contour line), real-time display, profile characteristic graph display (bearing area curve, amplitude distribution graph, power spectrum, Fourier table
	CNC automatic measuring, automatic centering/tilting adjustment (for CNC models)
Special Functions	Easy operation “Easy mode” / for CNC “Expert mode”, wide-range, security function by password, error self-diagnosis function

Replaceable Roughness / Profile Styli

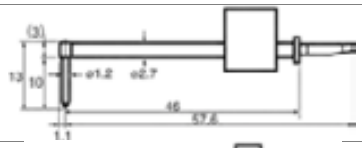
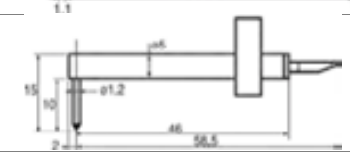
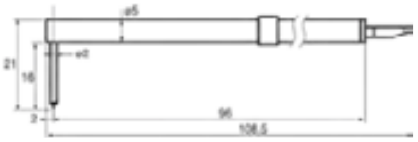
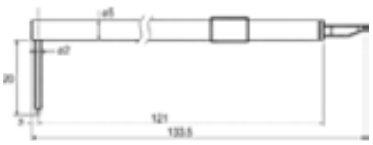
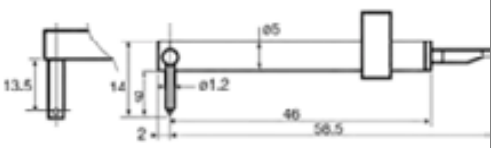
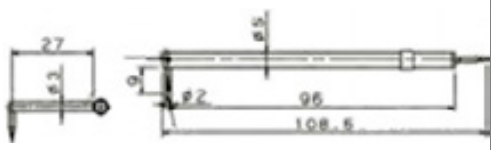
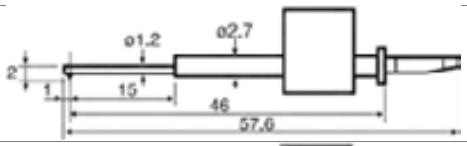
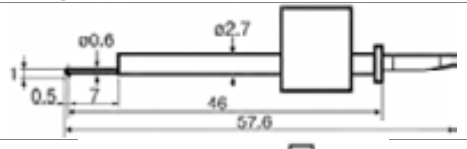
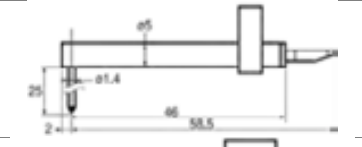
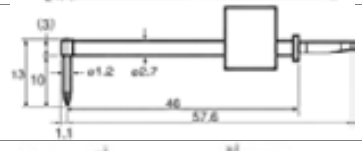
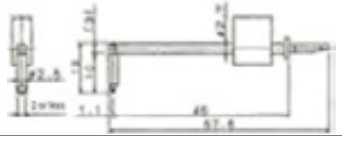
For Surfcom Touch Series / Surfcom 1400 / Surfcom NEX 001

Applications	Model	External view	Specifications	Remarks
General purpose 	DM43801		2µm radius, 60° Cone, Diamond, 0.75mN	• All orientations • Horizontal tracing possible • Standard accessory
Medium fine holes 	DM43809			• All orientations • Horizontal tracing possible
Extra fine holes, gear flank 	DM43811			
Fine holes/thin grooves 	DM43812[1]			
Hole bottom/conical surfaces 	DM43813			
Corners/tooth surfaces 	DM43814[1]			
Fine wires, knife edges 	DM43802		2µm radius, 60° Knife edge-shaped, Diamond, 0.75mN	• All orientations
Deep/round grooves 	DM43815[1]		2µm radius, 60° Cone, Diamond, 0.8mN	• Downward measurement • Large waveform distortion
Low mag, long holes 	DM43822[1]		2µm radius, 60° Cone Diamond, 3mN	• Downward measurement • Sensitivity: 1/2 • Mag: 20000x
Low mag, corners 	DM43824		2µm radius, 60° Cone, Diamond, 4mN	
Deep hole / O-ring groove bottom surfaces 	DM43825		2µm radius, 60° Cone, Diamond, 3.4mN	• Downward measurement • Sensitivity: 1/2 • Mag: 20000x • Large waveform distortion
Deep groove corners 	DM43827		2µm radius, 60° Cone, Diamond, 4mN	• Downward measurement • Sensitivity: 1/2 • Mag: 10000x
Fine long holes 	DM43821		2µm radius, 60° Cone, Diamond, 3mN	• Downward measurement • Sensitivity: 1/2 • Mag: 5000x • Large waveform distortion
Extra deep grooves 	DM43826		2µm radius, 60° Cone, Diamond, 4mN	

[1] Indicates stylus/nose piece set DM43800. Value of measuring force when E-DT-S03A/B / E-DT-SE19A/B / E-DT-SS01A/B / E-DT-SSE01A are mounted.

Replaceable Styli

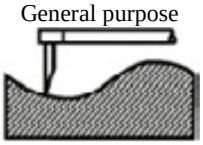
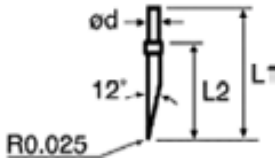
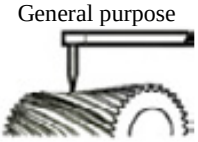
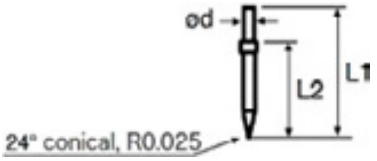
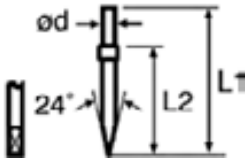
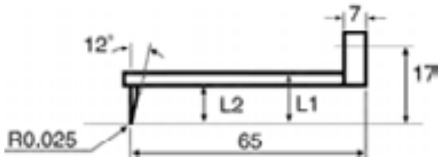
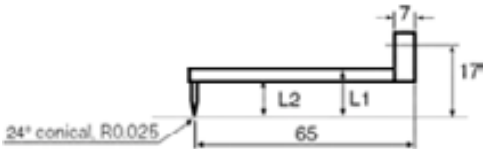
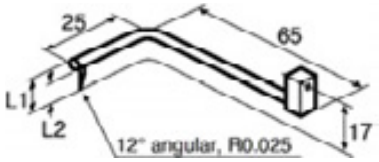
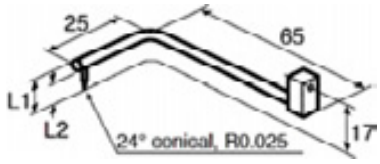
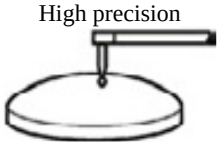
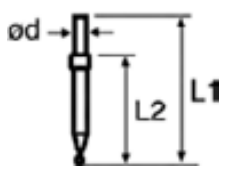
For Surfcom CREST / Surfcom NEX100

Applications	Model	External view	Specifications	Remarks
General purpose	DM48505		2µm radius, 60° Cone, Diamond, 0.75mN	• Stroke: 5mm (Surfcom NEX 100) Stroke: 13mm (Surfcom Crest) • For roughness and contour measurement
General purpose highly rigid stylus	DM84071			
Highly rigid stylus for contours 2X arm	DM48508		Ø 1 ruby ball, 0.75mN	• Stroke: 10mm (Surfcom NEX 100) Stroke: 26mm (Surfcom Crest) • For contour measurement only
Highly rigid stylus for contours 2.5X arm	DM48509		Ø 1 ruby ball, 3.2mN	• Stroke: 12.5mm (Surfcom NEX 100) Stroke: 32.5mm (Surfcom Crest) • For contour measurement Only
Offset measurement Stylus	DM48511		2µm radius, 60° Cone, Diamond, 0.75mN	• Stroke: 5mm (Surfcom NEX 100) Stroke: 13mm (Surfcom Crest) • For roughness and contour measurement
Offset measurement stylus 2X arm	DM48742		25µm radius, 24° conical carbide, 4mN or less	• Stroke: 10mm (Surfcom NEX 100) Stroke: 26mm (Surfcom Crest) • For contour measurement Only
Small hole stylus	DM48513		2µm radius, 60° Cone, Diamond, 0.75mN	• Stroke: 5mm (Surfcom NEX 100) Stroke: 13mm (Surfcom CREST) • For roughness and contour measurement
Extra small hole Stylus	DM48514			
Deep hole stylus	DM48515			
Stylus for fine contours	DM48588		5µm radius, 30° Cone, Diamond, 0.75mN	
Stylus for ridge/ tooth tip measurement	DM48774		2µm radius, 60° Knife edge-shaped Diamond, 0.75mN	

*Special stylus will be studied and proposed in accordance with customer's workpieces.

Contour Styli

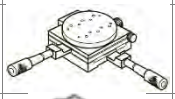
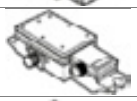
For Contourecord 1600 / Surfcom 1800

Applications	Model	External view	d	L1	L2	Applicable arm	Remarks
General purpose 	DM45501 [2]		3	60	52	010 2804	
	DM45502		3	34	26	010 2800	
	DM45503		2	21	13	010 2801	
General purpose 	DM45504 [2]		3	60	52	010 2804	Standard accessory
	DM45505 [3]		3	34	26	010 2800	
	DM45506		2	21	13	010 2801	
Edge line 	DM45507 [2]		3	60	52	010 2804	
	DM45508 [3]		3	34	26	010 2800	
	DM45509		2	21	13	010 2801	
Small holes 	DM45081		-	12	9	010 2802	
	DM45082		-	7	5		
	DM45083 [1]		-	3.5	1.5		
Small hole twist 	DM45084 [3]		-	12	9	010 2802	
	DM45085		-	7	5		
	DM45086 [1,3]		-	3.5	1.5		
Ordinary offset 	DM45087		-	12	9	010 2802	Offset: 25mm
	DM45088		-	7	5		
	DM45089 [1]		-	3.5	1.5		
Helix surface offset 	DM45090		-	12	9	010 2802	Offset: 25mm
	DM45091		-	7	5		
	DM45092 [1]		-	3.5	1.5		
High precision 	DM45522 [2]		3	60	52	010 2804	Ø 0.7 ruby ball
	DM45523		3	34	26	010 2800	
	DM45524		2	21	13	010 2801	
	DM45525 [2]		3	60	52	010 2804	Ø 1 ruby ball
	DM45526		3	34	26	010 2800	
	DM45527		2	21	13	010 2801	

[1] Requires master ball calibration unit for small holes. [2] Requires pickup holder joint. [3] Indicates stylus/arm set 010 2999.

Adjustment Devices

For All Surfcom Series

Name	Model	External view	Orthogonal axis adjustment (mm)			Swivel adj.		Tilt adj.		Table size mm	Load/ Weight in kg	Remarks
			X	Y	Z	Fine	Coarse	Fine	Coarse			
Adjustment Stand	E-AT-S01D		50	50	-	8°	360°	-	-	Ø 150	20 / 7	Min reading increment 10µm
Leveling Adjt. Stand	E-AT-S02A		-	-	-	-	-	±1.5°	-	80×110	15 / 3	
Adjustment Stand	E-AT-S03A		-	±2.5	-	±2°	-	-	-	80×58	3 / 0.9	For E-RM-S75A/B
	E-AT-S04A		-	±8	-	±3°	-	-	-	80×125	15 / 8	
	E-AT-S05A		-	±3	-	±1°	-	-	-	120×58	3 / 1.4	For E-RM-S76A/B
X-direction movement Adjt. Stand	E-AT-S08A		400	-	-	-	-	-	-	150×150	20 / 25	-
3D fine Adjt. Stand	E-AT-S10B		50	50	30	-	-	-	-	76×76	1.6 / 5	Straightness 0.03mm
1-axis precision fine Adjt. Stand	E-AT-S11B		-	50	-	-	-	-	-	125×150	20 / 4.9	Straightness 3µm. Min reading: 10µm
Swivel fine rotation stand	E-AT-S12B		-	-	-	±5°	360°	-	-	Ø 90	3 / 0.58	Min reading: 5’
Tilting stand	E-AT-S64B		-	-	-	-	-	±20°	-	60×120	10 / 1	Min reading: 5’
Universal stand	E-WJ-S03A		-	-	-	-	360°	-	±90°	Ø 110	3 / 2.5	X/Y-direction adj.
Column spacer	E-CS-S32A [1] E-CS-S77A [3]		-	-	H:200	-	-	-	-	-	-	Set between table and column
Tracing driver spacer	E-CS-S33A [1]		-	L : 70	-	-	-	-	-	-	-	Set between column and tracing driver
Column rotary spacer	E-CS-S31A [1] E-CS-S76A [3]		-	-	H: 100	-	360°	-	-	-	-	Set between table and column
Tracing driver tilting device	E-CA-S32A [2] E-CA-S101A [3]		-	-	-	-	-	-	±5°	-	- / 5	For roughness

[1] Cannot be used with S3000A Series and S5000 Series.

[2] For S1400D, S1800D, S2800E, C1600D, C2600E.

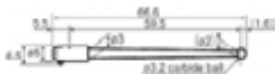
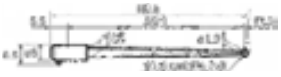
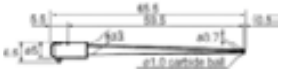
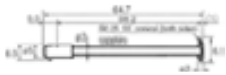
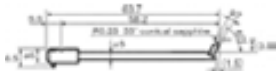
[3] For the Linear Series and S1400G, C1600G, S1800G, C2600G, and S2800G Series, S TOUCH 550, S480.

[4] For the NEX Series, Linear Series, and 1400G, 1600G, 1800G, 2600G, and 2800G Series.

[5] For the NEX Series.

TABLE ROTATING RONDCOM STYLI

For Rondcom 31 / 41 / 43 / NEX / NEX α / NEX Rs / NEX Rs α / 60A / 65B

Application	Model with External View		Specifications
	1:1 Standard Sensitivity L = 59.5mm	1.5:1 Sensitivity L = 97mm	
General Purpose	 EM46000-S300	 EM46100-S300	Ø 3.2mm Carbide ball
	 EM46000-S302	 EM46100-S302	Ø 1.6mm Carbide ball
Small Holes	 EM46000-S301	 EM46100-S301	Ø 1mm Carbide ball
Grooves	 EM46000-S303	 EM46100-S303	R0.25mm, 55° conical Sapphire, L-type, L = 4.5mm
	 EM46000-S306	 EM46100-S306	R0.25mm, 55° conical Sapphire, T-type, L = 6.5mm
	 EM46000-S307	 EM46100-S307	R0.25mm, 55° conical Sapphire, T-type, L = 10mm
Deep Grooves	 EM46000-S304	 EM46100-S304	R0.25mm, 55° conical Sapphire, L-type, L = 10mm
	 EM46000-S308	 EM46100-S308	R0.25mm, 55° conical Sapphire, T-type, L = 20mm
Corners	 EM46000-S305	 EM46100-S305	R0.25mm, 55° conical Sapphire, L-type, L = 3.4mm/60°
Extra Small Holes	 EM46000-S309	 EM46100-S309	Ø 0.5mm Carbide ball
Cutter Mark Removal	 EM46000-S310	 EM46100-S310	R0.25mm Sapphire, L type, L = 4.8mm/R15mm

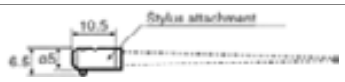
2:1 Sensitivity		
Stylus Attachment	 EM-59103-S001	Used when 2: 1 stylus for detectors E-DT-R32A/-R74A is mounted

TABLE ROTATING RONDCOM STYLI

For Rondcom 31 / 41 / 43 / Touch / 60A / 65B

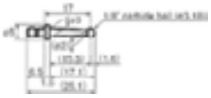
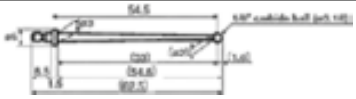
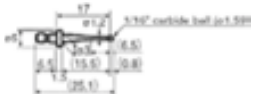
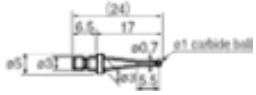
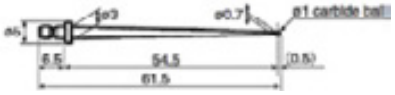
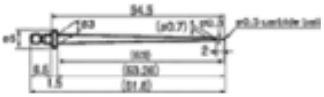
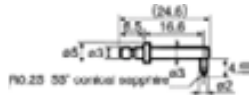
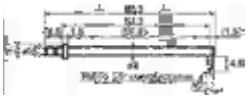
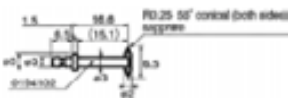
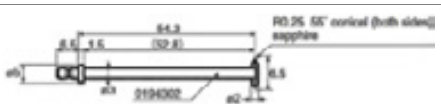
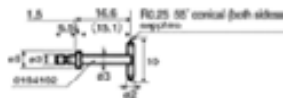
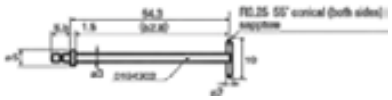
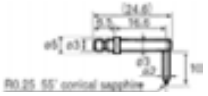
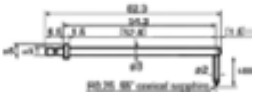
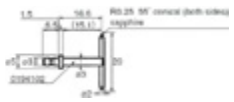
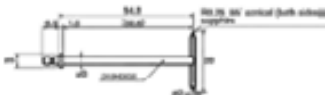
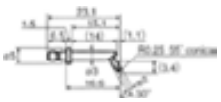
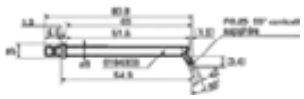
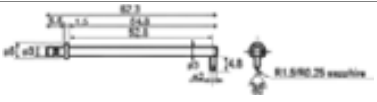
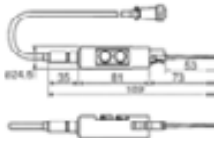
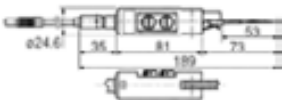
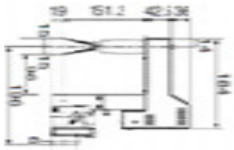
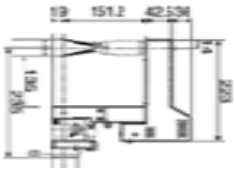
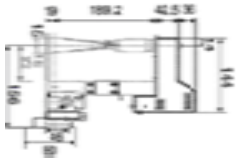
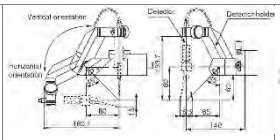
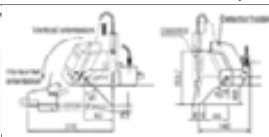
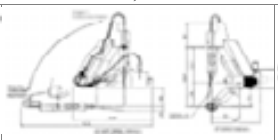
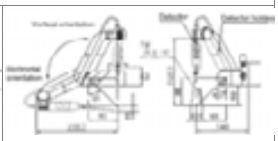
Application	Model with External View		Specifications
	1:1 Standard Sensitivity L = 17mm	2:1 Sensitivity L = 54mm	
General Purpose	 0194 000	 0194 200	Ø 3.2mm Carbide ball
	 0194 002	 0194 202	Ø 1.6mm Carbide ball Standard stylus
Small Holes	 0194 001	 0194 201	Ø 1mm Carbide ball
Extra small holes	 0194 009	 0194 209	Ø 0.5mm Carbide ball
Grooves	 0194 003	 0194 203	R0.25mm, 55° conical Sapphire, L-type, L = 4.5mm
	 0194 006	 0194 206	R0.25mm, 55° conical Sapphire, T-type, L = 6.5mm
	 0194 007	 0194 207	R0.25mm, 55° conical Sapphire, T-type, L = 10mm
Deep Grooves	 0194 004	 0194 204	R0.25mm, 55° conical Sapphire, L-type, L = 10mm
	 0194 008	 0194 208	R0.25mm, 55° conical Sapphire, T-type, L = 20mm
Corners	 0194 005	 0194 205	R0.25mm, 55° conical Sapphire, L-type, L = 3.4mm/30°
Cutter Mark Removal	 0194 010	 0194 210	R0.25mm Sapphire, L type, L = 4.8mm/R15mm

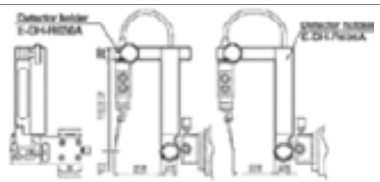
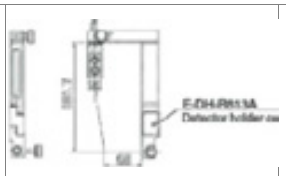
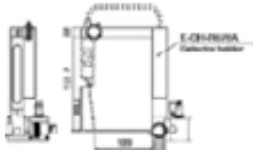
TABLE ROTATING RONDCOM DETECTORS/HOLDERS

For All Rondcom Series

General Purpose Detectors			
Model with External View	 E-DT-R83B and –R95B		 E-DT-R120B
Applicable for	E-DT-R83B for R47/55/60A/65B with detector safety device	E-DT-R95B for R31/41/43	R55/60A/65B with E-DH-669B; R NEX/α/Rs/Rs α with E-DH-R749B/R774B/R770C
Specifications	Meas. Range: ±1000µm; Meas. Force: 30 to 100mN; Front adjust mechanism: ID/OD switch function		

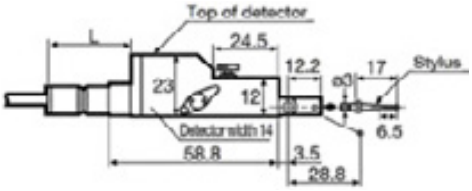
CNC Detector Holders (for E-DT-R120B)				
Model with External View	 E-DH-R665B and -R669B	 E-DH-R720B	 E-DH-R677B	 E-DH-R690A
Applicable for	E-DH-R665B for R60A/R65B and E-DH-R669B for R55	R60A/R65B [1] + 30mm EE74023 combi link cable	R60A/R65B + 70mm EE74017 combi link cable	R55/R60A/R65B + 30mm EE74023 combi link and EE74022 holder cable
Throat Height	151mm			189mm
Throat Depth	55mm	96mm	135mm	55mm
Others		Magnification: ≤ 10000x	Magnification: ≤ 5000x. For Stylus Sensitivity: 1.5:1	

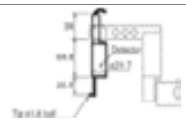
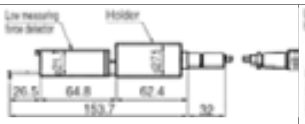
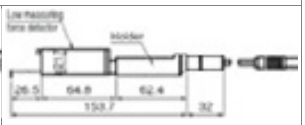
Offset Detector Holders (for E-DT-R120B)				
Model with External View	 E-DH-R749B/(R845A)	 E-DH-R770C/(RB28C)	 E-DH-R779B/(R892A)	 E-DH-R774B/(R900B)
Throat Height	153mm		191mm	
Throat Depth	65mm			
Operation	Manual	CNC		
Others			filter 15, 50 peaks/rotation for stylus sensitivity 1.5:1	
Applicable for	R54. R55, R60A and R65B with horizontal feed device. Rondcom NEX (-R845A, -RB28C, -R892A, -RB30B)			

Manual Detector Holders				
Model with External View	 E-DH-R636B/-R603B	E-DH-R618A	 E-DH-R613A	 E-DH-R678A
Applicable for	R636B for R47/55/R65B [1] R603B for 60A	R31/R41/R43 [2]	R47/R55/R60A/R65B [1] and R31/R41/R43 [2]	
Throat Height	154mm		192mm	
Throat Depth	68mm			120mm
Others		Magnification: ≤ 5000x. For Stylus Sensitivity: 1.5:1		

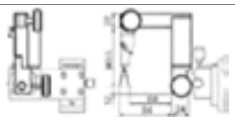
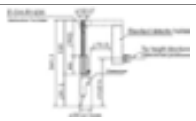
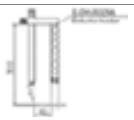
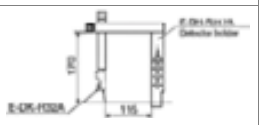
[1] With detectors E-DT-R83B, E-DT-R173B, E-DT-R120B, E-DT-R168C. [2] With detector E-DT-R95B.

TABLE ROTATING RONDCOM DETECTORS/HOLDERS

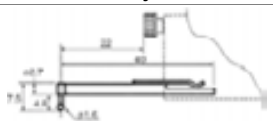
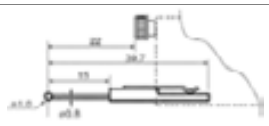
General Purpose Detector		
Model with External View	 E-DT-R32B and -R272C	R32A: L = 25mm R74A: L = 45mm E-DT-R74B
Applicable for	E-DT-R32B for R30/R31/R40/R41/R43 and E-DT-R272C for R Touch	R47/R55/R60A/R65B
Specifications	Meas. Range: ±400µm; Meas. Force: 70mN; Front adjust mechanism: ID/OD switch function	Meas. Range: ±800µm; Meas. Force: 70mN; Front adjust mechanism: ID/OD switch function
Option	Stylus: Ø 1.6 carbide ball (0194 002)	

Low Measuring Force Detector				
Model with External View	 E-DT-R10B	E-DT-R87B	 E-DT-R173B	 E-DT-R168C
Applicable for	R30/R31/R40/R41/R43 [1]	R47/R55/R60A/R65B [1,2]	R47/R55/R65B [3], R55/R65B [3,6,7], R60A [4], R60A [4,6,7]	R55/R65A [3,6], R60A [4,6], R44/R54 [5]
Specifications	Meas. Range: ±400µm; Meas. Force: 5mN			

[1] Stylus: Ø 1.6 ruby ball (010 2505) with cable length 1.5m. [2] with detector holder E-DH-R639A and C46 adapter (cable length 0.5m). [3] With holder E-DH-R636B. [4] with holder E-DH-R603B. [5] with offset holder E-DH-R749B. [6] With CNC holder. [7] With C6L6 conversion adapter.

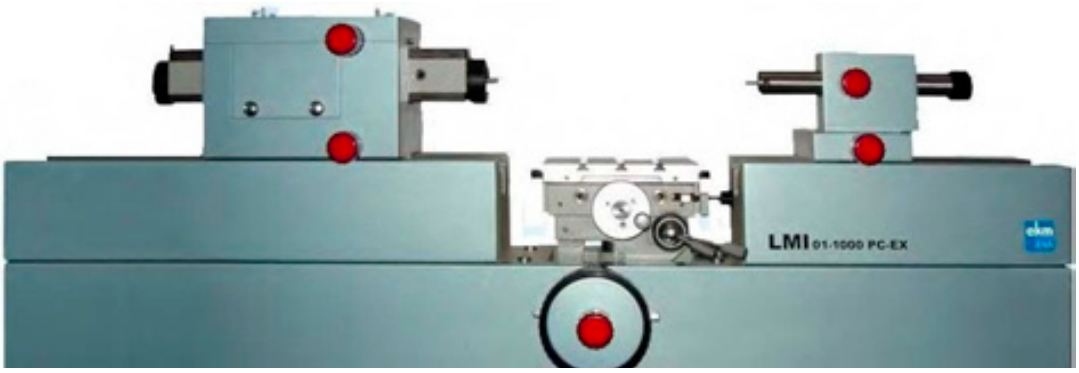
Detector Holders					
Model with External View	 E-DH-R639A and -R384A	E-DH-R617A	 E-DH-R149B	 E-DH-R329A	 E-DH-R317A
Applicable for	R639A for R47/R55/R65B [1,3], R384A for R60A	R31/R41/R43 [2,4]	R31/R41/R43/R47/R55/R60A/R65B [1,2]		R60A [1]
Throat Height	90.1mm			300mm	170mm
Throat Depth	68mm			60mm	115mm
ID / ID Meas. Range			Ø 31mm	≥ Ø 31mm / Ø 16 to 300mm	Ø 20 to 300mm
Magnification			≤ 2000x	≤ 1000x	≤ 2000x
Stylus Sensitivity			1:1	1:1 to 3:1	

[1] With detector E-DT-R74B. [2] With detector E-DT-R32B. [3] With detector E-DT-R87B. [4] With detector E-DT-R10B.

Stylus for Low Measuring Force Detector		
Model with External View	 General Purpose Stylus 010 2505	 Small Hole Stylus 010 2516
Applicable for	E-DT-R10B, -R87B, -R172B, -R173B, -R168C	
	Stylus: Ø 1.6mm ruby ball	Stylus: Ø 1mm ruby ball

LMI 01-400 / 680 / 1000 PC Universal Length Metrology Instrument

For accurate length measurements and inspection tools calibration



LMI 01-1000 PC-EX

Universal Length Measuring Instrument available in 400, 680 and 1000mm range

Calibration of plug/pin gauge

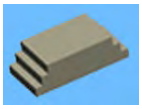
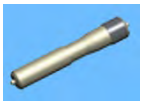
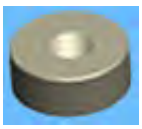
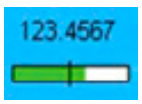
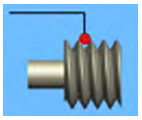
Calibration of slip gauge

Calibration of ring gauge ID

- USB interface plus a retrofitted model
- LMI-MS for Windows® 10 software
- Digital axis in X, Y and Z
- 3D mode for gauges with parallel contact surfaces
- Motorized Z-Axis option / Granite bed option
- Software and kits available as retrofits for older systems

Calibration of thread ring gauge

Available Kits: For plain gauges (cylindrical plug, ring, taper and snap gauges), thread gauges, indicator tools (dial gauges, micrometers) and for measuring the diameter between/over balls/pins at gears and gear gauges.

	External Measurements D > 0mm		Taper External D > 0mm Internal D ≥ 1mm		Snap Gauges D ≥ 0.5mm
	Internal Measurements D ≥ 0.5mm		Dial Gauges / Indicators Range ≤ 100mm		Kits of Masters D ≥ 0mm
	External Threads d2 ≥ 0.8mm; P ≥ 0.2mm		Internal Micrometer Range ≤ 100mm		Taper Threads External d > 0mm Internal D ≥ M3
	Internal Threads D2 ≥ M3; P ≥ 0.45mm		External Micrometer D ≥ 25mm		General Measurements External d > 0mm Internal D ≥ 0.5mm
	Lead – External d2 ≥ 0.8mm; P ≥ 0.45mm Lead – Internal D2 ≥ 0.8mm; P ≥ 0.45mm		Gears & Serrations External MdK ≥ 7mm Internal MdK ≥ 15mm	New kits for large internal threads and for measuring forces up to 11N, and others on request	

AVX550 AVX CNC Automatic Vision Metrology System

- Innovative dual-optical feature that delivers accurate, fast measurement and throughput
- Dual camera inputs allow users to inspect parts at multiple levels without changing lenses or re-calibrating
- Large format platform stage: 550x400x250mm
- Metlogix™ M3 software with video edge detection is extremely user friendly and intuitive
- 24" touchscreen monitor and PC
- Dedicated 12:1 zoom optics with choice of 0.14x-4x telecentric optics
- Linear guide X-Y transport for ultra-smooth, high-speed positioning
- Ideal for large platform measurements uses in quality control labs in research engineering and manufacturing inspection processes, where large parts with intricate features need inspection

AVX550

	AVX550
System	CNC XY&Z Servo Motor Drive with CNC/Joystick Control
X x Y x Z Travel in mm	550mm x 400mm x 250mm
E2 X,Y Accuracy	2.5+5L/1000µm
E1 Z Accuracy	2.5+5L/1000µm
Scale Resolution	0.1µm
Max Sample Load	23kg
Multi-Sensor Compatible	Optic & Touch Probe
Base	Granite
Control System / Display	MetLogix M3 / 24” Touchscreen PC
Zoom Optics – Standard	12:1 (26X to 310X)
Telecentric Options	Choice of 4.0x, 2.0x, 1.0x, 0.8x, 0.5x, 0.3x (fixed or interchangeable), 0.14x (fixed)
Digital Video Camera	1.3MP with Zoom Lens, 5.0MP with Telecentric Lens
Illumination	LED (Surface Ring / Transmitted / Coaxial)
Options	Adjustable ergonomic work station including a compact control panel, CNC rotary axis fixtures, Renishaw touch probe kits and changing racks, Calibration standards, Part fixtures and work holding devices

AV/AV+ Automatic Vision Metrology

AV450

High resolution, excellent illumination, mechanically precise platforms plus MetLogix M3 DXF/FOV/CNC touchscreen metrology software combine to deliver fast, automated and reliable 2D and 3D (with add-on Renishaw touch probe) measurement and documentation. QC-CAL SPC can be added (option).

* FOV models available with 7 interchangeable and 1 fixed telecentric lens.

Rotary Stage

Part Holding Fixtures

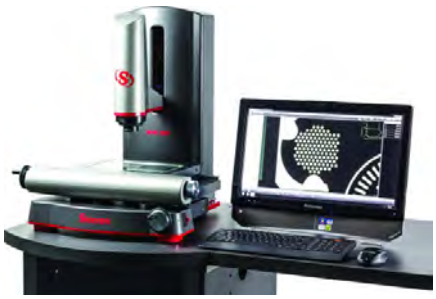
Renishaw Touch Probe Kit

Renishaw Changer Rack

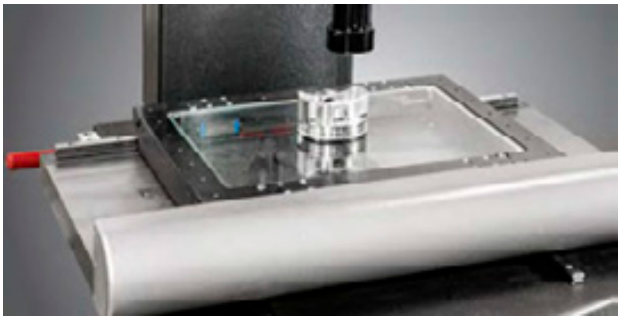
	AV350	AV450
System	CNC Z-Axis Measuring with Vertical Part View Orientation with CNC X-Y Stage	
X x Y x Z Travel in mm	350x350x200	450x350x200
E2 X,Y Accuracy	2.5+5L/1000µm	
E1 Z Accuracy	2.5+5L/1000µm	
Scale Resolution	0.1µm	
Multi-Sensor Compatible	Optic & Touch Probe	
Base	Granite	
Control System / Display	MetLogix M3 / 24” Touchscreen PC	
Zoom Optics – Standard	6.5:1 (31X to 198X); 12:1 (26X to 310X)	
Digital Video Camera	1.3MP Digital Colour	
Illumination	LED or Fibre Optic (Surface Ring / Transmitted / Optional Coaxial)	
Common Options	Auxiliary Lenses 0.5X, 1.5X, 2.0X, Rotary Fixture / Renishaw Touch Probe / Part Fixturing / Dark Field Quad Illumination (LED only)	
Video Pixel Cal Standard	Option	
Calibration Artefact Options	Calibration Standard; and FOV, Linear, 2D Calibration Standard	
Type	Floor Standing with Machine Pedestal and Point of Control Cart/Arm provided	
Dimensions WxDxH in mm	872x1143x1044	
Gross / Net Weight	579kg / 185kg	

[1] Workstation with swing arm may be purchased locally.

AVR CNC / **MVR** Manual Vision Metrology



MVR200



MVR stage

AVR300

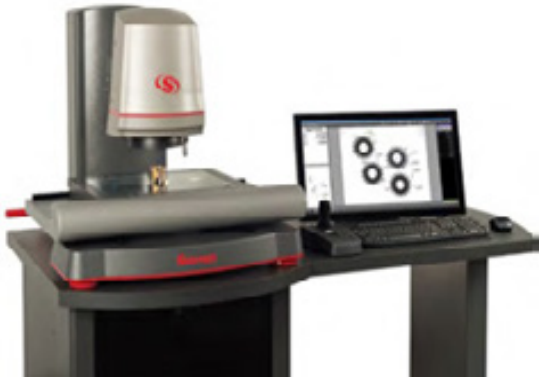
Ultra-low 0.001% distortion telecentric FOV measurements; Stable granite base; Recirculating ball linear guides for precise stage motion; automatic CAD comparisons and minimal external wiring: makes the AVR200/300 an ideal, affordable metrology tool. The manual MVR200/300 version is useful for short run individual measurements.

* FOV models available with 7 interchangeable and 1 fixed telecentric lens.

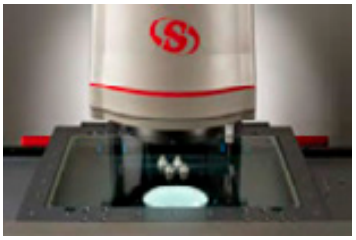
	MVR200	**MVR300**	**AVR200**	**AVR300**
System	Vertical Part View Orientation Bench Top System with Optional Workstation			
X x Y x Z Travel	200x100x200mm	300x200x200mm	200x100x200mm	300x200x200mm
E2 X,Y Accuracy	2.5+5L/1000µm		1.9+5L/1000µm	
E1 Z Accuracy	2.5+5L/1000µm			
Scale Resolution	0.5µm		0.1µm	
Base	Granite			
Control System / Display	MetLogix M3 / 21.5” Touchscreen PC			
Zoom Optics – Standard	6.5:1		6.5:1 – 2 LED; 12:1 – 3 LED	
Digital Video Camera	1.3MP Colour Standard: 2.0MP with Telecentric			
Surface Ring Illumination	LED			LED or Fibre Optic
Transmitted Illumination				
Coaxial Illumination Option				
Auxiliary Lens Options	0.5X, 1.5X, 2.0X			
AVR Options	N/A		Renishaw Touch Probe / Dark Field Quadrant Illumination (LED only)/ Rotary Fixture	
Common Options	Workstation Base, Extension and Swing Arm / Part Fixturing / Video Pixel Calibration Standard / Calibration Standards / FOV, Linear and 2D Calibration Standards			
Dimensions W x D x H	411 x 679 x 585mm	541 x 884 x 683mm	520 x 685 x 863mm	740 x 890 x 865mm
Gross / Net Weight	115kg / 90kg	135kg / 113kg	115kg / 66kg	135kg/ 102kg

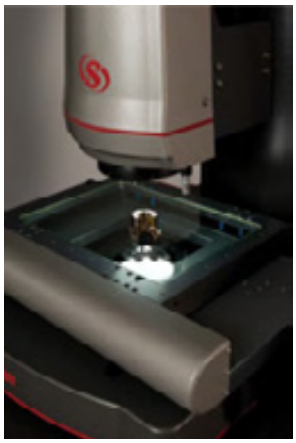
Optical Parameter	**Telecentric Lenses**						**AVR Zoom Optics**	**MVR Zoom Optics**	
							12:1	**6.5:1**	
Optical Magnification on CCD	**0.30x**	**0.50x**	**0.80x**	**1.0x**	**2.0x**	**4.0x**	**1.4x to 4.7x**	**0.47 to 3.0x**	**0.7 to 4.5x**
Total Magnification on Monitor	13x	22x	36x	45x	89x	178x	26x to 310x	31 to 200x	
Field of View Width	24mm	14mm	9mm	7mm	3.5mm	1.8mm	11 to 1.2mm	10 to 1.6mm	
Working Distance	110mm						86mm	88mm	
CCD Camera Array	1/1.8”						1/3”		1/1.8”

AVR FOV 0.14 CNC FOV Model



AVR FOV 0.14





A precision mechanical bearing X-Y-Z stage and column along with interchangeable telecentric lenses gathers data accurately and with repeatability via the MetLogix software. The compact bench top AVR FOV 0.14 is a rapid video-based FOV CNC measurement system that reduces measurement time and is ideal for quality assurance, inspection labs, manufacturing, assembly and research facilities.

	AVR FOV 0.14
System	Bench Top System
X x Y x Z Travel	300x200x200mm
E2 X,Y Accuracy	3.0+5L/1000µm
E1 Z Accuracy	3.5+5L/1000µm
Scale Resolution	0.1µm
Base	Granite
Control System / Display	MetLogix M3 / 24” Touchscreen PC
Digital Video Camera	6.0MP Monochrome
Illumination	LED (Surface Ring / Transmitted / Coaxial)
Options	Rotary Fixture, Renishaw Touch Probe, Workstation Base, Extension and Swing Arm, Part Fixturing, Video Pixel Calibration Standard, Calibration Standards

MVR/AVR FOV Specifications – with 2MP Camera and 24” Monitor and M3 Software

Telecentric Magnification	**0.14x**	**0.3x**	**0.5x**	**0.8x**	**1.0x**	**2.0x**	**4.0x**
Telecentric FOV	50x38mm	23x18mm	14x10mm	9x6.5mm	7x5.3mm	3.5x2.6mm	1.8x1.3mm
Optical Line Resolution on Monitor (Lines/mm)	20.1	17.9	14.3	11.3	8.0	5.0	4.0
Accuracy [1]	15.7µm	7.3µm	4.4µm	2.8µm	2.2µm	1.1µm	0.6µm
Magnification on Monitor	6.2x	13.2x	22x	35x	44x	89x	177x
Telecentric Working Distance	110mm (All Lenses)						
6.5:1 Manual Zoom Optics Mag	0.7x	1.0x	2.0x	3.0x	4.0x	4.5x	
Zoom FOV	9.6x8.90mm	7.2x6.1mm	3.7x3.0mm	2.4x2.0mm	1.8x1.4mm	1.5x1.3mm	
Magnification on Monitor [2]	29x	39x	80x	112x	160x	188x	

[1] Accuracy results are dependent on many variables. [2] Screen magnification is variable based on Best Fit setting in M3 software.

KMR Video Inspection Metrology

KMR 200

- 6 versatile, affordable inspection and metrology models
- Ideal for incoming QC, manufacturing, assembly and documentation
- Small features within FOV can be measured by software gauging without applying the 200mm stage motion for larger parts
- MetLogix M3 software with PC and 24” touchscreen monitor
- LED surface and transmitted illumination
- Small footprint

Model Type	-200-M3	-Zoom-M3	-FOV-M3-0.3x	-FOV-M3-0.5x	-FOV-M3-1.0x	-FOV-M3-0.14x
Optics	6.5:1 Zoom		Telecentric Lens			
CCD Sensor	1.33MP		2.02MP			5MP
Camera Interface	USB Cable					
Computer	PC					
Software	Metlogix ™ M3					
Video Screen	24" Touchscreen Monitor					
Screen Resolution	1920 x 1080					
Lens Magnification	0.7x to 4.5x Zoom Lens		0.3x	0.5x	1.0x	0.14x
Screen Magnification	31x to 200x		13x	22x	45x	4.7x
Auxiliary Lenses	0.5x, 2x		-			
Field of View Width	1.4mm to 9.0mm		24 mm	14mm	7.1mm	60mm
Field of View Height	1.1mm to 7.4mm		19mm	11mm	5.8mm	51mm
X-Y Stage Motion	200 x 100m	-				
Z Travel	125mm	-				
Metrology Means	X and Y Encoders	M3 FOV Software				
Measurement Resolution	0.5µm	Up to 2µm*				Up to 3µm*
Meas. Accuracy	2.5µm+5L/1000	Up to ±2.5µm*				Up to ±3µm*
Basic Stand	Standard					Milled
Boom Stand	N/A	Optional	-			
LED Back Light	Standard					Narrow Angle
LED Ring Light	Standard					Dome
Lighting Control	Via M3 Software					
Video Inspection	Yes					
Basic Dimensions	Yes, VED- FOV Stage Measurement					
Geometric Constructs	Yes					
Image Annotation	Yes					
Image Archiving	Yes					
Video Edge Detection	Yes					

* Best value achievable; actual values depend on zoom lens setting / selected telecentric lens.

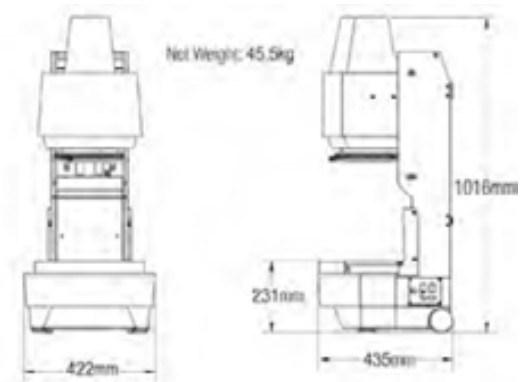
HVR-FLIP Digital Video Metrology *NEW!*

HVR-FLIP
Vertical format

- Flips between vertical and horizontal stand up depending on application
- Rapidly measure a single feature, an entire part, or multiple parts up to 3.65 x 3” with the HVR-Flip’s large FOV and working distance of 10”
- Metlogix M3 one-touch feature measurement with auto-detect part recognition, DXF import and export and “Part View” constructions
- Option modules: Profile fitting, wire insulation and thread measurement
- Compare complex profiles with discreet data points and CAD
- Geometric tolerancing with flexible report content and formatting
- Multi-language support

Horizontal format

HVR 100	
Field of View / Field of View Accuracy	92.7mm x 76.2mm / 0.01mm
Optical Magnification	0.090X
Total Magnification on Monitor	3X
Working Distance	254mm
Camera	5MP 2/3” CCD Monochromatic
Lighting	LED
Software	MetLogix M3 on Windows® operating system incl. 24” touchscreen monitor
Shipping Dimensions / Weight / Net Weight	122 x 66 x 78cm / 94kg / 45.5kg



HDV Series High Productivity Digital Video Comparator

- Supercharges traditional horizontal projector with new Field of View lens technology plus digital software gauging for highest productivity with accuracy
- Based on Starrett's renowned horizontal projector on rigid steel workstage
- Large FOV telecentric lens (62 x 47mm, 7µm res, better than 0.001% optical distortion) and mounted 5MP digital video camera for precise measurements
- MetLogix M3 software on Windows® 10 64-bit PC with 24" colour touchscreen
- All features in the FOV are digitally measured in split seconds!
- DXF file import for CAD nominal vs Video edge inspected image comparison

HDV300

	HDV300	HDV400	HDV500 CNC
System	Bench Top, with Horizontal Part View Orientation		
X x Y Measuring Range	300 x 150mm	400 x 150mm	500 x 200mm
CNC	Option		Standard
X,Y Accuracy	3.0+L/33µm		
Scale Resolution	0.5µm		
Base	Steel		
Control System	MetLogix M3		
Display	24" Touchscreen		42" Monitor
Telecentric Optics Choices	4.0X, 2.0X, 1.0X, 0.80X, 0.50X and 0.30X interchangeable lenses (Optional 0.14X fixed)		0.24X, 0.16X and 0.11X interchangeable lenses
Digital Video Camera	5MP Black and White		
Illumination	LED (Surface Ring Illumination / Transmitted Illumination)		
Options	Part Fixturing / Video Pixel Calibration Standard / Calibration Standards / FOV, Linear and 2D Calibration Standards / Cabinet Stand (Only HDV300 & 400)		
Workstage / Max Load Capacity	540 x 130mm / 50kg		540 x 130mm / 150kg
Gross / Net Weight	195kg / 118kg	200kg / 118kg	635kg / 600kg

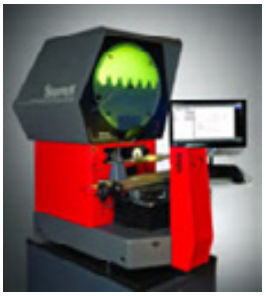
	Telecentric Lenses							6.5:1 Zoom Lens	
Optical Magnification	0.14x	0.30x	0.50x	0.80x	1.0x	2.0x	4.0x	0.7x	4.5x
Magnification on 24" Monitor	8.6x	18.5x	21x	49x	62x	124x	247x	58x	363x
Field of View Width	63mm	29mm	15mm	11mm	9mm	4.3mm	2.3mm	11mm	1.5mm
Working Distance	110mm						N/A	88mm	
Optical Distortion	0.001%		0.002%		0.005%		0.006%	N/A	

VB300 / 400 / HB / HD / HE400 Bench Top Profile Projectors

HB400

- Classic bench-top projectors with rigid, inherently stable construction for optimal performance and accuracy, expanded travel and measuring capacity
- New Measurement Functionalities and Efficiency from MetLogix Software
- Fully usable Ø 400mm screen with integral hood
- Precision workstage with machine slots for fixturing (horizontal projectors)
- Dual mirror design for vertically corrected image
- Rotary workstage helix adjustment/Fully retractable fibre optic surface illumination system/Dual fan-cooled lamps for VB400
- Fine adjustment all axes, zero back-lash, fast X-Axis traverse (HE/HB/HD/VB400)
- Motorised/CNC workstage options and wide choice of lenses and accessories

HE400



HD400

VB300

VB400

	HE400	HB400	HD400	VB400	VB300
Image Projection	Horizontal			Vertical	
Screen Diameter	Ø 400mm				Ø 300mm
X x Y Measuring Range	250x100mm	300x150mm	100x100mm	200x100mm	100x100mm
X x Y Measuring Range Option	N/A	400x150mm	N/A		
Linear Glass Scale Encoder	Standard on X and Y-Axis				
Motorized X-Y Axis / CNC Control	N/A	Optional		N/A	
Focus Range	30mm	50mm		100mm	90mm
Work Stage	475 x 120mm	540 x 130mm		400 x 225mm	225 x 225mm
Load / Max Load	6.8kg / 25kg	10kg / 50kg		10kg / 22.7kg	5kg / 6.8kg
Profile / Surface Illumination	Standard				
Quick Change Lens Mount	Single		Dual	Single	
Collimating Condenser	Standard with Yellow/Green Filter				
Control System	M1, M2	M1, M2, M3		M1, M2	
Display	15.6” Touchscreen PC, M1 with 7” tablet (also 21” Touchscreen PC or 24” Monitor for HB400 & HD400)				
Lenses – Screen Magnification	10X, 20X, 25X, 31.25X, 50X, 100X			10X, 20X, 25X, 50X, 100X	10X, 20X, 25X, 50X
Options	Optical Edge Detection / Precision Centers and Vees / Cabinet Stand 23” / Canopy and Curtains (except VB300)				
	Iris Diaphragm / Precision Rotary Vise / Vee Block on Rotary Base / Precision Fixed Vise / Glass Plate Work Holder / Cabinet Stand 32” / Digital Video Camera System (except HE400)			Helix Center Support System / Precision Rotary Work Stage	N/A

Lens Specifications / Screen Mag	10X	20X	25X	31.25X	50X	100X
Field of View Diameter	40mm	20mm	16mm	13mm	8mm	4mm
Working Distance	80mm	76mm	62mm	57mm	50mm	41mm

VF / HF / HS600 / HF / HS750 Floor Standing Profile Projectors

HS600

HS750

VF600

HF750

HF600

	VF600	HF600	HS600	HS750	HF750
Image Projection	Vertical	Horizontal			
Screen Mounting	Vertical		Side Bed		Vertical
Screen Diameter	Ø 600mm			Ø 750mm	
X x Y Measuring Range	200 x 100mm	300 x 200mm (500 x 200mm Option)			
Linear Glass Scale Encoder	Standard on X and Y-Axis				
Motorized X-Y Axis	Optional	Standard			
CNC Control	N/A	Optional			
Focus Range / Work Stage in mm	100 / 400 x 225	75 / 630 x 230			
Load / Max Load	10kg / 30kg	50kg / 150kg			
Quick Change Lens Mount	3 Lens Turret	4 Lens Turret		3 Lens Turret	
Control System / Display	M2, M3 / 21" Touchscreen PC or 24" Monitor				
Lenses – Screen Magnification	10X, 20X, 25X, 50X, 100X				
Standard	Profile/Surface Illum., Canopy/Curtains, Collimating Condenser with Yellow/Green Filter				
Optional	Optical Edge Detection / Precision Centers and Vees				
	Helix Center Support/Precision Rot. Workstage	Digital Video Camera System / Iris Diaphragm / Precision Rotary or Fixed Vise / Vee Block on Rotary Base / Glass Plate Work Holder			

Lens Specifications	VF600, HF600 and HS600					HF750/HS750				
Screen Magnification	**10X**	**20X**	**25X**	**50X**	**100X**	**10X**	**20X**	**25X**	**50X**	**100X**
Field of View Diameter	60mm	30mm	24mm	12mm	6mm	75mm	37.5mm	30mm	15mm	7.5mm
Working Distance	138mm	127mm	103mm	88mm	44mm	151mm	101mm	92mm	60mm	48mm

Optional Accessories

A – Large Centers and Vees
B, K, N – Rotary Vise
C – Magnification Checking Graticule
D, E, G – Centers and Vees
F – Helix Center Support Fixture
H, J – Vertical Glass Plate Holder
M – Rotary Work-stage
P – Universal Vee Block on Rotary Base
S – Cabinet Stand
T – Canopy and Curtains (* not shown)

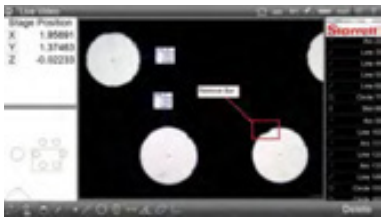
Mx Series *NEW!* Simple and Innovative Readout (Mx100 / Mx200)

- Simple and durable interface with large rubber buttons and intuitive operation
- Graphics-rich display providing instant information on feature form, tolerances, and measurement data on 7" color screen
- Optical edge detection on Mx200 provides better throughput and removes operator subjectivity
- MetLogix™ control readouts provide a broad range of powerful, user-friendly functions on a compact, icon-based touchscreen interface in place of the traditional control

Mx200

MetLogix M3 Touchscreen Software for Vision Systems

- Windows®-based multi-touch screen – pinch, swipe or touch to pan and zoom
- Works with active part views and live video feeds
- Advanced Video tool probe box, Edge touch and “Vtouch” video touch probe
- “Eye Measure” captures complex edges generated by touchscreen finger path
- “Measure Logic” instant touch feature determination and measurement
- “Quick Annotate” – displays data with smart marquee feature selection
- Industry-standard stage and camera calibration methods



Live video

Part view

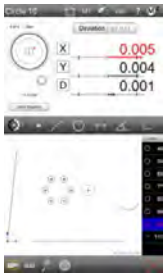
Tolerance

MetLogix M1/M2 for Optical Comparators

M2 for Optical Comparators

Crosshair

Report



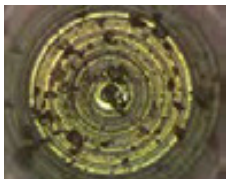
Geometric

- Touchscreen, large icon buttons and intuitive operation. Mounts and displays vertically/ horizontally
- X and Y Linear Axes and Q angular screen rotation Display. Easy part alignment and datum function
- Geometric tolerance and measurements: point, line, angle, distance, radius and diameter
- Teaching part programming – visually guides operators through repeated part measurements
- Optical edge detection (option) – reduces operator subjectivity
- Advanced crosshair “auto edge” probe toolbox captures points on edges automatically upon crossing
- M2 utilizes a Windows®-based operating system for flexible data export and interface capability
- M1 utilizes an Android™ operating system and a Bluetooth® connection to the host Optical Comparator

iNEXIV VMA Versatile Multi-Sensor Metrology

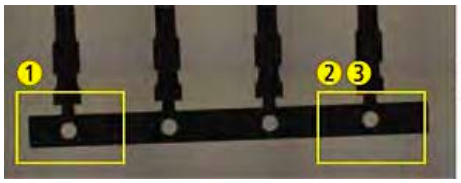
VMA-2520 VMA-4540 VMA-6555

- Generous 3D volume from wide 13x10mm FOV at 0.35x (for easy search and alignments),73.5mm robust working distance, 200mm Z-Axis stroke for large step heights to cover tall bosses or deep holes
- Available in 3 models covering 250x200mm to 650x550mm X-Y Range; Option for Renishaw® touch probe
- 10x zoom for high res accurate measurements. Excellent high 0.11 NA low distortion Apochromat objective lens
- Episcopic (top), diascopic (bottom) and 8-segment-ring (18º oblique angle) LED illumination for detecting low contrast edges. Factory Option for extended 1.5x magnification for minute parts
- Nikon's VMA AutoMeasure Software for easy setup, teaching, measurements and evaluations



Highly repeatable vision AF

Laser AF (option)



Intelligent search

	VMA-2520		VMA-4540		VMA-6555	
Measurement Range in mm	XY	Z	XY	Z	XY	Z
Measurement Range TP20	200 x 200	166	400 x 400	166	600 x 550	166
Measurement Range TP200		170		170		170
Measurement Range Vision AF	250 x 200	200	450 x 400	200	650 x 550	200
Measurement Range MCR20 [1] TP20	175 x 200	166	325 x 400	166	525 x 550	166
Measurement Range MCR20 [1] TP200		170		170		170
Measurement Range MCR20 [1] Vision AF	225 x 200	200	375 x 400	200	575 x 550	200
Minimum Readout	0.1µm					
Max Workpiece / Guaranteed Acc. Weight	15kg / 5kg		40kg / 20kg		50kg / 30kg	
Measurement Uncertainty [2] E_{UX}/E_{UY}	2+8L/1000 µm		2+6L/1000µm			
Measurement Uncertainty [2] E_{UXY}	3+8L/1000 µm		3+6L/1000µm			
Measurement Uncertainty [2] E_{UZ}	3+L/50 µm [3]		3+L/100µm [3]			
Camera	1/3" 3CCD color; Progressive scan (B/W Option)					
Working Distance	73.5mm (63mm with Laser AF)					
Magnification	Optical: 0.35 to 3.5x; On screen: 12 to 120x					
Field of View	13.3x10mm to 1.33x1mm					
Auto Focus	Vision AF; Laser AF Option					
Illumination	Contour and Surface: White LED; Oblique: 8-Segment White LED Ring					
Video Resolution	640x480 pixels					
Power Supply / Consumption	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz. / 5 to 2.5A					
Machine Dimensions WxDxH / Weight	565x690x740mm / 72kg		1000x1340x1553mm/500kg		1200x1640x1553mm/665kg	
Controller Dimensions WxDxH / Weight	145x400x390mm / 13kg		145x400x390mm / 13kg		145x400x390mm / 14kg	
Table Dimensions WxDxH / Weight	600x700x825mm / 38kg		Included in Main Body Weight			
Operational Environment	Temperature: 10 to 35°C; Humidity: 70% or less					

[1] The iNEXIV dedicated MCR20 can be used for both TP20 and TP200. [2] Nikon's in-house test at 20°C±0.5K, where L = Length in mm. [3] With Laser AF or Touch Probing.

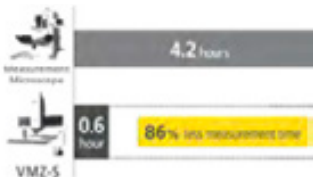
NEXIV VMZ-S Series *NEW!* Real-Time FOV Confocal Measurements

VMZ-S3020

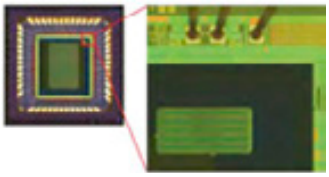
VMZ-S4540

VMZ-S6555

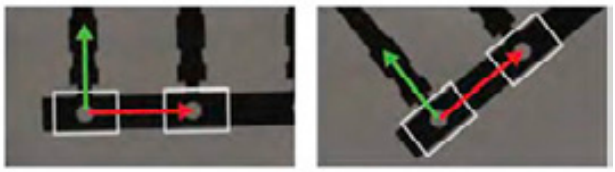
- Measure various samples in the expanding market of in-vehicle electronic components and semiconductors, as well as in precision machined and molded parts
- Nikon's proprietary linear encoder with 0.01µm resolution, built as standard into all axes to accurately detect linear position
- Improved measurement efficiency with image processing program and high-performance electric motor stage
- Eliminate operator measurement variations with highly repeatable measurements independent of operator subjectivity and experience
- Highly accurate, high speed height measurements made possible with the high accuracy TTL laser AF capable of high-speed scanning at 1000points/s
- Detect difficult edges and features with multiple illuminations
- Non-stop automatic measurements for various samples
- Easy to use, streamlined NEXIV AutoMeasure software suite
- Automation of the production floor with multiple NEXIV controls and integration



Significantly improved measurement efficiency



Capable of high resolutions at long working distance



Non-stop automatic measuring

Possible to measure difficult samples

	VMZ-S3020	VMZ-S4540	VMZ-S6555
Stroke XxYxZ Standard	300x200x200mm	450x400x200mm	650x550x200mm
Stroke XxYxZ TZ at Low Mag	250x200x200mm	400x400x200mm	600x550x200mm
Minimum Readout	0.01µm		
Maximum Workpiece Weight in kg	20 (Accuracy guaranteed: 5)	40 (Accuracy guaranteed: 20)	50 (Accuracy guaranteed: 30)
Measurement Uncertainty [1] E_{UX}/E_{UY}	1.2+4L/1000µm		
Measurement Uncertainty [1] E_{UXY}	2+4L/1000µm		
Measurement Uncertainty [1] E_{UZ}	1.2+5L/1000µm		
Probing Error [1, 2]	MPE P_{F2D} 0.8µm		
Probing Error of Imaging Probe [1, 2]	MPE P_{FV2D} 0.3µm		
Camera	Black & white / Colour 1/3 CMOS Camera		
Working Distance	Types 1-3: 50mm / Type 4: 30mm / Type TZ: 11mm / Type A: 73.5mm (63mm Laser AF)		
Autofocus	Laser AF (Option for Type A) / Image AF		
Laser AF Repeatability Range [1, 3]	$2\sigma \leq 0.5$µm		
Types 1, 2, 3 Illumination	Episcopic, diascopic, and 8-segment ring with 3 angles *All white LED		
Type 4 / A Illumination	Episcopic, diascopic, and 8-segment ring with 1 angle *All white LED		
Type TZ Illumination	Episcopic/darkfield for both Left/Right objective lens. Also diascopic for Right lens.		
Power Source / Consumption	AC 100 to 240V, 50/60Hz / 4 to 2A		
Dimensions WxDxH / Weight	700x730x1793mm / 265kg	1000x1340x1818mm / 510kg	1200x1640x1818mm / 740kg
Controller Dimensions/Weight	190x450x450 / 12kg		
Footprint	2700x2400mm	3000x3000mm	3200x3300mm

[1] Determined by Nikon in-house measurement method. [2] With 15x Type 2 head. [3] Workpiece: Chrome on calibration plate, without Type A head.
[4] Includes maintenance space.

NEXIV VMZ-H3030 High Precision NEXIV Model

Achieves Measurement at the Highest Precision of the NEXIV Series; Advanced Usability and Performance.

VMZ-H3030

- Highest precision NEXIV model at 0.6+2L/1000µm
- 5 types of optical zoom systems for different fields of view and resolution requirements
- 8-segment white LED ring illuminator with 3 incident angles to accurately capture edges
- Easy to use, streamlined software with customizable GUI and versatility
- Applications include molds, mechanical parts (household, automobile), PCB, electronic parts, ceramic parts, electronic parts, high density package substrate, and wafer pattern

VMZ-H3030 Specifications

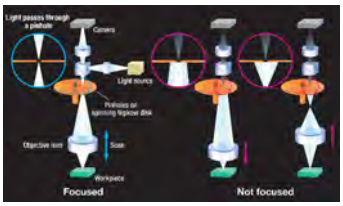
X x Y x Z Stroke	300 x 300 x 150mm
Minimum Readout	0.01µm
Maximum Sample Weight	30 kg (Accuracy guaranteed: 10kg)
Maximum Permissible Error (Samples <20kg)	$E_{UX,MPE}$, $E_{UY,MPE}$: 0.6 + 2L / 1000µm $E_{UXY,MPE}$: 0.9+3L / 1000µm $E_{UZ,MPE}$: 0.9+L / 15µm
Accuracy Guaranteed Temperature	20°C ± 0.5K
Maximum Driving Speed XY, Z	100mm/s, 50mm/s
Minimum Driving Speed XY, Z	0.01mm/s, 0.001mm/s
Camera	1/3“ Black and White CCD, 1/3“ Color CCD * Color camera option is available only with Type 1, 2 and 3
Working Distance	Type 1, 2, 3: 50mm (10mm when using 75° LED illumination) / Type 4: 30mm Type TZ: 31mm (low magnification), 11mm (high magnification)
Magnification and FOV	Type 1: 0.5-7.5x/9.33 x 7.01-0.622 x 0.467mm Type 2: 1-15x/4.67 x 3.5-0.311 x 0.233mm Type 3: 2-30x/2.33 x 1.75-0.155 x 0.117mm Type 4: 4-60x / 1.165 x 0.875-0.078 x 0.058mm Type TZ: 1-120x/4.67 x 3.5-0.039 x 0.029mm
Autofocus	Vision AF, Laser AF
Illumination	Type 1, 2, 3, and 4 Episcopic, diascopic, and 8-segment ring with 3 angles * All white LED/Type 4 has only 1 angle Type TZ: Episcopic, diascopic, darkfield
Power Source	AC 100 to 240V ± 10% 50/60Hz
Power Consumption	5 to 2.5A
Dimensions (W x D x H) / Weight	Main body with table: 1000 x 1125 x 1750mm / ~500kg Controller: 190 x 450 x 440mm / ~15kg
Footprint (W x D)	3000 x 2800mm

NEXIV VMZ-K Real-Time FOV Confocal Measurements

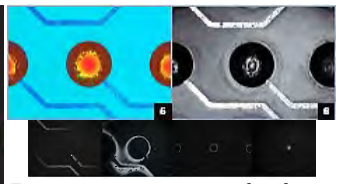
Multi-functional confocal video measuring with leading opto-mechatronics, brightfield with 15x zoom and TTL Laser AF for exceptionally fast and accurate 2D/3D inspections!

VMZ-K6555

- Simultaneous wide-area height measurements. 2D measurement with 15x brightfield zoom optics
- Handles 300mm Semicon wafers at fabs; measures complex structures such as bump heights on advanced IC packages, probe cards, precise glass micro lens, contact lens, laser marks on semicon wafers, MEMS, Wire bonding, etc.
- NWT-300 automatic 300mm wafer handling and OHT/RGV compatible – bumps and laser marks with on-line host coms; wafer retention via edge clamp or rear side vacuum method

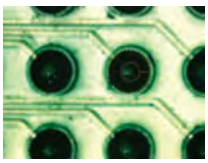


Original low flare confocal optics



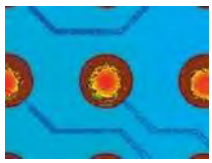
Z scan images reconstructed real time into 3D contour map and EDF images

Confocal Optics Principle – Light passing through a pinhole on a spinning Nipkow disk is reflected by the workpiece at the focal point back through the pinhole and detected as a very narrow DOF confocal image by the camera. Multiple images sampled as the focal plane is moved vertically are combined into a confocal image with height information via interpolation technology.



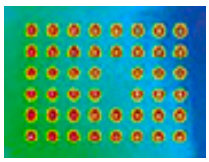
Bright Field

Confocal Image

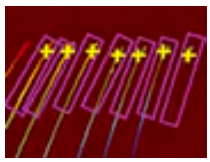


3D CF Image

EDF Image



CSP-Bump Ht/Size



Bonding Wire-Loop Ht

VMZ-K3040 / K6555 Specifications

Objectives	**3x**	**7.5x**	**15x**	**30x**
Objective Lens Working Distance	24mm	5mm	20mm	5mm
Confocal Optics Field of View	4x3mm	1.6x1.2mm	0.8x0.6mm	0.4x.3mm
Confocal Height Measure Repeatability (2σ)	0.35µm	0.25µm	0.25µm	0.20µm
Confocal Height Measurement Resolution	0.01µm			
Brightfield Optics 2D Measure Zoom Method	Motorized 5-step zoom			
Brightfield Optics Field of View	4x3 to 0.27x0.2mm	1.6x1.2 to 0.11x0.08mm	1.26x0.95 to 0.1x0.074mm	0.63x0.47 to 0.05x0.04mm
Illumination	White LED diascopic and episcopic illuminator for all types, White LED ring light for type 3x and 7.5x			
Auto Focus	Vision AF and TTL laser AF (Scan Mode available)			
X x Y x Z Stroke/Load Capacity	300 x 400 x 150mm / 20kg (VMZ-K3040) 300 x 400 x 150mm / 30kg (VMZ-K6555)			
Measurement Uncertainty [1] E_{UX}/E_{UY}	1.5+4L/1000µm			
Measurement Uncertainty [1] E_{UXY}	2.5+4L/1000µm			
Measurement Uncertainty [1] E_{UZ}	1+L/1000µm			
Machine Footprint / Weight	VMZ-K3040: 2500 x 1600mm / 850kg VMZ-K6555: 2500 x 1900mm / 830kg			
Power Supply / Consumption	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz. / 13 to 6.5A			
Operating Conditions	Temperature: 20°C ± 0.5K, Humidity: 70% or less			

[1] All measurement uncertainties are given in MPE per ISO 10360.

ECLIPSE LV-N Industrial Microscopes

- Modular – industrial applications including semiconductor devices, packaging, FPDs, electronic components, materials, and precision moulds
- New optical system and evolutionary features
- Four motorized and three manual dedicated reflected illumination and combined reflected/transmitted illumination observation types
- Nikon's unique high Numerical Aperture with long Working Distance now evolved with chromatic aberration correction and lighter weight
- Digital Sight System Camera 8.4" HD touch panel monitor allows digital image acquisition without a PC or computer monitor
- Option: nosepiece motorization for efficient image capture and observation
- Observation via brightfield, darkfield, polarizing, differential interference, epi-fluorescence and two-beam interferometry

Eclipse LV100ND

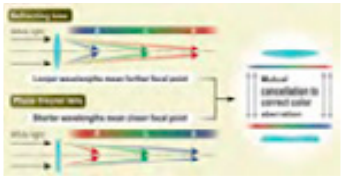
TU Plan ELWD Series

Universal standard objectives for brightfield, darkfield, simple/sensitive polarizing, differential interference, epi-flourescence

CFI L Plan EPI CR

Objective lenses with glass thickness correction for high contrast observation of cells or patterns, unaffected by glass substrate

Phase Fresnel Lens



Colour abberation correction with phase Fresnel lens enable longer working distances than with conventional lenses

	LV150N	LV150NA	LV100ND	LV100NDA
Max Sample Height	38mm (LVNU5AI U5AI nosepiece + LV-S32 3x2/LV-S64 6x4 stage) 73mm (one column riser)		38mm (LVNU5 U5 nosepiece + LV-S32 3x2/LV-S64 6x4 stage)	33mm (LVNU5AI U5AI nosepiece + LV-S32 3x2/LV-S64 6x4 stage)
Illumination	12V/50W Precentered lamphouse			
Base Unit	Left: coarse and fine adjustment; Right: fine adjustment, 40mm stroke; Coarse adjustment: 14mm/turn (with torque adjustment, refocusing mechanism); Fine adjustment: 0.1mm/turn (1µm/graduation)			
Nosepieces	C-N6 ESD; LV-NU5; LV-NBD5 BD; LV-NU5I	LV-NU5A; LV-NU5AC	C-N6 ESD; LV-NU5; LV-NBD5 BD; LV-NU5I; D-ND6	LV-NU5AI
Episcopic Illuminator	LV-UEPI-N; LV-UEPI2		LV-UEPI-N; LV-UEPI2	LV-UEPI2A
Diascopic Illuminator	-		LV-LH50PC	
Eyepiece Tubes	LV-TI3; LV-TT2 TT2; C-TB; P-TB; P-TT2		LV-TI3; LV-TT2 TT2; P-TB; P-TT2	
Stages	LV-S32 3x2; LV-S64 6x4; LV-S6 6x6		LV-S32 3x2; LV-S32SGH; LV-S64 6x4; LV-SRP P; NIU-CSRR2 Ni-U; C-SR2S	
Condensers	-		LWD Achromat, LV-CUD U dry, Achromat 2 to 100x slide, DF dry	
Eyepieces	CFI eyepiece series			
Objective Lenses	Industrial Microscope CFI60-2/CFI60 series objective lens: Combination in accordance with the method			
ESD Performance	1000 to 10V within 0.2sec (excluding certain accessories)			
Power Consumption	1.2A/75W			1.2A/90W
Weight	8.6kg	8.7kg	9.5kg	10kg

ECLIPSE MA100N/MA200 Flexible, Modular, Inverted Microscope

- Strong, compact, robust construction with dedicated LED illuminator providing long life, low power consumption and diffused illumination
- Long working distance as standard with CFI60-2 phase Fresnel lens
- Colour aberration correction for greatly reduced colour distortion and excellent image quality with CFI60-2
- Materials cast iron analysis according to JIS G5502, ASTM A247-06 and ISO945-1 standards with NIS-Elements Software
- Grain size analysis according to JIS G0551, ASTM E112-13, E1382-97, ISO643 and GB/T 6394 standards with NIS-Elements Software
- Ideal for metallurgical material inspection in many industrial applications

Nikon ECLIPSE MA100N

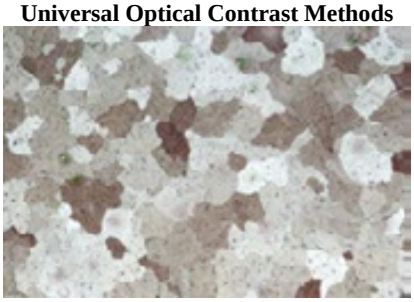
Modular Component Accessories

Selected optical components match the user's applications

Nikon CFI60-2 Optical Series

Provides long working distance capability with an advanced chromatic aberration correction system

Universal Optical Contrast Methods



Reflected light: brightfield, darkfield, polarising and differential interference contrast without the need for sample levelling

	MA100N	**MA200**
Optics	CFI60/CFI60-2 system	CFI60 /CFI60-2 system
Observation Image	Reversed image	Surface Image
Observation Method	Brightfield and polarization (with MA P/A simple polarizer/analyzer set)	Bright/Darkfield/Simple Polarizing/DIC/Epi-Fluorescence
Focusing	Focusing nosepiece (Fixed stage), coaxial coarse/fine adjustment knob with 8.5-mm stroke (Coarse adjustment of 37.7mm per turn, fine adjustment of 0.2mm per turn)	Focusing nosepiece (Fixed stage) Coaxial coarse/fine adjustment knob (torque adjustable) (Coarse adjustment of 4.0 mm per turn, fine adjustment of 0.2 mm per turn)
Nosepiece	Brightfield 5-position nosepiece	MA2-NUI5: Bright/Darkfield/ DIC 5 position nosepiece, LV-NU5A: Motorized Bright/Darkfield/DIC 5 position nosepiece/D-NID6: Brightfield 6 position nosepiece (Intelligent), D-NI7: Brightfield 7 position nosepiece (Intelligent)
Stage	MA-SR-N; MA-SP-N; TS2-S-SM	MA-SR
Illuminator	Internal power supply white LED light source, condenser built-in (lever operated), Ø25mm filter can be inserted	With flare prevention, Built-in UV cut filter Field diaphragm, Filter, Fluorescence filter blocks
Light distribution	-	Eyepiece tube/Back port: 100/0, 55/45
Binocular Body	Built-in Siedentopf binocular, 45 inclination angle and 50 to 75-mm interpupillary adjustment, attachable camera port, eyepiece/Port: 100/0:0/100	-
Trinocular Eyepiece		Siedentopf, interpupillary distance adjustment 50-75mm
Power Input		100-240 V, 50-60 Hz
Power Consumption	Max 15W	1.2A, 75W
External Dimensions	229x551x404mm (WxDxH)	439x521x428mm (WxDxH)
Weight	Approx. 10kg	Approx. 26 kg (depends on combination)

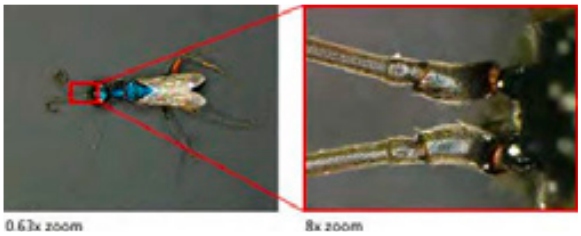
SMZ Versatile to Advanced Stereo Microscopes

- High mag hi-res observation of minute structures
- Improved chromatic aberration correction for bright, sharp images throughout viewfield through use of semi-Apochromat optics
- Ergonomic parallel optics to accommodate various observation attachments
- Wide zoom ratio of 8:1 for high res observation of 640LP/mm with high numerical aperture ED Plan Apo 2x/WF at max zoom
- Objectives available: From high-NA, high-res wide-viewfield Plan Apo WF with superior image and chromatic aberration correction to 0.75x low mag
- Double nosepiece for easy on-axis imaging, for observation of bottom of holes and distortion-free extended depth-of-focus imaging
- Wide range of accessories and controls

SMZ800N

- Highest-in-class 12.7x zoom for low mag. wide view field observation of a whole 35mm petri dish (with 1x objective at lowest mag) during screening and high-magnification observation of minute cell structures
- New WF objectives for uniformly bright images even at low magnification and wide viewfield observation when used with the SMZ1270/1270i
- New 0.75x objective, expanding the low magnification objectives lineup
- Apochromat optics for sharp images without blur or colour fringe
- On-axis observation with nosepiece. Ergonomic expandability with a wide range of accessories. OCC high contrast illumination of transparent samples
- Intelligent status readout – calibration automatically follows magnification changes to display correct scale and measured results on the images

SMZ1270i



	SMZ1270	SMZ1270i	SMZ800N
Optical System	Parallel-optics type (zooming type)		
Zoom Ratio	12.7:1		8:1
Zoom Range	0.63 to 8x		1 to 8x
Total Magnification [1]	3.15 to 480x		5 to 480x
With Co-ax Episcopic Illumination	15 to 540x		22.5 to 540x
Tubes	20° P-B Binocular Tube, 15° P-TL100 Trinocular Tube, 0 to 30° T-TERG 100 Trinocular Tilting Tube, P-TERG 50 Trinocular Tilting tube		
Eyepiece	C-W10xB (F.N. 22), C-W15x (F.N. 16), C-W20x (F.N. 12.5), C-W30x (F.N. 7)		
Objectives	Plan Apo (0.5x/WF, 0.75x/WF, 1x/WF), ED Plan (1.5x/WF, 2x/WF)		Plan Apo (0.5x/WF, 0.75x/WF, 1x/WF), ED Plan (1.5x/WF, 2x/WF, 0.75x) Plan 1x, Achro 0.5x
Working Distance	70mm (with Plan Apo 1x/WF)		78mm (with Plan 1x)
Machine Approx. Weight	9.8kg with Binocular Tube + LED diascopic stand	11.9kg with Trinoculor tilting tube + LED diascopic stand	6.8kg with Binocular tube + plain stand

[1] Depends on eyepiece and objectives.

SMZ745 / 745T / 445 / 460 Long Working Distance and Wide FOV

Features (for both SMZ745 / SMZ745T)

- 7.5x extremely high zoom range for broad observation
- Superior 115mm working distance with high zoom ratio and magnification
- SMZ745T Trinocular optical head ideal for monitoring and digital imaging
- Airtight, anti-mold, anti-electrostatic design for robust environments

SMZ745/SMZ745T

- SMZ445 (0.8 to 3.5x zoom magnification) or SMZ460 (0.7x to 3.0x zoom magnification), inclination angles of 45° or 60° respectively
- Diascopic/episcopic LED Stand to observe a wide range of specimens, from Petri dishes to plants, insects, small animals and minerals
- Auxiliary objective lens for a wider field of view and longer working distance – 0.5x (WD 181mm) and 0.7x (WD 127.5mm)
- Mold-resistant lens finish to withstand even hot, humid environments
- New All-In-One LED Stand. Other stand options: plain and diascopic stand S
- Achieve high quality images with superior flatness
- Multicoatings on lens surfaces provide clear, bright and high contrast images
- Long 100mm working distance for safe focusing of uneven specimens

SMZ445/SMZ460

	SMZ745	SMZ745T	SMZ445	SMZ460
Optical System	Greenough Type (Zooming Type)	Greenough Type (Zooming Type), Trinocular Tube	Twin zooming objective optical system. True erect image, 12º inner bevel, independent adjustment of right and left eyepieces, and 54 to 75mm interpupillary adjustment	
Zoom Ratio	7.5:1		4.4:1	4.3:1
Zoom Range	0.67-5x (with 0.67/1/2/3/4/5x stops)		0.8x to 3.5x	0.7x to 3x
Total Magnification [1]	3.35-300x (depending on eyepiece and auxiliary objective used)		8x to 35x (4x to 70x by replacing eyepiece and/or auxiliary objective lens)	7x to 30x (3.5x to 60x by replacing eyepiece and/or auxiliary objective lens)
Straight Tube	-	Built-in C-mount 0.55x magnification lens, compatible with 2/3 in. or smaller CCD	-	
Eyepiece Inclination	45º			60º
Eyepiece	C-W 10xB, C-W 15x, C-W 20x, C-W 30x		SM 10xB eyepieces (F.N. 21), SM 15xB eyepieces (F.N.14), SM 20xB eyepieces (F.N. 12)	
Auxiliary Objective Lens	G-AL 0.5x, G-AL 0.7x, G-AL 1.5x, G-AL 2x, G-AL ERG 0.77-1.06x		AL0.5x, 0.7x Option	
Working Distance	115mm		100mm (standard configuration), 127.5mm (AL0.7x), 181mm (AL0.5x)	
Zooming Body Weight	1.6kg	1.8kg	Approx. 1.0kg	

[1] Depends on eyepiece and objectives.

MM Next-Generation Measuring Microscopes

MM-200

MM-400

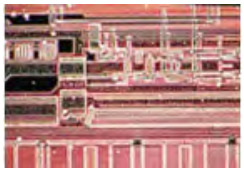
MM-800

- Accuracy; Digital Imaging and Vision Processing Metrology. Improved Body Strength for Larger Workpiece Stages. 3 Model Sizes for 2D or 3D, Monocular, Trinocular or Video Head, Z-Axis scale (manual or motorized), Variable Magnification, High Magnification and with choice of Nikon or third-party DRO or Software
- Non-Contact Z-height Measurements; Coordination with Data Processing Systems
- Optional TTL Laser AF and new Focusing Aid for more accurate Z-Axis focus and measurement
- Nikon Digital Camera Image Capture with E-Max auto-edge detection Metrology Software
- Stands with Integrated Controller interface to DP-E1 Data Processor, SC counters and E-Max software
- Choice of Manual or Motorized Illuminators with 12V/50W Halogen light option, 8-Segment LED Ring Light

LV-U EPI [1]	Universal Epi-Illuminator for brightfield, darkfield, simple polarizing, and DIC observations
LV-U EPI2 [1]	Universal Epi-Illuminator auto sets optimum illumination through shutter field and aperture diaphragm link
LV-U EPI2A [1]	Motorized Epi-Illuminator allows optimum image capture conditions
LV-U EPI FA	Universal Epi-Illuminator with Focusing Aid provides for greater Z-Axis accuracy
LV-EPI LED	White LED Illuminator maintains constant colour temperature to prevent adverse effects on measurement

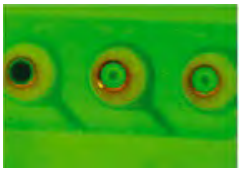
[1] TI-PS100W power supply required

Brightfield

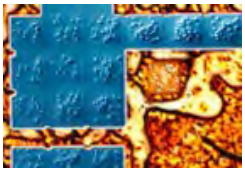


Darkfield

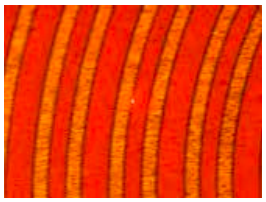
Brightfield



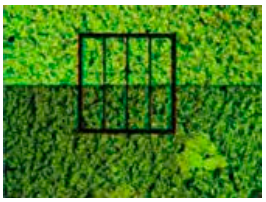
Epi-Fluorescence



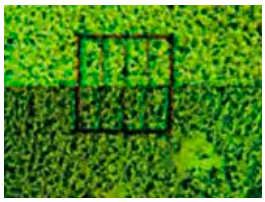
DIC



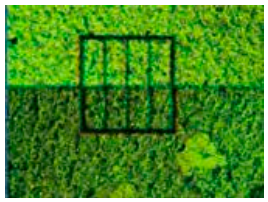
Laser AF Tracking on FPC



Front Focus



Focused



Rear Focus

New 300 x 200mm PS12x8C Stage

Controller Backpack IF

All White LED Illuminators

2D MM Series Measuring Microscopes Summary

MM-200	Compact, cost-effective, with monocular optical or C-mount video head
MM-800/400	Popular Sizes, with monocular/trinocular optical head
MM-800/400U	High Power Magnification for measuring fine geometries

* MM800/400/S instead of MM800/400 available for use with third party DRO (Quadra-Chek, MetLogix)

MM-200 Compact Shop Floor Measuring Microscopes

MM-200		
Optical Head	Monocular Eyepiece Tube	C-Mount Video Head
X x Y x Z Stroke	50x50x110mm	
Stage Accuracy	2.5+L/50µm (with LEC), 3+L/50µm (L=measurement length in mm)	
Scale Resolution	0.01/0.1(default)/1/10µm	
Max Sample Weight	2kg for guaranteed accuracy, 5kg for operation	
Magnification Accuracy	0.1%	
Objective Lenses (WD)	Standard: 3x (75.5mm), Optional: 1x (79mm), 5x (64mm), 10x (48mm)	
Illumination	Standard: diascopic/episcopic (white LED), Optional: 8-segmented ring light (white LED)	

MM800/400 and /U Measuring Microscopes

	MM-800/400	**MM-800/400/U**
Description / Application	Cost performance model for dies and molds, stamped parts, fine machined parts	High power magnification models for Semicon packages, MEMS, FPD, HDD
Z-Axis Movement	Manual (dual side coarse/fine focus knob)	
MM Controller Backpack I/F	Built-in	
Optical Heads	Monocular or Trinocular optical head	C-TB binocular tube, LV-T13 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube with built-in reticle
Eyepiece (all Field No 20)	Dedicated 10x	CFl10x, CFI10x CM
Objective	Measuring microscope objectives	CFI60-2 TU Plan Fluor EPI and Fluor BD series, and CFI60 L Plan EPI CR series
Diascopic Illumination	LED diascopic illuminator (standard), 12V/50W halogen light source (option) [1]	
Episcopic Illumination	LED episcopic illuminator	LV-EPI LED, LV-U EPI2A [1], LV-U EPI2 [1], U-EPI [1] and LV-U EPI FA

[1] TI-PS100W power supply needed.

MM – Basic Dimensions and Stages (2D and 3D)

	MM-200	**MM-400**	**MM-800**
Workpiece Measuring Height	110mm	150mm	200mm
Machine Dimensions [1] W x D x H	316 x 455 x 533mm	300 x 600 x 638mm	385 x 785 x 725mm
Machine Weight	40kg	50kg	72kg

Stages	**PS 2x2B**	**PS 4x4B**	**PS 6x4B**	**PS 8x6B**	**PS 10x6B**	**PS 12x8C**
Applicable Models	**MM-200, MM-400** and only **MM-800LV/LVFA**			All **MM-800 Models**		
X x Y Travel Stroke	50 x 50mm	100 x 100mm	150 x 100mm	200 x 150mm	250 x 150mm	300 x 200mm
Glass Stage Area	Ø 107mm	160 x 160mm	210 x 160mm	255 x 190mm	305 x 190mm	330 x 230mm
X-Y Table Surface	Ø 174mm	284 x 230mm	350 x 230mm	348 x 260mm	398 x 260mm	448 x 320mm
Scale	Linear Encoder, 0.0001mm Resolution (Min reading)					
Swivel Plate Rotation	360º	N/A		±3º		
Tool Installation	6-M6 depth 7	8-M6 depth 10		10-M6 depth 10	12-M6 depth 10	16-M6 depth 10
Max Sample Weight	5kg	15kg		20kg		
Approx. Stage Weight	15.5kg	23.5kg	27.5kg	49kg	52kg	67kg

[1] Dimensions are approximate, varying depending on stage selected. Applicable for both 2D and 3D Measuring Microscope systems.

3D MM Measuring Microscopes Summary

MM-800/400L	Built-in Z-Axis scale and Optional Focussing Aid
MM-800/400LU	Universal Epi-Illuminator and Optional 12V/50W halogen or LED light
MM-800/400LM	Motorized Z-Axis scale built-in and Optional Focussing Aid
MM-800/400LMU	High Power Magnification with Motorized Universal Epi-Illuminator

* Additional corresponding models with additional **S** suffix are for use with third party DRO (Quadra-Chek, MetLogix) or software; i.e. MM800/400/SU instead of MM800/400U; SL instead of L; and SLU instead of LU.

MM800/400/L, /LV, /LVFA and /LM 3D Measuring Microscopes

	MM-800/400/L	MM-800/400/LV	MM-800/400/LVFA	MM-800/400/LM
Z-Axis Movement	Manual (dual side coarse/fine focus knob)			Motor (max 10mm/s)
MM Controller Backpack I/F	Built-in	N/A		Built-in
Optical Heads	Monocular, Trinocular, Trinocular optical FA	Variable magnification optical head, Variable magnification optical FA head		Monocular, Trinocular, Trinocular optical FA
Z-Axis Linear Scale	Built-in	N/A		Built-in
Eyepiece	CFWN10x (Field No 20)			
Objective	Measuring microscope objectives			
Objective Lens Mag (WD)	N/A	1x (79mm), 3x (75mm), 5x (64mm), 10x (48mm), 20x (20mm), 50x (15mm), 100x (4mm)		N/A
Diascopic Illumination	LED diascopic illuminator (standard), 12V/50W halogen light source (option) [1]			
Episcopic Illumination	LED episcopic illuminator			

MM800/400/LU and /LMU High Power Mag 3D Measuring Microscopes

	MM-800/400/LU	MM-800/400/LMU
Description / Application	High power magnification models for Semicon packages, MEMS, FPD (LCM), HDD sliders	
Z-Axis Movement	Manual (dual side coarse/fine focus knob)	Motor (max speed 10mm/s)
MM Controller Backpack I/F	Built-in	
Optical Heads	C-TB binocular tube, LV-T13 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube	
Z-Axis Linear Scale	Built-in	
Eyepiece (all Field No 20)	CFI10x, CFI10x CM (Field No 20)	
Objective	CFI60-2 TU Plan Fluor EPI and TU Plan Fluor BD series, and CFI60 L Plan EPI CR series	
Diascopic Illumination	LED diascopic illuminator (standard), 12V/50W halogen light source (option) [1]	
Episcopic Illumination	LV-EPI LED, LV-U EPI2A [1], LV-U EPI2 [1], U-EPI [1] and LV-U EPI FA	

[1] TI-PS100W power supply required.

E-Max / DP-E1 / U-DP Measuring Software / Applications

E-Max

- Direct FOV measurements with automated video edge detection
- Supports illumination controls, motorized nosepiece, universal epi-illuminator, and TTL Laser AF controls
- Real-time dynamic data exchange SPC

DP-E1

- Graphical Feature Oriented Operation
- Measurement results automatically saved as teaching steps
- Improve accuracy and efficiency
- 0.1µm reading counter on 320x240 pixel LCD display

U-DP

- Browser-based metrology software compatible with PDAs
- Interactive icons and navigation enable immediate operation
- 2-1 skew alignment, point, circle and point to line distance measuring tools

Digimicro Series Digital Length Measuring System

- Available in 3 high accuracy models

		MF-1001	MF-501	MH-15M
Measurement Length		0 to 100mm	0 to 50mm	0 to 15mm
Minimum Reading	MFC-200	0.1µm (can be switched to 0.5µm or 1µm)		-
	TC-200	0.01µm (can be switched to 0.05µm, 0.1µm, 0.5µm, 1µm, 5µm)		
Guaranteed Accuracy at 20°C		3µm	1µm	0.7µm
Max Speed		500mm/s		100mm/s
Measuring Force		Down 1.23 to 1.81N Lateral 0.64 to 1.23N	Down 1.13 to 1.62N Lateral 0.64 to 1.23N	Up 0.25N Down 0.64N Lateral 0.44N
Operating Temperature		0 to 40°C		
Weight		480g	310g	220g
Compatible Counters		MFC-200, TC-200		TC-200
Compatible Stands		MS-12C, MS-22S, MS-32G, MS-41G		MS-51C

MF-501 + TC-200

MF-501 + MFC-200

Digital Sight 1000 *NEW!* All-in-One, High-Definition Model

- Equipped with 2MP CMOS sensor, displays at 30fps, captures, and saves FHD 1920x1080px images to the built-in SD card slot
- Built-in overlay scales and reticles
- Control and view easily with NIS-Elements L (tablet PC version)
- PC-Free Operation
- Standard functions: side by side image comparison, circle distance, parallel line, polygon display, calibration, scale bar, angles, concentric circles, freehand line, rectangle, coordinate data, measurement result storage, perpendicular distance, and line and circle display

Digital Sight 1000

DS-Fi3 Digital Cameras for Microscopes

- High resolution images with CMOS high density 5.9MP sensor
- USB3.0 data transfer for fast focusing with high resolution, and easy image capture in all types of observation contrast methods such as brightfield, darkfield, differential interference, and phase contrast
- Interfaces with PC computers via a USB3.0 interface directly to the camera head with NIS-Elements series software for image acquisition

DS-Fi3

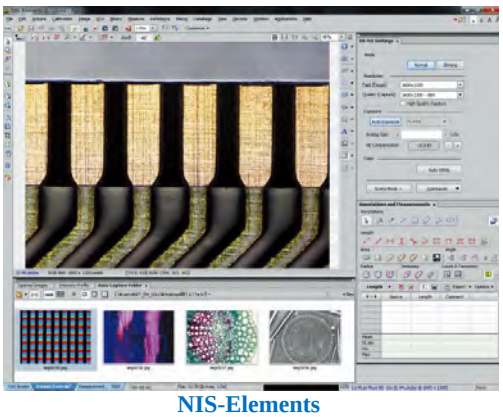
Digital Sight 10 Wide FOV at Ultra-High Definition 6K Resolution

- Enables unprecedented 6K ultra-high definition, capturing microscopic images at up to 6000x3984 pixels (23.9MP)
- Achieves up to 357fps directly from sensor area
- Easy switching between colour and monochrome modes using the imaging software by a motorized hands-free process

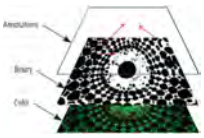
Digital Sight 10

NIS-Elements Total Software Solution for Image Capture, Archiving, Analysis

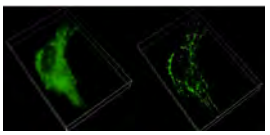
- Integrated Nikon comprehensive microscope control, image capture, analysis, documentation and data management
- Intuitive feature set / large multi-dimensional image files database
- 3 Packages: 1) AR for Advanced Research applications; 2) BR for Basic Research applications; and 3) D for colour Documentation for bioresearch, clinical and industrial applications
- Multi-layer structure for non-destructive archiving of image date
- Combine X, Y, Z, Wavelength, Time, and Multi Stage Points within one integrated platform for multi-dimensional imaging
- High accuracy Time Lapse Imaging capture without focus drift even for long experiments with motorized inverted microscope
- Large Image Acquisition generates high-mag wide FOV images via automatic stitching of multiple adjacent frames acquired with a motorized stage or from images captured from previous sessions
- High Dynamic Range Image Acquisition creates images with appropriate dark and bright regions brightness by combining images with different exposures or using multiple images
- Deconvolution options to remove fluorescence image haze and blur
- Dedicated High-Content Acquisition and Analysis Module for automated acquisition and analysis of multiple high-content, multi-dimensional images via integrated control of high-speed motorized focus, Ti-E inverted stage, camera and peripheral devices



NIS-Elements



Multi-layer document structure

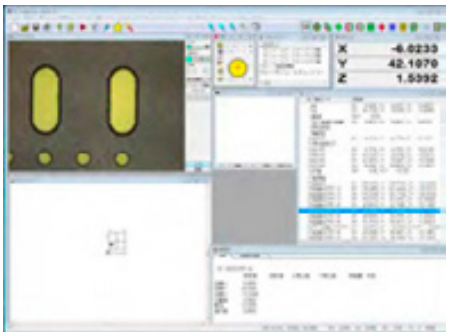


3D Deconvolution

Time-Lapse

AutoMeasure Measurement and Control Software for NEXIV/iNEXIV

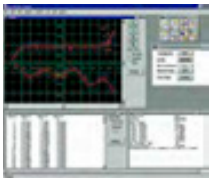
- Interactive, customizable measurement and teach wizards with online CAD interface. CAD data can be read into a Virtual Video Window on separate PC for off-line teach programming without actual workpiece
- NEXIV Profiler allows you to measure and judge 2D profile shapes in a workpiece that cannot be measured in the normal geometric mode
- VMR Report Generator (AutoMeasure compatible) for quick, powerful inspection reports generation in standard or customizable formats
- VMR Control for multiple teach files to sequentially measure different workpieces continuously. Separable system admin and inspector environments for dates of manufacture and inspection, lot number, etc.



AutoMeasure

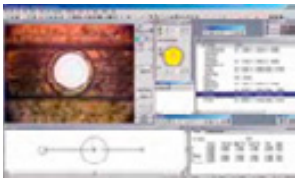
Measurement wizards

NEXIV Virtual AutoMeasure



Constant pitch profiling (XY plane)

CAD graphic window



Main program layout

Digital Chart Comparator

Profiler

3D Metrology Simulator

Vertical Profile Projectors with Superb Image Accuracy!

V-12B

V-20B

- Focusing mechanism by up/down moving of objective head for long cross travel up to 250x150mm with adjustable base 2mm from surface to isolate vibration
- Max workpiece height of 100mm
- Built-in digital counter and protractor and rotating or fixed screen selections
- Erect and unreversed images as sharp as reversed
- Built-in switchable vertical/oblique surface illumination for improved edge detection in resin, etc.
- 4-step zoom condenser lens controls light to suit the projection lens mag (DIA required for 200/500X mag)
- Large effective Ø 500mm screen
- Built-in digital counter and protractor
- Par focal long working distances projection lenses (5, 10, 20, 50, 100X)
- Built-in half mirror eliminates adjusting illumination for each magnification change
- Excellent improved images at eye-point height
- Up to 20kg workpiece for 10x6 stage with 250x150mm measurable range
- Stage Adapter S to mount other than the 10x6 Stage

	V-12B	**V-20B**
Type	Bench	Floor Standing
Screen Diameter and Image	Ø 305mm, erect and unreversed	Ø 500mm, inverted and reversed
Screen Type	DC/D: Digital protractor with etched center crossline, 360° rotation, 1min arc fine knob SC/S: fixed screen without rotation	protractor screen; inclined 8°
Lens Mount	3-lens turret mount; clamping	3-lens turret mount; screw type
Projection Lens	5/10/20/25/50/100/200/500x	5/10/20/50/100x
Magnification Accuracy (Illumination Dependent)	±0.1% for oblique surface/contour; ±0.15% for vertical surface	±0.1% for contour; ±0.15% for surface
Illumination	Bright 24V/150W halogen for both Contour and Surface	
Max Workpiece Height	100mm (70mm for 10x6 Stage)	150mm
Stages	10x6, 8x6, 6x4, 4x4, 03L or 2x2. V-20B: 10x6 direct mountable; Rest mountable with adapter. For V-12B all direct mount	
XY Counter	DC and SC – Built-in (1.0/0.5µm selectable); D/S Not provided	Built-in digital counter
Power Supply	AC 100 to 120V, 220 to 240V, 50/60Hz	
Machine Dimensions W x D x H	409 x 648 x 970 to 1070mm	570 x 1200 x 1900mm
Machine Weight	Approx. 80kg	260kg

GTR-Series Double Flank Gear Rolling Testers

GTR-4LS

- Efficient and fast measuring of total accuracy of various sizes of gears such as fine pitch gears and small and medium size gears with center distances of 11 to 130mm, applicable to cameras, clocks, computer peripherals, printers and audio devices
- Windows® 10 software for computing tooth-to-tooth composite error, total composite error, tooth bearing, nick, run-out and backlash in both analogue and digital grading. Compliance with ISO, JIS and AGMA standards
- Linear scale for setting distance between two centers and measuring a test radius. Various outputs including linear and circular graphs. Optional Accessories – master gear, gear with shaft measuring/bevel gear equipment.

	GTR-4LS	GTR-25	GTR-40	GTR-60	GTR-30
Measuring Item	Double Flank Rolling Test				
Gears to be Measured	Spur and Helical Gear / Ring Gear, Gear with Shaft				
with Optional Equipment	Bevel Gear / Cross Axis / Worm and Worm Wheel / Internal Gear				
Center Distance	11 to 130mm	105 to 250mm	110 to 400mm	120 to 600mm	58 to 300mm
with Optional Equipment	N/A	25 to 170mm	30 to 320mm	40 to 520mm	38 to 300mm
	N/A	70 to 215mm	75 to 365mm	85 to 565mm	N/A
Measuring Pressure	±600g	-10 to +2.5kg			0 to 2.5kg
Spindle Motor Drive	N/A	0.5 to 9rpm		0.4 to 4rpm	6rpm
Machine Basic Size in mm	470 x 230 x 391	925 x 456 x 472	1010 x 540 x 460	2060 x 918 x 1071	830 x 325 x 360
Machine Weight	50kg	300kg	450kg	2200kg	120kg
Power Supply / Consumption	Single phase AC 100V±10%. Grounding required. 50/60Hz±1Hz. / 1kVA				

Master Gears												
Module	**0.2**	**0.25**	**0.3**	**0.35**	**0.4**	**0.45**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**	**1.0**
P.C.D. mm	38.0	38.0	38.4	38.5	38.4	38.2	38.0	38.4	38.5	38.4	37.8	38.0
Inner Dia/Tooth Width	12.7/12.7mm											
Outer Ø in mm	38.4	38.5	39.0	39.2	39.2	39.1	39.0	39.6	39.9	40.0	39.6	40.0
No of Teeth	190	152	128	110	96	85	76	64	55	48	42	38

AG-230 Automatic Gear Selecting Machine

Digital display of OK/NG for measuring value of double flank rolling test against pre-set tolerance for nick, runout and size in real-time basis with high accuracy.

AG-230

Master Gears

For standard use pressure angle 20º or 14.5º. Inner Diameter Ø 32 with tooth width 20

Module	No of Teeth	P.C.D.	Module	No of Teeth	P.C.D.
1.75	45	78.75	3.0	38	114.0
2.0	40	60.0	3.5	32	112.0
2.25	36	81.0	4.0	28	112.0
2.5	32	80.0	5.0	30	150.0
2.75	42	115.5	6.0	26	156.0

CLP Series CNC Gear Measuring Instrument *NEW!*

CLP-35SF

CLP-35DDSF

- Newest Type F models with 60% reduced pitch measuring time with the new DSA-60R2 detector by measuring left and right within one rotation gear
- Newest Detector DSA-60R2 with optical encoder built-in to improve detection sensitivity
- Full CNC model for measuring tooth profile, lead, pitch, etc.
- **CLP-35SF/DDSF CNC Gear Measuring Instruments** for efficient, reliable measurement of tooth profile, lead, pitch and runout of gears for high performance transmissions and powdered metallic or precision plastic gears
- Fully automated from measurement to analysis of results. Windows® 10 based software for measurement of pitch and profile deviation and helix form deviation and various other gear measurement applications

Internal Gears

Hobs

Shaving Cutters

Master Gears

Worms

Worm Wheels

Plastic Gears

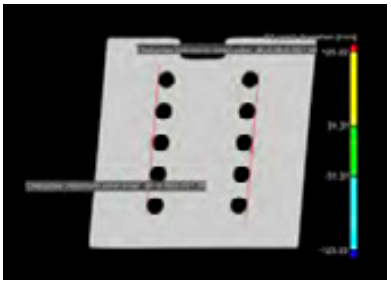
	CLP-15SF	CLP-35SF	CLP-35HF	CLP-65F
Measuring Item/Number of Teeth	Tooth profile, lead, pitch (single, adjacent, cumulative), runout (spur and helical gear including internal gear)/10 to 500			
Module	M0.2 to 5	M0.5 to 12		M0.5 to 20
Max Gear Outer Diameter	Ø 150mm	Ø 350mm		Ø 650 (Ø 850) mm
Base Circle Diameter / Option	Ø 0 to 130mm	Ø 0 to 300mm		Ø 0 to 600/ to 800mm
Max Tooth Width	200mm	400mm		400mm
Profile Measurement Tangent Length	±50mm	±120mm		±200mm
Helix Angle	0° to ±65° (±65° to ±90° with optional equipment)			
Gear Shaft Length / Extension Option	0 to 300/ to 500mm	50 to 600/ to 800mm		50 to 800/ to 1000mm
Resolution	0.0001mm			
Machine Weight / Max Gear Weight	0.8ton / 20kg	1.5ton / 50kg		2.0ton / 200kg
Dimensions W x D x H mm	842.5 x 893 x 1670	1133 x 1071 x 1995 / 1133 x 1071 x 2104		1500 x 1266 x 2118 / 1655 x 1268 x 2338
Power Supply / Consumption	Single phase AC 100V±10%. Grounding required. 50/60Hz±1Hz. / 2kVA			

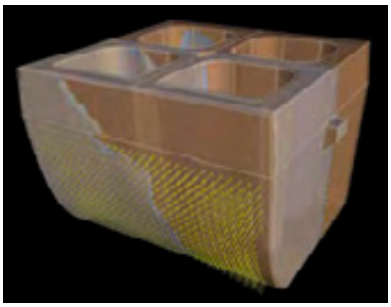
VGStudio Max CT Visualisation and Analysis Software

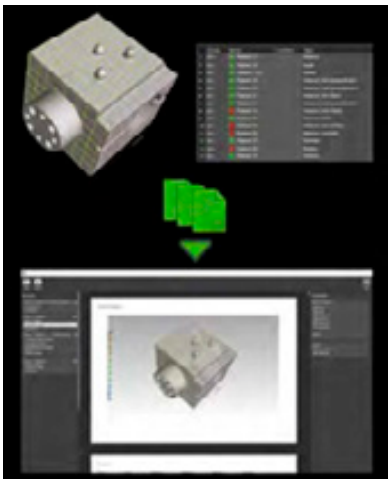
VGStudio is the industry-leading Computed Tomography analysis and visualisation software, processing voxel and mesh data using Windows® 11 multi-processor/multi-core PCs linked directly to CT scanners.

VGStudio MAX add-on modules: Coordinate Measurement, Nominal/Actual Comparison, Porosity/Inclusion Analysis, Wall Thickness Analysis, Fibre Composite Material Analysis, CAD Import with optional Product and Manufacturing Information (PMI), Foam Structure Analysis, Transport Phenomena and more!

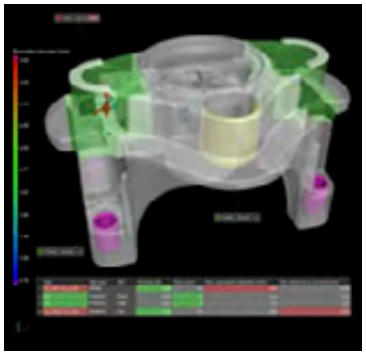
New and Improved Features in VGStudio Max 2022

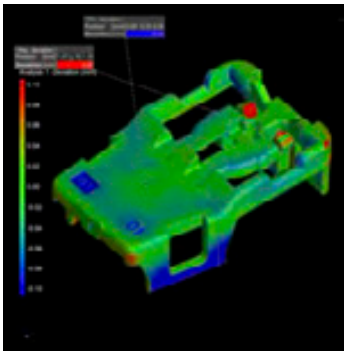






- Shape-Following Adaptive Measurement Templates
- Chebyshev Fit Option for Point, Line, and Torus Geometry Elements and Combined Elements
- Color Support in STL Import and Export
- Wall Thickness Analysis – Detecting Maximum Material Accumulation
- Manufacturing Geometry Correction – Locking Areas during Mesh Compensation and Faster Uniform Control Point Calculation
- Structural Mechanics Simulation – Importing External FE Results and Submodeling of Complicated or Large Parts
- Reporting and Traceability – Comparison Tables for Coordinate Measurement Results and Absolute Reference Support for Info Fields
- Manufacturing Geometry Correction where the visualization of compensated points provides visual feedback on the results when compensating a geometry, for better interpretation of used parameters
- Compensation Mesh for Additive Manufacturing for the difference between the actual object and a reference object
- Porosity/Inclusion Analysis
- Improved Reporting and Traceability with new integrated reporting
- Nominal/Actual Comparison with automated annotations for min./max. Deviations





MyVGL Viewer

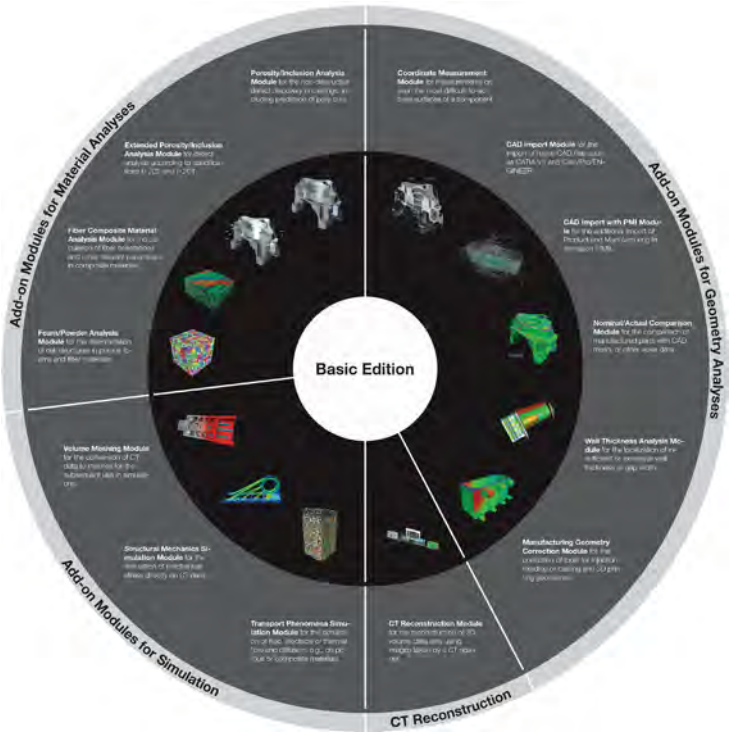
- Free powerful CT data viewer with interactive visualisation and detailed analysis of .vgl projects created with VGStudio MAX and VGStudio.
- Analysis and annotations can be moved over entire component surface.
- Pack & Go reduces file sizes by up to 90% to allow CT data analysis results to be shared with customers and colleagues.
- myVGL import assistant options to intelligently reduce dataset size for very large data sets to be visualized on computers with limited resources

VGStudio Max Modules

Basic Edition starting point: offers innovative measuring functions, visualization and tools for manual inspections, reporting and presentations

Add-on Modules – wide and growing selection for material analysis, geometry analysis, simulation and CT reconstruction

Packages and Bundles – VGStudio MAX pre-configured packages tailored to the most common application. Includes a VGStudio MAX license. Bundles consist of a selection of add-on modules and a one-year update/service agreement.



VG InLine Automating CT Inspections and Analyses

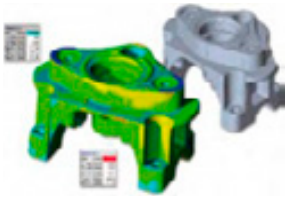
VG InLine - serial testing and automatic good/bad decisions

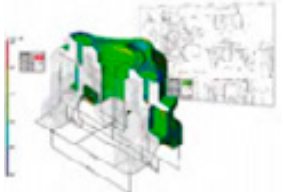
- Brings VGStudio MAX features to fully/semi-automated industrial CT in-line / at-line inspections
- Understands all reconstructed CT volumes, including older and proprietary formats of existing CT systems
- Uses VGStudio MAX macros for automated jobs and analyses incoming CT datasets from dedicated directory
- Software of choice for quick and easy part inspection with recurring analysis/visualization patterns
- Cost-effective for quality labs with growing need for an inspection solution that can handle small batch series

VGMetrology Maximum Precision, Minimal CT Data Set Sizes

VGMetrology

- Easy-to-use, universal metrology solution
- Precise picture of all objects' surfaces – saves in new, very compact .mvgl format
- No trade-off between file size and quality of information
- VGStudio MAX's full metrology and GD&T functions
- Measures on voxel data, point clouds, meshes and CAD data





Wide Range of Dial Gauges Since 1916

15Z
Res: 0.001mm
Range: 0.16mm

196Z
Res: 0.01mm
Range: 0.8mm

107-BL
Res: 0.01mm
Range: 10mm

U3HA
Res: 0.01mm
Range: 66 to 80mm

T-1
Res: 0.01mm
Range: 0 to 160mm

Thickness Gauges / LA Dial Calipers / Cylinder Gauges

G-1A
Res: 0.01mm
Range: 0 to 10mm

G-2
Res: 0.01mm
Range: 0 to 20mm

LA-2
Res: 0.1mm; Range: 0 to 80mm
Throat depth: 240mm

LA-7
Res: 0.01mm; Range: 0 to 60mm
Throat depth: 85mm

CC-01
Range: 10 to 18mm

CC-4
Range: 100 to 160mm

Standard Digital Gauge / Digital Thickness Gauges

DG-127
Res: 0.01mm; Range: 12.5mm

DG-205
Res: 0.001mm; Range: 25mm

G2-205
Res: 0.001mm; Range: 20mm

JA-205
Res: 0.001mm; Range: 20mm

Linear Gauges / Digital Counters

D-100
Resolution: 0.01mm; Range: 100mm

C-500 (Simple type)
Displayed digits: selection of 10µm / 1µm

C-700 (Multi type)
Displayed digits: selection of 10µm / 1µm

Food, Pharmaceuticals and Industrial Solutions

Anritsu X-Ray Systems

Anritsu Metal Detectors

Cassel Metal Detectors

Anritsu Checkweighers

Anritsu Rejectors

Portable Solutions

Hexagon Portable Measuring Arm

Structured Light System

Leica Laser Tracker

OUR MANAGEMENT COMMITMENT

Our **Vision** is to be your trusted metrology solutions partner of choice via our **Mission** to support your quality quests with appropriate metrology solutions and competent pre- and post-sales technical support throughout the solutions' useful lives.

Pre- and Post-Sales Support includes: -

- Software Applications & Measuring Related Services
- Preventive Maintenance and Repairs
- Retrofits and Upgrades of Pre-Owned Machines
- Performance Verification and Calibration

ISO/IEC 17025 CALIBRATION LABORATORY ACCREDITATION

We are certified to ISO/IEC 17025:2005 Laboratory Accreditation in Singapore, Malaysia, Thailand and Philippines by SAC-Singlas and in Indonesia by Komite Akreditasi Nasional for the calibration in general of CMMs (contact and non-contact), Surface Roughness, Contour and Roundness Testers, Profile Projectors and Universal Length Metroscopes.

Our calibration labs in Thailand, Philippines and Indonesia are also accredited for Portable Coordinate Measuring Machines complying with B89 standard, and ISO10360-12 standard for the latest model. We are also accredited for the calibration of Checkweighing systems in Singapore, Malaysia and Indonesia..

About ISO/IEC 17025

ISO/IEC 17025 is the international standard for the competence of testing and calibration laboratories, which include meeting the requirements of ISO9001 for management system plus technical competence in testing and calibration. Calibration reports issued under the standard includes a proper evaluation of all risks and uncertainties including a budget statement of the expanded uncertainty of measurement of calibrations performed.

Our Service Department Goals

We believe that equipment maintenance is primarily our customers' responsibility while our responsibility is to support our customers. Our Service Department goals are to help ensure minimum downtime on all equipment serviced by us and deliver customer satisfaction. To do this, we identify tasks that customers can perform themselves and help them to do this; for example, by providing basic preventive maintenance training to our customers to perform first-level and urgent repairs or rectifications by themselves. This relieves us for more advanced work that customers cannot perform, where we constantly work to improve our competences and levels of capabilities in these tasks.

In this way, we walk the quality journey with our customers and so hope to become their trusted partner of choice.

The International System of Units (SI)

Length – metre (m): the path length travelled by light in vacuum during a time interval of 1/299792458 of a second; commonly realised through the wavelength of the 633nm radiation from a helium-neon laser stabilised against a spectral line of iodine molecules, based on the formula $\lambda o = c/\nu$ where c is the speed of light in vacuum defined at 299792458 m/s and ν is the measured frequency of the radiation used.

Mass – kilogram (kg): the unit of mass, equal to the international prototype of the kilogram, made of platinum-iridium and kept at the International Bureau of Weights and Measures (BIPM) in Paris. International standardisation is carried out using precision comparators, combinations and sub-multiples of the 1kg masses of similar materials.

Time – seconds (s): the duration of 9192631770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium-133 atom; realized using caesium atomic clocks, where quantized caesium energy levels provide a source of resonance frequency, which is then phase-locked to a quartz oscillator to produce a very precise frequency (with a good long-term stability) to define the second.

Thermodynamic temperature – Kelvin (K): the unit of thermodynamic temperature (symbol T), is the fraction of 1/273.16 of the thermodynamic temperature of the triple point of water. T at 273.16 K, also defined as 0.01°C in Celsius temperature (symbol t), is realised by the use of the water triple point cells, from which other temperatures are related through the International Temperature Scale of 1990 (ITS-90).

Electric current – ampere (A): that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2 x 10-7 Newton per metre of length; realised through the *volt* and the *ohm* representations determined using the Josephson effects of super-conductivity and the quantised Hall resistance (von Klitzing constant) respectively.

Amount of substance – mole (mol): the amount of substance which contains as many elementary entities as there are atoms in 0.012kg of carbon 12. The elementary entities must be specified and may be atoms, molecules, ions, electrons, other particles, or specified groups of such particles. The mole is most accurately realised through the determination of the Avogadro Constant by primary methods such as isotope dilution mass spectrometry.

Luminous intensity – candela (cd): the luminous intensity in a given direction of a source that emits monochromatic radiation of frequency 540 x 1012 hertz and has a radiant intensity in that direction of 1/683watt per steradian; realised using a cryogenic radiometer that measures optical radiant power based on the thermo-equivalence of the heating effect of optical radiant power with that of electrical power. A solid-state photometer with a relative spectral responsivity simulating the spectral efficiency function V (λ) of the human eye, calibrated directly against the cryogenic radiometer, is used to evaluate light of other frequencies in the visible spectral region.

20 May 2019 Redefinition of the SI Units

From 20 May 2019, the SI units will be revised in terms of 7 defining constants that describe the natural world:

Base Unit	Defining Constant		Constant Values	Unit
Kilogram kg	Planck Constant	h	$6.62607015 \times 10^{-34}$	J s
Meter m	Speed of Light in Vacuum	c	299 792 458	m/s
Seconds s	Unperturbed ground state hyperfine transition freq. of Cs133 atoms	$\Delta\nu Cs$	9 9192 631 770	Hz
Ampere A	Elementary Charge	e	$1.602176634 \times 10^{-19}$	C
Kelvin K	Boltzmann Constant	K	1.380649×10^{-23}	J/K
Mole mol	Avogadro Constant	N^A	$6.02214076 \times 10^{23}$	mol^{-1}
Candela cd	Luminous efficacy of monochromatic radiation of freq. 540×10^{12}Hz	K_{cd}	683	lm/W

The SI base units will then be derived from the defining constants or from 22 important derived units derived from the constants and maintained for consistency per the ISO/IEC 80000 International System of Quantities (ISQ).

The highest-level experimental methods used for the realization of units by the equations of physics are now known as primary methods. The new definitions allow freedom to choose equations of physics for the realization with the defined constants of unit quantities to be measured for limitless improvements in measurement accuracies.