CAIRNHILL METROLOGY

Precise, Comprehensive Metrology
In the Laboratory or Anywhere

CAIRNHILL METROLOGY 2024

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40 Years

CAIRNHILL METROLOGY

www.cairnhill.com

Vision, Mission and Values

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

Our **Vision** is to be our customers' trusted metrology solutions partner of choice—via our **Mission** to support your quests for process efficiencies, yields and quality by providing metrology solutions appropriate to requirements, supported with competent pre-sales and post-sales services throughout the solutions' life. Our **Values** are in the Golden Rule, "What you wish that others do to you, do so to them."

Our Solutions are focused on groups:

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

Our **IMT** solutions include focus-variation and confocal scanning interferometry, CMMs equipped with tactile, optical and laser sensors; surface-form and roundness testers; length metrology; profile projectors and video-based measurement systems; and handheld precision tools.

Our **XCT** solutions provide high-powered, high-resolution nano-, micro- and mini-focus CT analysis and inspections for various industries and manufacturing processes, as well as for research and science.

For real-time production inspection of larger automotive and aerospace parts and critical installations, our **PMT** solutions cover Portable Arm CMMs, 3D Digitizers and Optical/Laser Trackers with touch probes, laser scanners and optical reflectors, which can be automated or robotised—Quality Assurance Anywhere!

All our solutions are equipped or offered with competent, intuitive, yet **comprehensive software** for efficient metrology inspections, analysis, and reverse engineering.

Productivity

Reliably precise and advanced dimensional metrology facilitates innovation, creativity and productivity for manufacturers and R&D designers by reducing first-article set-up times, allowing complex designs to be inspected at the earliest after production or on the floor, for yield enhancements and process control.

Reliability

We partner long-term with metrology equipment manufacturers and software developers who are industry leaders in their respective fields, to provide reliable, leading-edge and sometimes breakthrough solutions.

Table of Contents

InfiniteFocus® G6 Unrivalled Flagship Performance!

- **Advanced Focus-Variation** combined roughness and coordinate measuring machine with vibration-insensitive design for hi-resolution and repeatable results, even of complex parts
- 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 automated measurement sequences for 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		3D Optical—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. Image Field: 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 (colour), 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
Control Server		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 X, Y Measurement Range		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]Objectives are available in the particular objective configuration.									
Resolution and Application Specifications									
Min Measurable Roughness	Ra	-	-	0.7µm	0.18µm	0.24µm	0.12µm	0.05µm	0.03µm
	Sa	-	-	0.35µm	0.09µm	0.12µm	0.06µm	0.025µm	0.015µm
Min Measurable Radius		20µm	12µm	5µm	5µm	3µm	3µm	2µm	1µm

FocusX*NEW!* Cost-Effective Fast Focus Variation!

- Limitless applications across various industries
- Form and roughness measurement from highly reflective surfaces, steep flanks, and complex forms to heavy and large components
- Fastest precision measurements—millions of measuring points within seconds with automation options.
- ISO-compliant roughness measurements done quickly!
- **Advanced Focus-Variation**—measures extremely smooth surfaces
- **Vertical Focus Probing** laterally of the sides of the workpiece—such as holes and bores with a diameter-to-depth ratio of 1:3 to 1:10.
- With **Real3D** technology, the component is measured from numerous perspectives, and the diverse visualisations are merged into a full 3D data
- **MetMaX** user software allows users to specify measurements already in the CAD model of a component

FocusX

FocusX		
Measurement Principle		3D Optical—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 / Image Field: up to 500 million
Positioning Volume X x Y x Z		100mm x 100mm x 100mm = 1 000 000mm^3
Coaxial Illumination		LE coaxial illumination (colour), high-power, electronically controllable
Ring Light Illumination (Optional)		White LED high-power ring light, 24-segments, wireless, Snap-on system
System Monitoring		Automatic self-diagnosis due to temperature sensors, internal current, and voltage monitoring
Control Server		12Core, 32GBDDR5, SSD512GB, Win10 IoT Enterprise 64bit, 2x27" Full HD LED Monitor
Sample	Surface texture	For any surface, including polished metals, no preparation is needed
	Dimensions H / W	Up to 145mm / Up to 8kg
	Measurable Slope Angle	Advanced Focus-Variation: 87° / Vertical Focus Probing: >90°

Objectives[1]		**1900 WD30**	**800 WD37**[2,4*]	**800 WD17**	**400 WD19**	**150 WD11**
Working Distance		30mm	37mm	17.5mm	19mm	11mm
Lateral Measurement Range (X, Y)		3.8mm	1.6mm		0.66mm	0.3mm
Measurement Point Distance		1.77µm	0.72µm		0.36µm	0.14µm
Measurement Noise[3]		100nm	90nm	20nm	12nm	6nm
Vertical Resolution		290nm	260nm	60nm	35nm	20nm
Resolution and Application Specifications						
Min Measurable Roughness	Ra	-	-	0.18µm	0.13µm	0.06µm
	Sa	-	-	0.09µm	0.07µm	0.04µm
Min Measurable Radius		12µm	10µm	5µm	3µm	2µm
Accuracy[5]						
Max Deviation of Height Step Measurement		Height Step 1000µm Height Step 100µm Height Step 10µm Height Step 1µm		$E_{UniZ: St: ODS, MPE}$=0.5µm, σ=0.1µm $E_{UniZ: St: ODS, MPE}$=0.4µm, σ=0.05µm $E_{UniZ: St: ODS, MPE}$=0.3µm, σ=0.025µm $E_{UniZ: St: ODS, MPE}$=0.15µm, σ=0.01µm		
Profile Roughness		Ra=0.1µm; Ra=0.5µm		U=0.025µm, σ=0.004µm; U=0.04µm, σ=0.002µm		
Area Roughness		Sa=0.75µm		U=0.05µm, σ=0.002µm		
Wedge Angle		β=70°-110°		U=0.15°, σ=0.02°		
Edge Radius		R=5µm-20µm; R>20µm		U=1.5µm, σ=0.15µm; U=2µm, σ=0.3µm		

[1]Objectives with longer working distance available upon request. [2]Objective is available in a special objective configuration. [3]Measurement noise NM: Evaluation conforming to ISO25178-700:2022 and Fair Datasheet V1.2. [4]Objective is available in special obj. config. [*]Only in the polariser. [5]EUni and EBi based on ISO 10360-8 and VDI 2617 sheet 12.2

InfiniteFocusSL / IF-SensorR25 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 repeatable
- Form and finish measurement on micro-structured surfaces
- Robust frame. Intelligent adjustable optimised 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, e.g., steep flanks and surfaces on gear tooth root. Miscellaneous export and print options

Model	**InfiniteFocusSL**				**IF-Sensor R25**			
Measurement Principle	Non-contact, optical, three-dimensional, based on Focus-Variation							
Ring Light Illumination	White LED high-power ring light, 24-segments							
Positioning Help	Coaxial laser beam							
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 ≥ 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 Area 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 pre-defined measurement programs require no prior metrology knowledge. Manual or automatic mode. It can be integrated into the 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

Model	**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 grips	Taper50 interface/other options plus flexible perforated plate
Additional Features	Integrated status lights; 4 emergency stops on 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	Six 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 visualise 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 harsh environmental conditions, ease of use and 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 optimised 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

Model	**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 motorised; 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 Area 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, Objectives 5xAX, 10xAX, and 20xAX apply. [1]Objective with a longer working distance is available upon request.

EdgeMaster / EdgeMasterX Resolution and Application Specifications

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

For high-resolution, optical 3D measurement of large and heavy components. 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. An automation interface allows fully automatic measurement in production.

Model	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 one °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 a 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	2mm	1mm	0.4mm
Lateral Area Measurement X x Y	4mm²	1mm²	0.16mm²
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 (motorised) / 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


Measurement on Racetrack


Mobility Case


Battery Pack

- 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.


IF-PortableRL

IF-PortableRL								
Positioning Volume X x Y x Z	50 x 50 x 25mm							
Objectives[1]	**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 Area 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

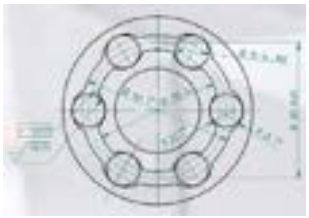
Height Step Accuracy (1mm)	0.1%							
Min Measurable Roughness Ra	0.55µm	0.25µm	0.2µm	N/A		0.65µm	0.3µm	0.25µm
Min Measurable Roughness Sa	0.30µm	0.15µm	0.1µm			0.35µm	0.15µm	0.13µm
Min Measurable Radius	5µm	3µm	2µm	20µm	10µm	5µm	3µm	2µm
Min Wedge Angle / Max Slope Angle	20° / 87°							

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		

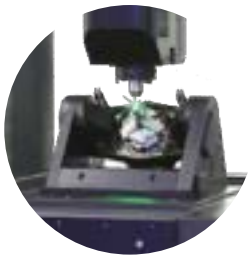
µCMM Fast Focus Variation Measurements over Large Volumes

µCMM

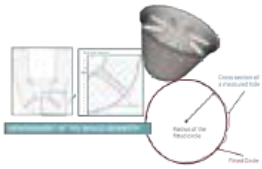


Precise - High accuracy and fast measurement over large volumes

Simple - Measure matte and highly polished surfaces easily with SmartFlash



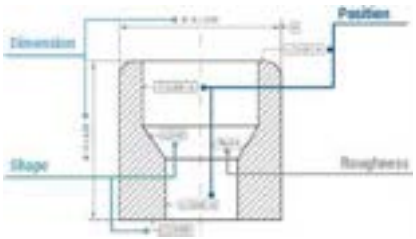
Expandable into a five-axis CMM



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 to 0.8+L/600µm 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 or Y: 1720. X x Y: 2.95 million
	Multi-measurement:	Up to 500 million
Positioning Volume / Axes Travel Speed		310 x 310 x 310mm (X x Y x Z) / Max 100mm/s
Compressed Air		Maintenance-free with compressed air according to specification, 6-bar
Coaxial Illumination		LED coaxial illumination (colour), high-power, electronically controllable
Objective Changer		Automatic pneumatic four-place objective changer
System Monitoring		Nine temperature sensors (accuracy ±0.1Kthree, three 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

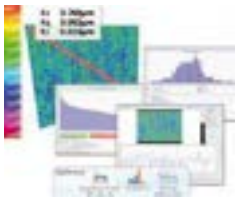
[1]Per ISO 10360-8 and VDI 2617. [2]Valid for all Multi Measurements. [3]Valid for single measurements, height step measurements.

Objectives	3000WD8	1900WD30	1500WD23	1500WD70	800WD17	800WD37	400WD19	150WD11
Working Distance	8.8mm	30mm	23.5mm	69.4mm	17.5mm	37mm	19mm	11mm
Lateral Measurement X, Y	5.26mm	3.29mm	2.63mm	2.63mm	1.32mm	1.32mm	0.66mm	0.26mm
Lat Area Measurement X x Y	27.64mm²	10.8mm²	6.91mm²	6.91mm²	1.71mm²	1.71 mm²	0.43 mm²	0.06 mm²

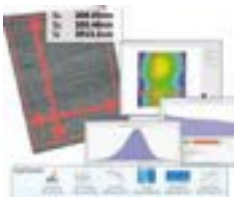
InfiniteFocus® Measurement Modules

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

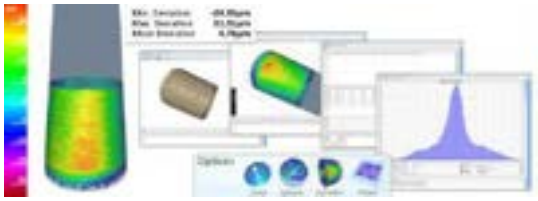
Profile-Form – Radii, angle, height steps, distances, circum- and in-circle profiles, thread parameters, cutting edges, basket arch form, wedge angles, and bevel lengths.



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

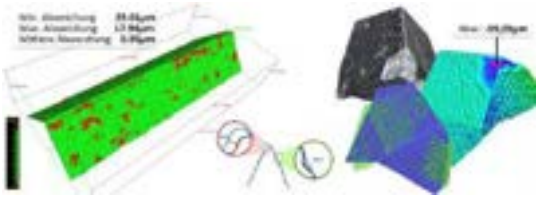


Areal Surface Texture – Sa, Sq, Sz per ISO25178 with statistics, fractal dimension, gradient, spectral distribution, local homogeneity, Roughness filtered from 3D waviness.

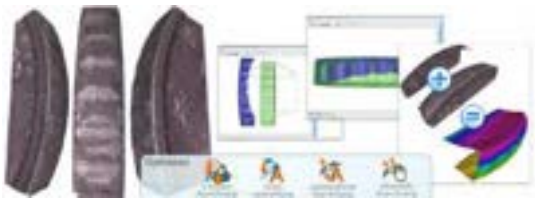


3D Form Module – Automatic fitting of spheres, cones, and cylinders to measured geometries and curved surfaces for visualisation with analysis of form deviation from nominal.

Contour Module – Measures angles, distances, circles, thread pitch, etc., from every position. Handles complex profiles. 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.

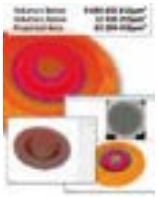


Fusion – Merge individual measurements at various positions into a 3D data set for visualisation from different angles.

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

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

Automation – Customisable repeat measurements with script-language.

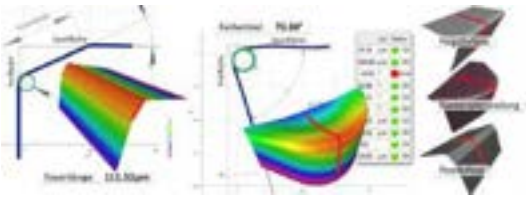


Volume – Pits and peaks. Easy positioning of cutting layers as a universal tool.

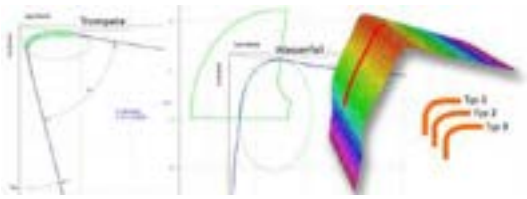
2D Image – Circles, lines, angles, distances, ellipses, rectangles etc.

InfiniteFocus® Tool Measurement

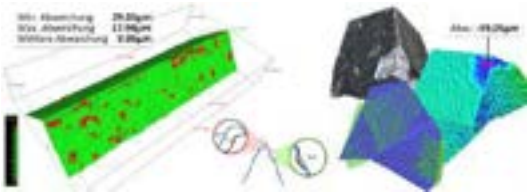
Used by leading manufacturers for visual, traceable, repeatable, high-resolution quality assurance of cutting tool edges, geometries, elliptical-fit roughness, edge break, ridges, etc.



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.



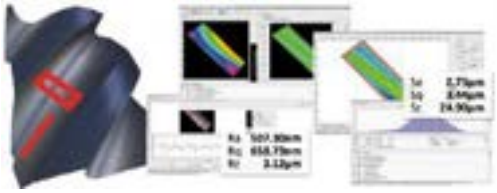
"True" Contour Through Elliptic Fit – Waterfall or Trumpet fit into edge region describes shape by two radial parameters. Compares edge-to-basket arch files of arbitrary shape.



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

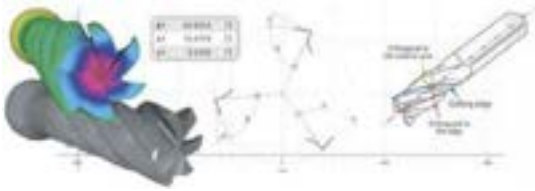
Flash (Burr) Measurement – Flash Width and Height to predict potential wear of moulding tools in inserts.

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



Tool Roughness Measurement – Measure tool roughness, both profile and area,l in addition to chipping along the edge.

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

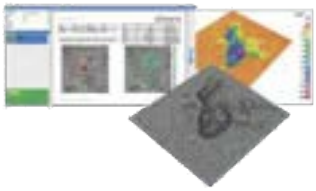


Angle Measurement – Measure clearance/wedge/rake angles of inserts, drills, end mills, and other round tools.

Applications for the Aerospace Industry

Non-contact Measurement of Critical Turbine Engine Components

Automatic Measurement of Cooling Holes – Automatically verifying the 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 and component edges with Area-based 3D measurements.

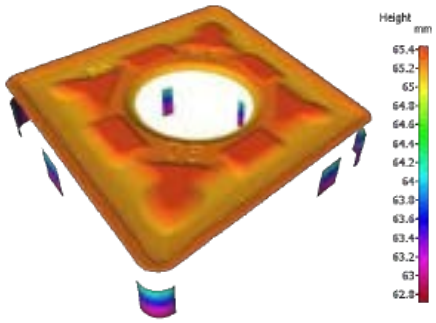
Focus Variation—Technical Principle

Focus variation combines the small depth of focus of a precision optical system with vertical scanning to provide topographical and colour information from the variation of focus. Various lens systems can be equipped with different objectives, enabling measurements with different resolutions. In contrast to other optical techniques limited to coaxial illumination, the maximum measurable slope angle is not dependent only on the objective's numerical aperture. Focus variation can be used with a wide range of illumination sources, such as a ring light, allowing measurements of slope angles exceeding 87°.

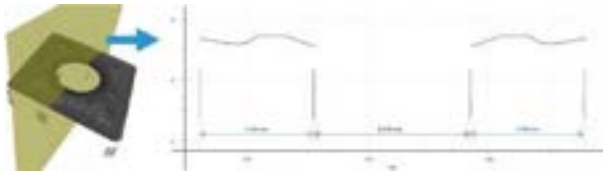
Focus Variation

Vertical Focus Probing—Lateral Probing of Components

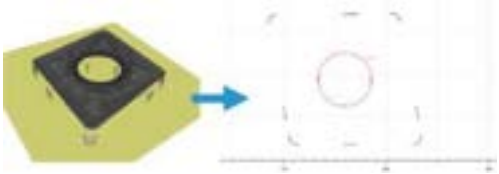
Vertical Focus Probing extends Focus Variation for measuring geometries such as boreholes of injection valves in the automotive industry and steep flanks >90° with high accuracy, high resolution, and short measuring times. The technique can be used for many dimensional metrology applications in tooling, precision manufacturing, automotive, and aerospace industries.



Vertical Focus Probing



Vertical cutting plane and resulting extracted profile



Horizontal cutting plane and resulting extracted profile

Real3D Technology—Full Form Measurement

Real 3D

Real3D expands the ability to measure from numerous perspectives. The 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 the form and roughness of the whole sample. Users can visualise and measure surface features such as diverse flank angles, thread pitch, and undercuts.

Application of InfiniteFocus Systems


Additive Manufacturing


Aerospace


Automotive


Injection Moulding


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

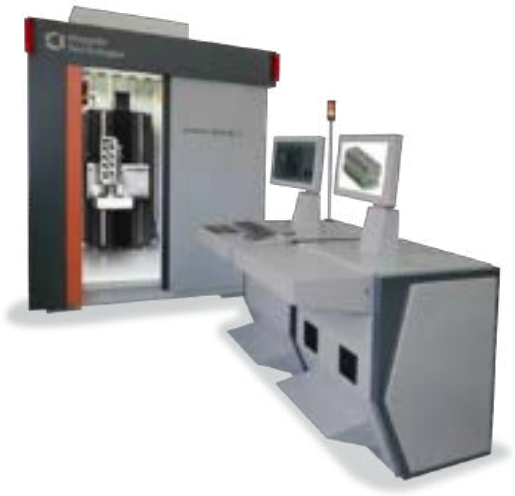

PTB traceable Cal Tool with 1000µm step height and chess patterns for lateral verification


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 re-verification tests for optical CMM measuring micro geometries

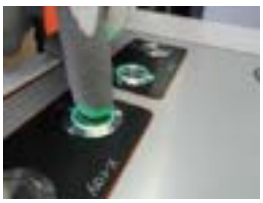
V|tome|x C450 High Power/Productivity CT with Metrology



- 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 the entire CT process, increasing repeatability and reproducibility of CT results
- Velo|CT II Accelerated 3D Reconstruction
- Measures size, volume, inclusion density, cavities and internal geometries to optimise 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

V|tome|x C450

Automated wall-thickness



One-button|CT

Quick|pick manipulator

Model	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 pack (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	Two 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 W x H x D	2310 x 2750 x 2870mm, excluding the console	
System Weight	Approx. 15,000kg	
Datos|x CT Software	Highly automated One-button|CT, including modules for CT data and workflow optimisation with VG or other 3D evaluation software for metrology and failure or structural 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.	

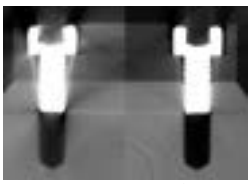
[1]Measured as deviation of sphere distance in tomographic static mode SD(TS) per VDI 2630. [2]Not for Scatter|correct and HS.

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

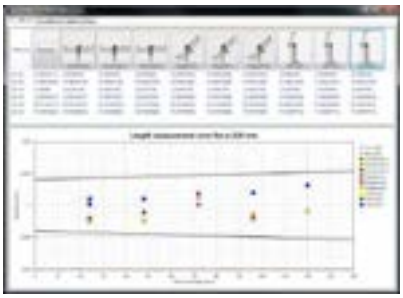
- High power 300kV/500W or 240kV/320W unipolar microfocus tubes with <1µm detail detectability
- Dual|tube pre-configured for 180kV/20W nanofocus option
- Temperature-stabilised tube and cabinet
- Metrology|edition: VDI 2630-1.3 traceable certification
- Very high image quality at up to 30fps, extremely 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 checks to verify VDI 2630-1.3 performance using calibrated artefacts above

Metrology Pack incl. vibration-insulated manipulator, long-term stabilised X-ray tube, 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, minimise the human factor and ensure up to 100% production control!

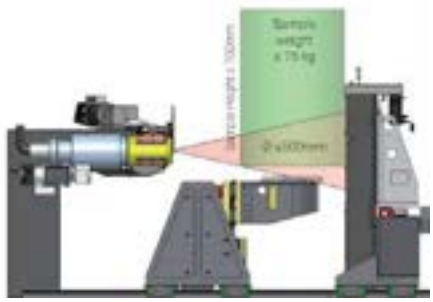
Add-on a collaborative robot to automate sample loading and achieve higher throughput and productivity with reproducibility.

Phoenix V|tome|x M Neo*NEW!* Precision meets Productivity

Phoenix V|tome|x M Omni

All premium features such as proprietary Scatter|correct technology, High-flux|target, exclusive Dynamic 41 detectors, and options for Automated Defect Recognition (ADR) with X|approver and a new standardised interface for integration into automated workflows with robotic and at-line inspection solutions.

- Variable Focus-Detector-Distance (FDD) for improved scanning results at reduced scan time
- High coverage of applications
  - Samples up to 500mm Ø at ≤ 700mm in height or up to 740mm in height Ø in diameter
  - Sample weight up to 75kg
- Improved Metrology performance referring to VDI2630-1.3
- New tube orientation for improved image acquisition
- New cabinet design to offer best-in-class flexibility and user options:
  - Load samples from the top or front to enable usage manually or with a crane or robot
  - Increased accessibility to core components for maintenance and repair
- New integrated dashboard system status, health monitoring and troubleshooting
- New standardised interface for integration into automated robotic and other at-line inspection workflows

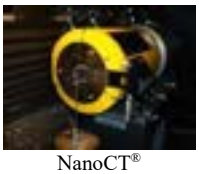


Variable FDD 280-900mm

Phoenix V|tome|x M Omni is well prepared to operate in the highest throughput scenarios

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

V|tome|x S



NanoCT®

Dual tube configuration

- High power 240kV/320W microfocus tube
- Dual|tube configuration for 180kV/20W nanofocus tube option
- Long|life filament for up to 10x increased lifetime
- Large-area Dynamic 41|200 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 two times faster data acquisition

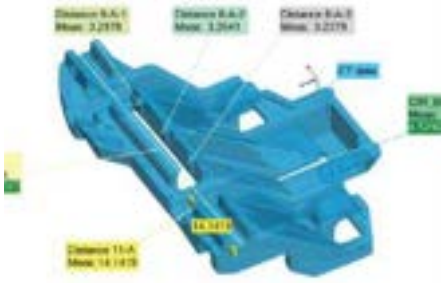
Model	V|tome|x M300	V|tome|x M240	V|tome|x S240
X-Ray Tube	Open directional high-power microfocus X-ray tube, closed cooling water circuit. Optional dual tube configuration for additional nanofocus X-ray tube.		
Microfocus Tube Power	Max 300kV/500W	Max 240kV/320W	
Detector Type	Dynamic 41|200 (4MP) or 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 minimised scatter radiation artefacts. Max scan Ø: 260mm, geometric magnification 1.51x to 100x		
Manipulation	Granite-based precision 4-axis manipulator		Optimised high stability 5-axis metal precision manipulator
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 420mmH
Max 3D Scanning Sample	420mmØ x 400mmH		
Max Sample Weight	High accuracy CT up to 20kg; Max up to 50kg		10kg
Dimensions W x H x D	2620 x 2060 x 1570mm (D: 2980 with user panel+generator)		2170 x 1690 x 1500mm
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 fewer artefacts; Offset|CT for bigger parts or higher resolution		N/A
Production|edition Option	Fully automated with a 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, fibre 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, hi-dynamic, hi-resolution DXR digital detector array and advanced algorithms combine to deliver optimal high image quality with detail detectability down to 200nm.

Nanotom M



Measurement of 5 features of injection moulded part with CAD variance.

Nanotom M	
X-Ray Tube	Proprietary open nanofocus tube, max 180kV/20W output, optimised 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 stabilised 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
Dimensions W x H x D / Weight	1980 x 1600 x 925mm / Approx. 1900kg
3D Metrology Bundle Option	Temperature stabilised 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, fibre 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, and cool stage 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

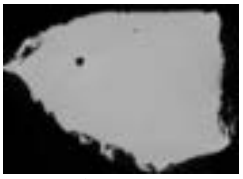


Image from nanotom m

Image from ESRF Synchrotron

Nanotom M detects minute details with optimised 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

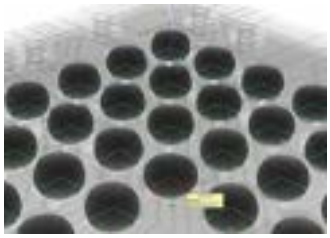
- High-mag unipolar 300kV tube for evaluating high-absorbing steel parts and large aluminium castings
- Option: 180kV/20W high-power nanofocus X-ray tube
- 3D Metrology package for dimensional measuring
- Easy switch between 2D and XCT
- Micro and Nano mode with details down to 1µm
- Optimised metal-ceramic 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

Model	**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 Dimensions W x H x D	4100 x 2600 x 2800mm	6400 x 3900 x 4300mm
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.	

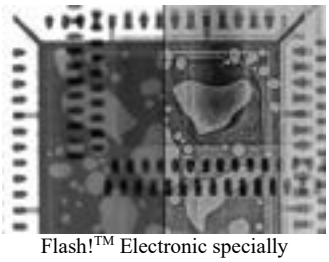
[1]Focus Object Distance. [2]Proportionate to object size.

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

X|aminer



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



Flash!™ Electronic specially optimised for electronic applications.

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

X|aminer	
X-Ray Tube	Low maintenance open microfocus tube, transmission head, 170° cone angle, collimated, Tungsten target rotatable for multiple uses.
X-Ray Detectors	Waygate Technologies DXR S85 1536 x 1536 pixel CsI 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 synchronised five-axis manipulation.
Max Inspection Area /Sample	410 x 410mm / 510 x 510mm
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
Dimensions W x H x D / Weight	1800 x 1900 x 1430mm (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*: a visual interface for rework and failure indication. *FLASH!™* Waygate's exclusive image optimisation technology, especially for electronics applications, is available as an option.
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 310 x 310mm
XY Table Option	510 x 510mm inspection area without rotation and OVHM

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

Microme|x neo / Nanome|x neo

CT of USB flash drive

Brilliant DXR-HD live imaging

- Temperature-stabilized digital DXR flat panel detector with 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. Flash!™ (option) for faster, more reliable failure detection.
- Diamond|window for two times faster data acquisition
- CT Upgrade Option for 3D scans within 10 seconds. PlanarCT easy 2D Slice and 3D Volume Inspection

Model	**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 uses		
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
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 synchronised 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)		
Dimensions W x H x D / Weight	1590 x 1958 x 2160mm w/o control console. (Transport 1770mmW) / 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 with 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 dies attach voiding evaluation capability.		
Software Options	*Flash!™* image optimisation. *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.		

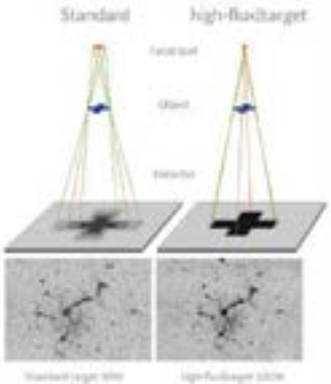
Detectors for High-Performing XCT Systems

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. Optimised for long-term reliability at high-energy use.	
Double resolution 16MP 100µm pixel size for up to 50µm feature detection with mini-focus tubes	4MP 200µm pixel size for up to 100µm feature detection even with mini-focus 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 an 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 the 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	

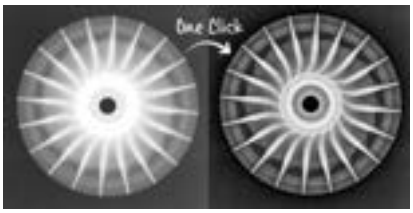
All detector specs per ASTM E2597-07.

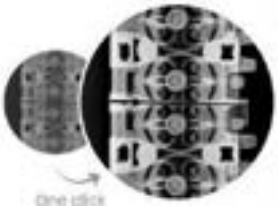
High-flux|target Up to 2X Faster microCT Scans or Doubled Resolution!



- With optimised 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!



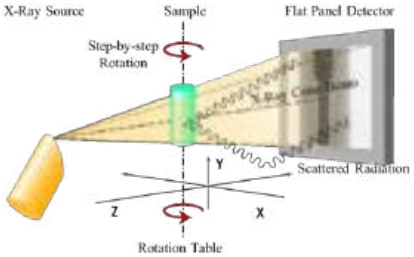


Automotive

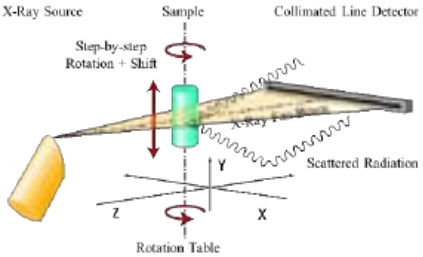
Oil & Gas

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

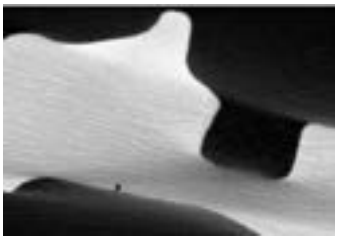
ASC|filter: Adaptive Scatter|Correct Filter Unrivalled Image Quality!



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

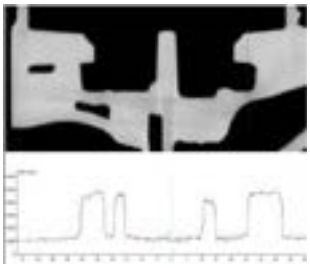


Fan beam CT with a collimated line detector acquires one slice of data at a time without scatter, resulting in high-quality images. The sample is then vertically shifted and scanned. Finally, all the results are combined. This takes time, while the manipulator movement introduces dimensional error.

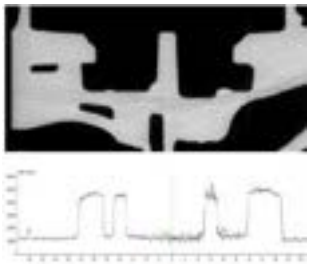


Scatter|correct

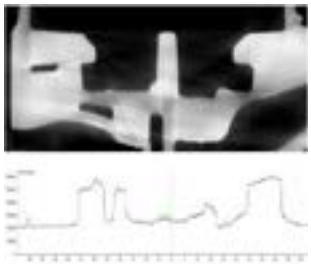
Scatter|correct with asc|filters



Conventional Fan Beam CT (2 hours)



Scatter|correct (9 mins + 1 initial scan)



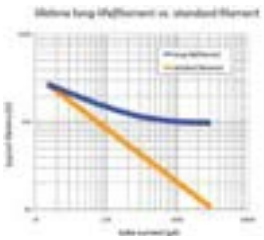
Conventional Cone Beam CT (9 mins)

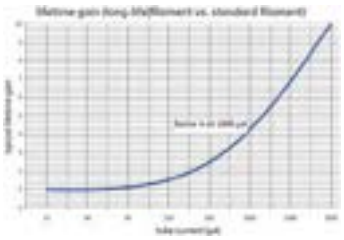
- Must be ordered with your system and factory-installed. Upgradeable on existing Scatter|correct versions.
- Reduced artefacts for best image quality. Fast and easy data evaluation.

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, aluminium, 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



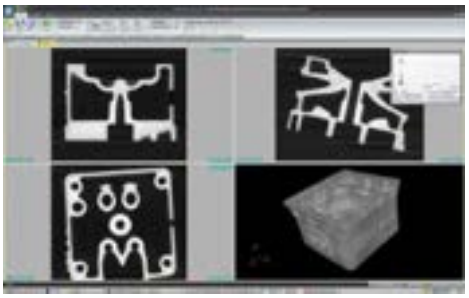


lifetime Long|life filament vs standard conventional filament; increases up to 10 times

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: The entire change process takes <20min

Phoenix Datos|x Fully Automated CT Data Acquisition Software

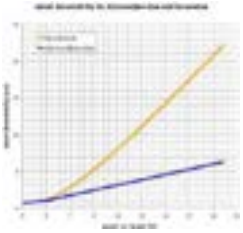


- Up to 14 times faster volume reconstruction for accelerated sample throughput with multi-GPU-based reconstruction
- Click & measure|CT functionality for high throughput
- Flexible functionality and interfaces for Customized CT
- CT system performance monitoring following ASTM 1695 guideline
- Production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

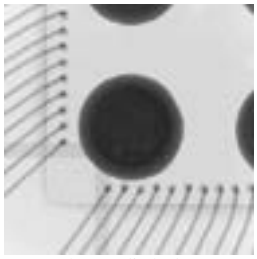
Diamond|window for up to 2 times faster hi-res data acquisition

Tube with **Diamond|window**

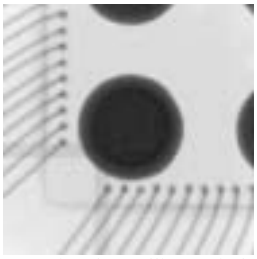
- Standard non-toxic target for all Phoenix micro- and nano-focus X-ray transmission tubes for 180kV/20W
- Up to 2X faster data acquisition at the same hi-res image
- Improved focal spot stability for long-term measurement
- Less degradation – increased high-power target life



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



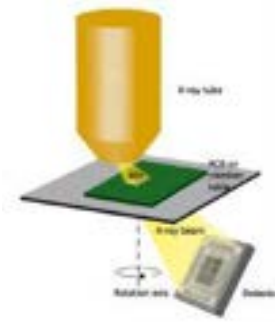
Diamond|window



Conventional Beryllium Window

The focal spot has to be wider at higher power 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 spots or higher resolution image acquisition up to two 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), 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

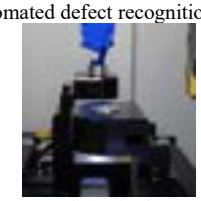
Complete visualisation and evaluation of multiple slice volumes of THT solder joint defects with Datos|x 3D|viewer

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

Speed|scan HD

Automated filter|changer

AI automated defect recognition (ADR)



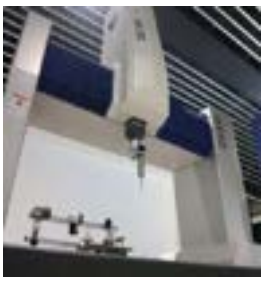
Dual manipulator

- Industry-proven fully automated high-speed inline CT system for production process control and optimisation. Automated part handling for 24/7 Speed|scan HD operations at exceptional voxel resolutions down to 25µm
- Large sample size inspections up to 100% of production volume
- Full 3D production control for electronic, automotive, medical devices, batteries, connectors, injection mouldings, and complex assemblies. 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

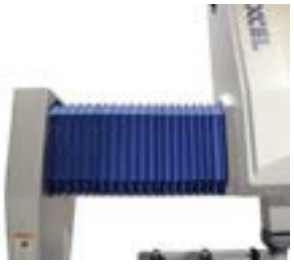
Speed|scan HD	
X-Ray Tube Type	Open directional high-power 240kV/100W microfocus tube with closed cooling water circuit
3D Geometrical Magnification	8X
Detail Detectability/Voxel size	Down to 20µm/Min 25µm
Detector type / Focus Detector Distance	Temperature stabilised Dynamic 41|200p+ large area detector 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(H) / 5kg
Dimensions W x D x H/Weight	~2310 x 2200 x 2055mm (without external components) / 7250kg
Max Focus Object Distance	500mm
Temperature Stabilization	Active X-ray tube cooling | temperature stabilised 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 an 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 AXCEL High Productivity CMM

AXCEL



New Highly Rigid Bridge



X-Axis temperature guide cover

4-direction Y-Axis air bearings

Open Y-Axis guide reduces heat.

- 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:
  - New drive mechanism increases speed by 64% and acceleration by 35% compared to previous models
  - New bridge structure with Y- and torsion-direction 3.8X and 1.5X increased rigidity than previous models
  - 4-direction Y-Axis guide support air pads, reducing runout and vibration at the probe tip
- Air Saver function reduces running costs. Option LED illumination of the 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

XYZAX AXCEL Probe Sensors

Zeiss RDS 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

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

XDT Probe (Option)

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

LineScan2 (Option)

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

ViSCAN (Option)

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

Renishaw PH Probe Systems

PH10T + motorised 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 W x H		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 the stylus with tip dia. Ø 3, length: 50mm for RDS.
[2]Adapting to temperature conditions of 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	
$P_{FTU, MPE}$		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 the stylus with tip dia. Ø 3, length: 50mm for RDS.
[2]Adapting to temperature conditions of 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

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

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

Energy-saving hybrid guideway

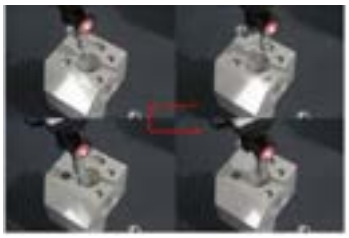
- In popular 5/8/4 and 5/5/4 compact sizes; 2.2+4L/1000µm at 18–22°C with PH10T+/TP200 probe
- 75% reduced air consumption and 73% savings on power due to using one air-bearing hybrid guideway
- 40% reduced footprint and 37% lighter L-shaped bridge; Smallest Ø 0.3mm stylus ball; 0.01µm res linear scales
- 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

Model		**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	
P_{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!* High Accuracy Manual CMM

mju NEX J with integrated PC



Automatic inner Ø hole measurement

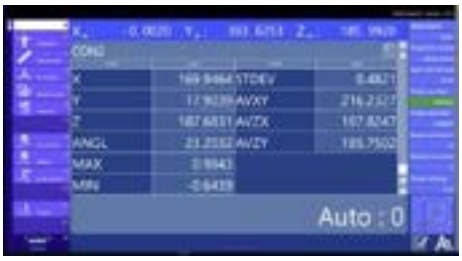
Auto Probing

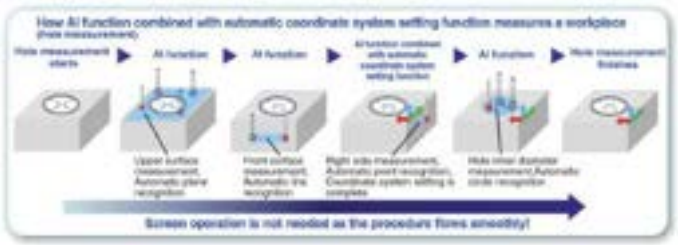
- New compact hand-held size operation box with double thumb sticks for easy positioning and precise measurement
- Smallest footprint in its class with air and power consumption reduced via a hybrid guide structure equipped with high-rigidity linear guides in X, Y (right), and Z axes and air bearings in Y axis (left).
- Dustproof covers for X and Y axes and Z axis column scale
- Auto-probing function at a constant measurement speed and force that enables accurate, stable measurements
- Field upgrades to CNC available when needed—for efficient creation of measurement plans and automatic CNC measurements of repeated samples for mass production and large inspection lots

Model	**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 / Min Display Value	Linear scale system / 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 // Gradient	1.0°C/hr, 2.0°C/day (at 18 – 22°C) // 1.0°C/m (at 18 – 22°C)	
Air Supply/ Consumption / Working Pressure	0.49 to 0.69MPa / 10Nℓ/min / 0.30MPa	
Power Supply / Consumption	Single phase AC 100V±10%. Grounding required. / 550W	
System W x D x H / Weight	1805 x 1920 x 2170mm/620kg	1805 x 2200 x 2170mm/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.

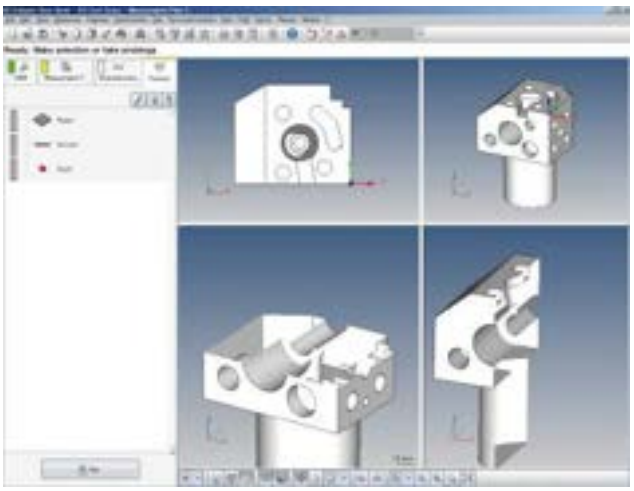
XYANA smart® General Purpose Measuring Software for Manual CMM





- For mju NEX J and SVF NEX supporting touch input and key-in
- AI auto geometric feature judgment, inner hole Ø measurement, voice guidance, coordinate system assist, etc.
- Avoid negative measurement influences / prevent breakdowns and shipment of defective products with alerts
- Support for accurate measurement that reflects the actual conditions

CALYPSO Powerful Versatile CMM Operations



On-screen Articulating Probe Angle Simulation

Automatic Stylus Calibration

- CAD kernel for efficient operability. Optional Interfaces: IGES 2D/3D, VDA 2D/3D, STEP 3D, DXF, PMI, and FTA direct processing or native interfaces: ParaSolid, CATIA V4, CATIA V5, ProE, UG, Inventor and SolidWorks
- Patented AI auto element recognition—points, straight lines, flat surfaces, spheres, symmetrical points, circles, cylinders, cones, ellipses, square and long holes—coordinate system setting and measuring plane recognition
- Auto Collision-Free Measuring Path Generation with safety/supplementary planes and probing return distance
- Geometric Division Evaluation for Flatness, Roundness and Straightness
- Actual Point Memory—Difference of flatness measurement 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, Diverse Edit, Calypso Macro, 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

Geometric Element Preview

Interchange of Icons

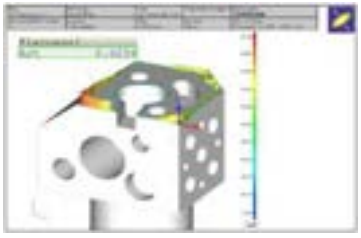
Calypso AutoRun Function

CALYPSO Powerful, Flexible Report Generator

Custom printout output example

Compact printout output example

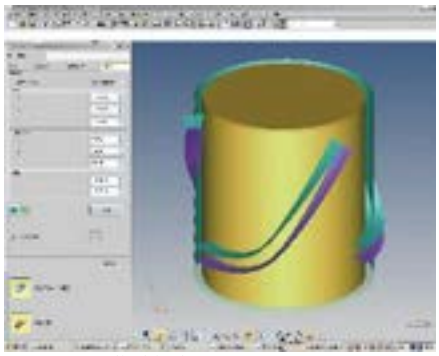
Roundness colour level evaluation



Flatness colour level evaluation

CALYPSO CC Curve Powerful Options for 2D and 3D curves—slope, length, form, cam throw, surface area for crank/camshafts, turbine blades

Calypso-CURVE



Cylindrical Cam Measurement

Blade Pro: Turbine Blade Evaluation Option

Form Data ASCII Input/Output Option

Expanded Plot Option

TESCHART Plus Optional Inspection Chart Generation Program

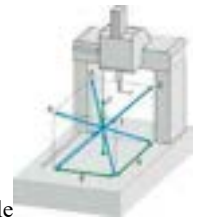
TESCHART PLUS

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

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)

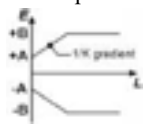
A step, block, or other artefact gauge is used with a total of 105 length dimensions—five gauges of varying lengths measured three times from seven directions within the CMM's measuring range. E_0 is the maximum difference between the standard calibration value and the measured values and must be within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



Seven positions example

E_0

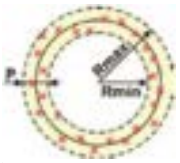
E_{150}



MPEE = ± [A + L/K ≤ B]
L= measured length in mm. A & K are constants, and B is the upper limit specified by the manufacturer in µm

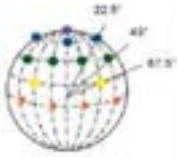
Limit of Repeatability Range R0 MPL (ISO10360-2)—From the E0 test values, for each of the 35 sets of three repeated length measurements, the difference between the maximum and minimum of the three test values is calculated. If these are equal to or less than the specified limits, the CMM has met its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

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

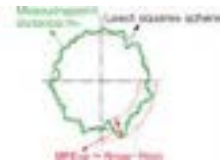


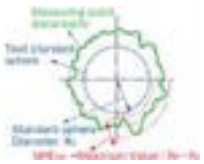
Probing Target Contact Points

- One point at the pole determined by styli shaft direction
- Four evenly spaced points 22.5º below the pole
- 45º below the pole: eight evenly spaced points rotated 22.5º from the previous group
- 67.5º below the pole: four evenly spaced points rotated 22.5º from the previous group
- 90º below the pole (equator): eight 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 a measuring pitch of 0.1mm, and the least squares method centre position is calculated. The distance R from this sphere centre location to all measured points is calculated. 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 the above must fall within the manufacturer's THP specifications. The time for the test is in seconds. THP is the range of all radii (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 evenly distributed are measured on a hemisphere of a test standard sphere of Ø 10 to 50mm, and the least squares method centre position is calculated. The distance R from this sphere centre location to the 25 measured points is calculated. PFTU is the difference between the maximum and minimum values of the 25 calculated distances (R_{max} – R_{min}) = sphere form, probing. This must be within the manufacturer's PFTU specifications, considering measuring uncertainties expressed in µm.

PFTU

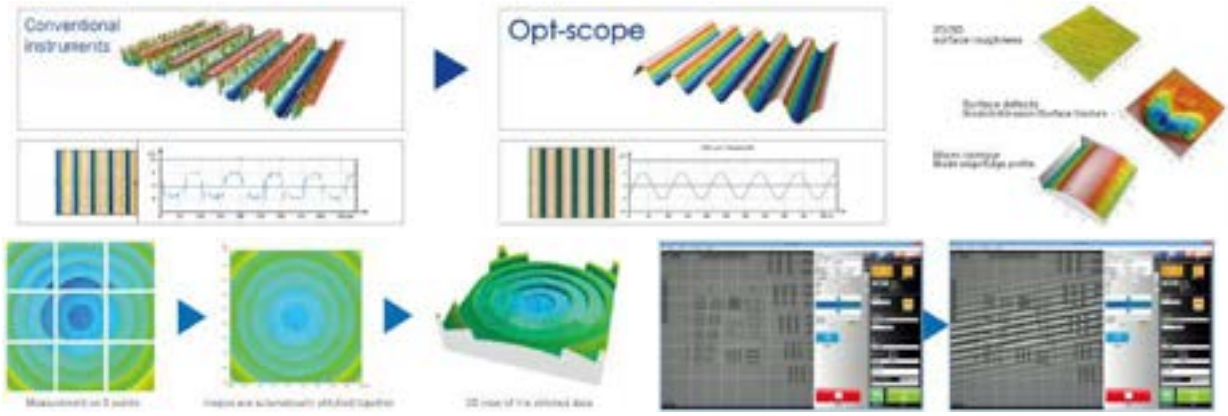
OPT-SCOPE *NEW!* Non-Contact Versatile Roughness Evaluation

Opt-scope R

Opt-scope R200

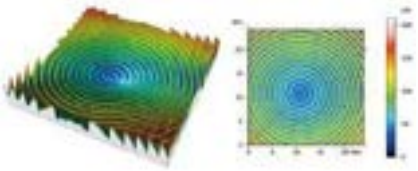
Opt-scope Rex st400

- Proprietary Peak Detection Algorithm of white interference fringe (DEAP) cum high-resolution PSI (Phase Shifting Interferometry) with a wide range of VSI (Vertical Scanning Interferometry)
- High-speed camera with improved DEAP2 algorithm—Six times faster than previous models
- Fast, comprehensive 3D surface texture and profile measurements of superfine surfaces and machined components
- Hundreds of times faster than styli instruments—Super-fast with original white light interferometer
- EDR function using two different amounts of light in one scan to obtain accurate, complete measurement of surfaces with strong brightness contrast
- Continuous measurement and stitching with an optional electric stage to extend measurements beyond the field of view for analysis as a single measurement dataset
- Highest resolution plus wide range—allows 3D evaluation of grinding stones, needle pins, blades, etc.
- 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

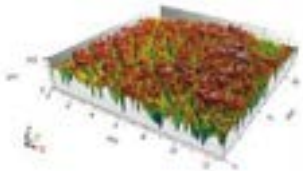


Continuous measurement and stitching functions

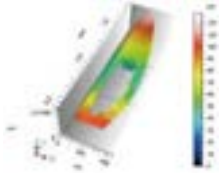
After applying the Autofocus function



Advanced Contour Analysis



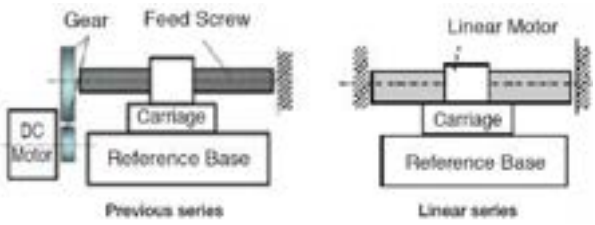
Grain Analysis



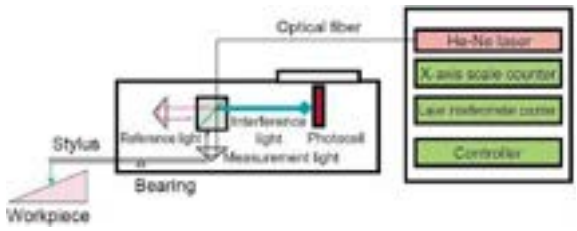
Fine Roughness Evaluation – Tip of injection needle

SURFCOM CREST Highest Accuracy and Speed

SURFCOM CREST



Linear Motor Drive (patented)



Sensor Structure

- 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!
- 42000000:1 Dynamic range: Resolution ratio! Evaluate contour profiles and hidden fine surfaces in one trace
- High-speed low, vibration linear motor drive—for stable, high accuracy, high-magnification measurement
- Tilting Unit Model—Surfcom Crest-T with up to 45° motorised tilting unit also available

Surfcom CREST	
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 meas force; 2µm R (50mm arm) with retract fn
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 W x D x H/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

Newly developed wide-range hybrid detector

Roughness, Contour/Hybrid Detectors, Driver Unit, and Measuring Stand

Freely combine/change detectors.

Ultra-low vibration linear driver

SURFCOM NEX

- World-first dual sensor hybrid detector—combines wide-range high-accuracy and narrow-range hi-res sensors for concurrent roughness and contour measurement (Patented)
- Z-axis measuring range extended to 13mm (2.6 times wider than conventional detectors)
- Patented hi-accuracy linear motor tracing driver minimises vibration for unmatched performance
- Patented newly developed column design enables extremely high-speed driving for shorter tact time
- Highest Z Indication Accuracy in class: ±(1.0+2H/100)µm
- Contour Detector linear drive with temperature correction for extended 20°C±5°C temperature range
- Quick-change arm with auto-recognition (Patent Pending)
- Z-axis 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

Detector Selection

Hybrid dual sensor detector

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

Contour detector

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

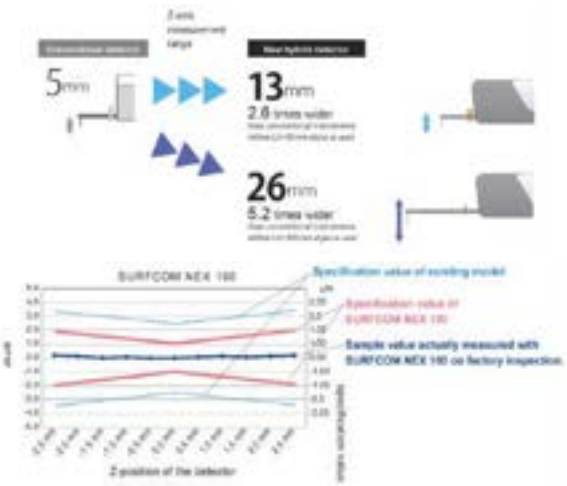
High-accuracy contour

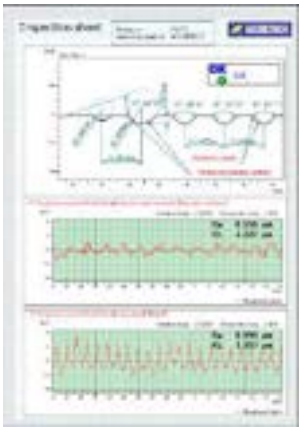
- Hi-acc laser diffraction linear scale for full-range measurement resolution of 0.02µm
- Indication accuracy: ±(0.8+|2H|/100)µm over 60mm Z-Axis Measuring range
- Auto meas force adjustment mechanism over 60mm Z-Axis meas range and quick-change
- Upward/downward meas option

Roughness Pickup

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

Hybrid Dual Sensor Detector

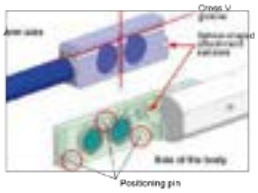




Contour Detectors

Attaching 100mm High rigidity offset arm.

Attaching lower offset arm attachment



Quick-change Arm

T-shaped stylus

Safety mechanism against detector collision

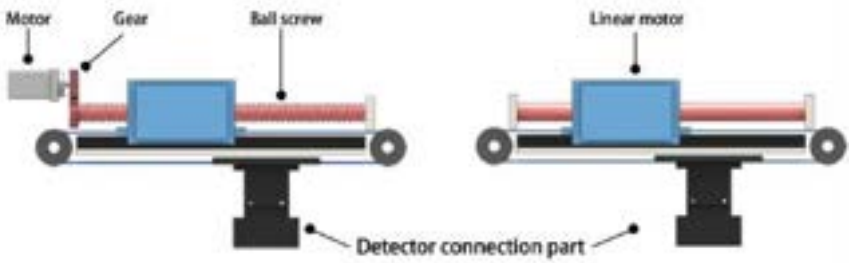
Optional Attachment for quick change arm

Roughness Detector

Measurement range of 1000µm in the Z direction

Auto stop possible for upward measurements

General Surface Texture and Contour Profile Measuring Instruments



Ball screw drive is based on transmission of motor rotation to the ball screw via a gear (daily oil supply is required)

The linear motor drive is based on magnetic attraction/repulsion forces of the magnet (daily oil supply is not required)

SURFCOM NEX DX2/SD2 Specifications

Model		-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		±15° (Optional tilting device)							
Measuring Stand Column Max Travel Speed/Base Material		CNC 50mm/s; Joystick 50mm/s/Gabbro							

Specifications	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

Specifications	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)

Specifications	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)

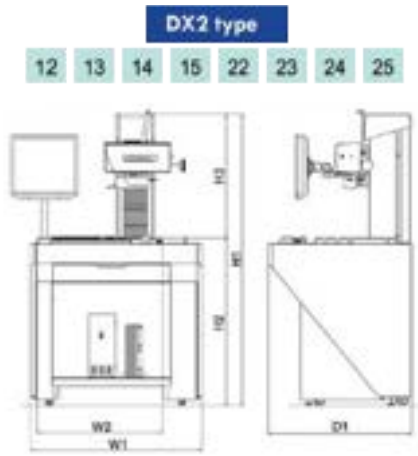
[1]Excluding when using roughness pickup. [2]Guaranteed accuracy excludes deformation of the piece caused by temperature change. [3]Indication accuracy (vertical) with general-purpose contour detector is variable depending on the temperature range. [Notes] Power and air supply and connecting hose required before the delivery. Power Supply (type D grounding) required. The 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.

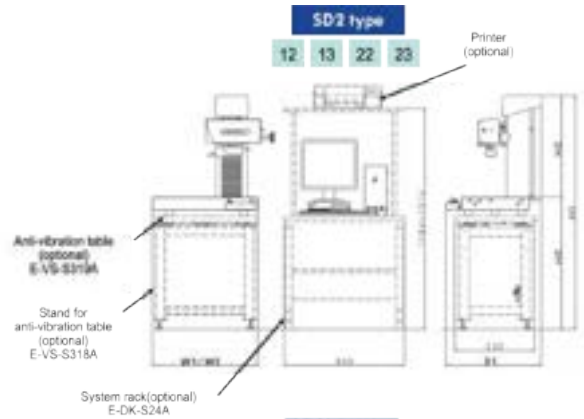
SURFCOM NEX DX2 Type External Specifications

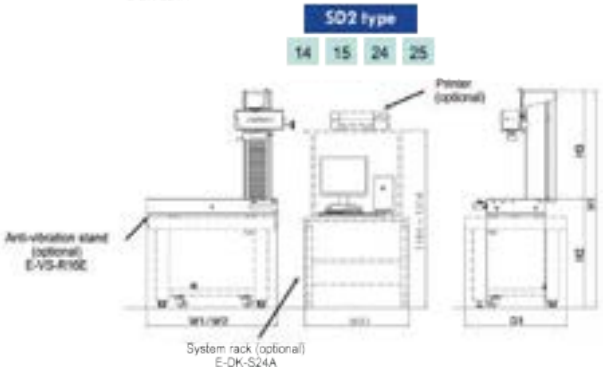
DX2 Type		Main Unit Dimensions			Table	Column	Measuring range		Base		Weight (kg)		
In mm, unless indicated		Width W1	Depth D1	Total Height H1	Height H2	Height H3	X-Axis	C-Axis	Width W2	Depth	Main unit	Total Weight[1]	Max Load
DX2	12	960	800	1489	855	634	100	250	700	450	277	290	82
	13			1689		834		450			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

SD2 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	C-Axis	Width W2	Depth	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]Weights on Left—include PC, driver unit, and monitor. Weights on Right—include PC, driver unit, monitor, and optional accessories (anti-vibration table, stand, rack) [3]Max Load is the value with optional anti-vibration table.													

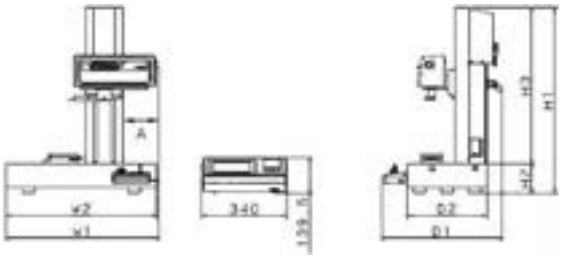






Surfcom Touch 550 Ergonomic Roughness Measurement

- 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
- Granite bases and columns can be combined to your workpiece height and X-axis drive range requirements



Surfcom Touch 550

Model	-11	-12	-13	-14	-15	-21	-22	-23	-24	-25
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	1163mm	667mm	738mm	938mm	963mm	1163mm
Machine Column Height H3	552mm	623mm	823mm		1023mm	552mm	623mm	823mm		1023mm
Column Travel Range	250mm		450mm		650mm	250mm		450mm		650mm
Base Width W2	600mm			1000mm		600mm			1000mm	
Base Depth D2	317mm			450mm		317mm			450mm	
Base Height H2	115mm			140mm		115mm			140mm	
Column Set (Position A)	140mm			240mm		140mm			240mm	
Machine Weight	89kg	95kg	104kg	209kg	218kg	94kg	100kg	109kg	214kg	223kg
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	600x317mm			1000x450mm		600x317mm			1000x450mm	
Measurement Stand Base Material	Granite									
Measurement Stand Max Load[1]	48kg	42kg	33kg	58kg	49kg	43kg	37kg	28kg	53kg	44kg
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, levelling 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

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

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.	

Handysurf+ / Surfcom Touch 35/40/45 Ultra-Portable Roughness

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.

Model	**-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				

Processor Choices

Surfcom Touch 35/40/45

Handysurf+

- Handy-type driver can be attached
- Calibration table E-WJ-S1045A, roughness specimen E-MC-S24C, touch pen E-MA-S112A, paper E-CH-S25A, SupportWare II V-type nosepiece E-WJ-S536A are included
- Calibrate without driver height/inclination adjustment

- Compact and versatile. Detachable display and tracing driver.
- USB port for small printer, USB memory stick, and PC
- 2.4-inch colour LCD. Six intuitive operations buttons. Multiple analysis functions. Stores 10 sets of measurement data

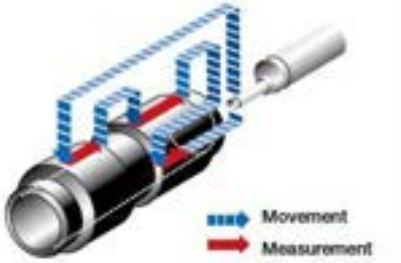
Model	**Surfcom Touch 35/40/45**	**Handysurf+**
Built-in battery with AC adaptor	3-hour full charge for ≈ 600 measurements	4-hour full charge for ≈ 1000 measurements
Power Supply	Single phase AC 100 to 240V±10%. Grounding required. 50/60Hz.	
Power Consumption	Max 80VA	Max 10W
Dimensions W x D x H/Weight	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

Model		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 colour liquid crystal touch panel	2.4-inch colour 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



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

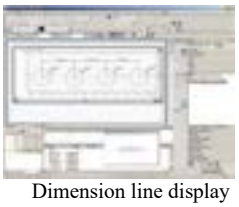
- Patented AI auto-selects roughness measuring conditions
- Teaching function to automate repeat measurements and generation of final reports
- Special film thickness step/area, wear volume calculation (superimposed profile area), and LCD glass substrate (special waviness) evaluations
- Re-perform analysis 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 a contour detector

Model		**-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 Hi-Accuracy Contour Metrology

SURFCOM 2600G



Dimension line display function

Peak and Valley function

- ≤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 fibre connectors, ball screws, precision parts
- Add roughness detector to become Surfcom 2800G/1800G

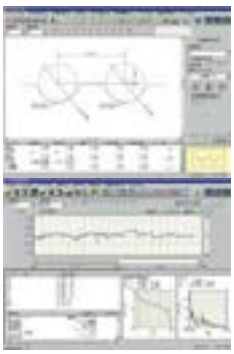
Model		**-11**	**-12**	**-13**	**-14**	**-21**	**-22**	**-23**	**-24**
Z-Axis Measuring Range		50mm							
X-Axis Measuring Range		100mm				200mm			
Tracing Column Up-Down stroke		250mm		450mm		250mm		450mm	
C1600G Z-Axis Scale Indication Accuracy		±0.25% (full scale)							
C1600G Contour Resolution		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.

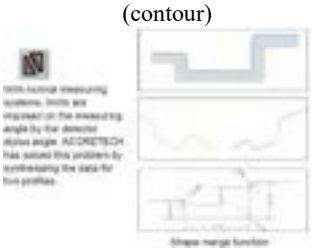
SURFCOM 2800G/1800G Combi Roughness-Contour Metrology

SURFCOM 2800G

- S2800G/1800G combines C2600G/1600G with S1400G!
- Patented roughness AI automatically sets measuring conditions and executes measurement. Contour AI auto-recognises 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)



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

Current Engine Production Roughness Measurement

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

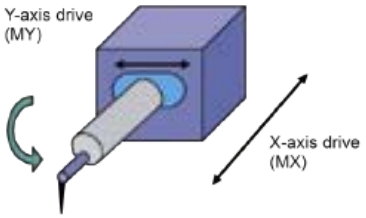
By Portable Texture Measuring

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

SURFCOM C5 Example for crankshaft

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)



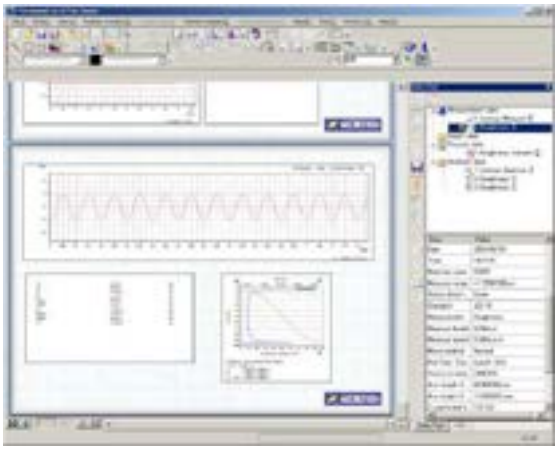
Surfcom C5	
Z-Axis Measuring Range	1000µm
X-Axis Measuring Range	200mm
Tracing Column Up-Down Stroke	500mm (resolution 0.1µm)
X-Axis Tracing Driver Travel Range	200mm (resolution 0.1µm)
Y-Axis Column Cross-Feed Travel Range	800mm (resolution 0.1µm)
Y-Axis Pickup Tracing Driver Travel Range	50mm (resolution 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

ROUGHNESS-CONTOUR—LINE-UP RECAP

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	●	-	●	-	-	-	-	1000µm	-	0.1-20nm	0.05+L/1000µm
Contour	S NEX 030	-	●	-	-	●	-	-	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	●	●	●	-	●	-	-	Roughness: 1000 µm Contour: 60 mm	±1.2 + |2H|/100 µm (20°C ±2°C) ±1.5 + |2H|/100 µm (20°C±5°C)	Roughness: 0.1-20nm Contour: 0.04 µm	Roughness: (0.05+L/1000) µm Contour: 1 µm/100 mm (2 µm/200 mm)
	S NEX 041									±(0.8+|2H|/100) µm	Roughness: 0.1 to 20 nm Contour: 0.02 µm	
Integrated Hybrid Roughness/ Contour	S NEX 200	●	●	●	-	●	-	-	13mm[1]/ 26mm[2]	±1.0+|2H|/100µm	0.9nm(13mm)/ 1.8nm (26mm)	0.05+L/1000µm
	S CREST DX/SD	●	●	-	-	-	-	●	13mm	±0.2+|H|/1000µm	0.31nm	0.05+3L/10000µm
Roughness	S1400G	●	-	●	-	-	-	-	800µm	-	0.4-10nm (0.1nm)[3]	0.05+1.5L/1000µm
	S Touch 550	●	-	●	-	-	-	-	1000µm	-	0.1-1.25nm	
	S Touch 50											0.3µm/50mm
	S Touch 35/40/45	●	-	●	-	-	-	-	370µm	-	0.7nm	-
	Handysurf+ 35/40/45											
Contour	C1600G	-	●	-	●	-	-	-	50mm	±0.25% Full scale	0.1-1µm	1µm/100mm 2µm/200mm
	C2600G				-	●				±0.8+|4H|/100µm	0.025µm	
Combined Roughness/ Contour	S1800G	●	●	●	●	-	-	-	Roughness: 800 µm Contour: 50 mm	Contour: ±0.25% Full scale	Roughness: 0.4 to 10 nm (0.1 nm)3 Contour: 0.1 to 1 µm	Roughness: (0.05 + 1.5 L/1000µm) Contour: 1 µm/100 mm (2 µm/200 mm)
	S2800G				-	●				Contour: ±(0.8 +|4H|/100) µm	Roughness: 0.4 to10 nm (0.1nm)3 Contour: 0.025 µm	

[0]DX2/SD2 refer to pg. 20; [1]When LH=50mm stylus is used.; [2]When LH=100mm stylus is used; [3]When high-magnification pickup is used.
*Some of our products shall be controlled by the Foreign Exchange and Foreign Trade Act and require an export license from the Japanese Government. Regarding exporting this product and/or providing technologies with a non-resident, please consult Tokyo Seimitsu.

ACCTEE for Integrated Roughness Measurement



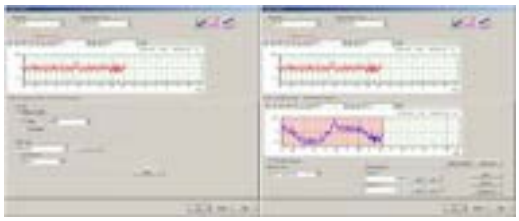
Easy to Use – All Operations in Document Screen!

- 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

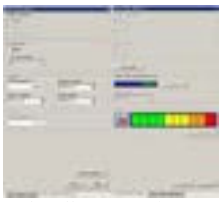
Self-Diagnosis Auto Pass/Fail Judgement under 16% JIS2001 Rule

AI: Can specify parameters, analysis/optimum measurement condition

Pickup sensitivity calibration by depth, magnification, or ref specimen



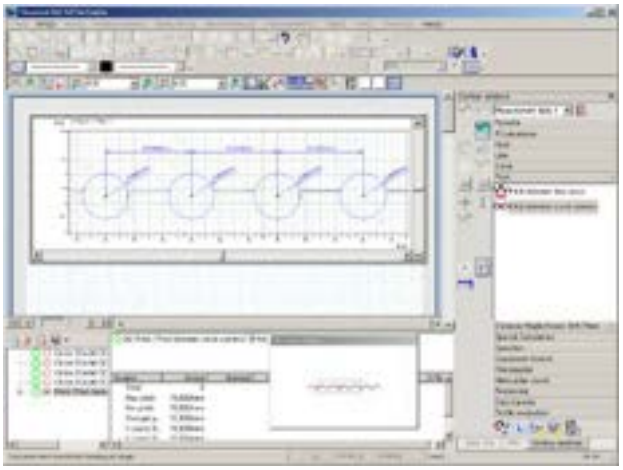
Change Analysis Conditions with Preview Function



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 centre line, rolling circle, rolling circle centre 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 Amt 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

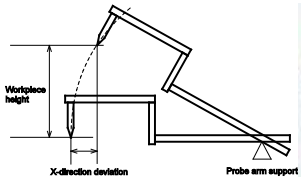
Work Trace Function displays manually traced profile

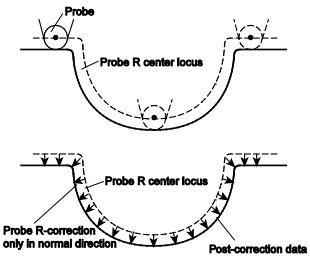
Ball Circle Calculation Ball Screw Probe Calculation

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

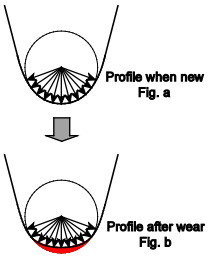
Master Ball Calibration Function (Patented)

Circle Correction Calculation: As the probe moves in a circular motion vertically around the support, x-axis error produced in the X-axis direction together with 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 centre 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 centres), 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

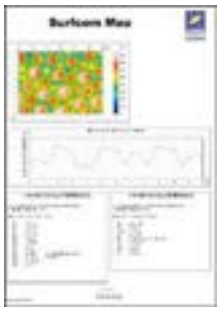
Workpiece Movement Type

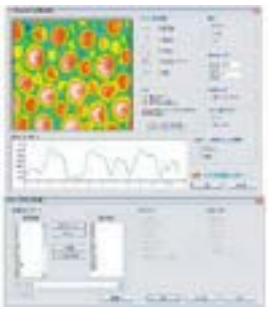
Y-Axis range settable between 50 to 200mm. For CREST/NEX/2800/1800/1400/2000/2900/1900/1910/1500.

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.

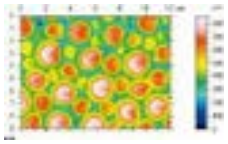
Specifications	E-DH-S173B	E-YM-S06B	E-YM-S12B	E-YM-S07B	E-YM-S08B
Drive System	Detector Moves	Workpiece Moves			
Drive Range	13mm	50mm	100mm	150mm	200mm
Min Feed Pitch / Measurement Pitch	0.001mm / 2 to 4001 lines				
Straightness Accuracy	1µm	0.05+3L/1000µm			
Table Dimensions	Handles large, heavy parts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

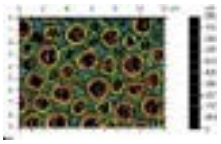
Analysis Functions



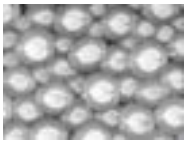
Colour Display

3D Display (Surface)

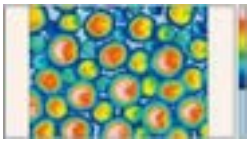
3D Display (Line)



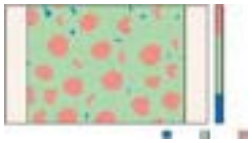
Contour Screen



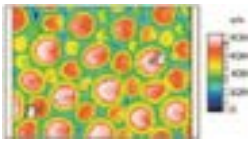
Photograph Display



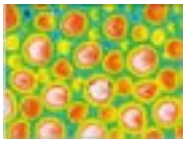
Island Volume



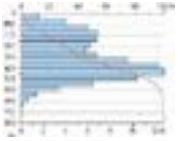
Section Profile Display



Distance & Angle



Hole/Projection Vol



Bearing Area Curve

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

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 points from upper table surface and R = distance from table rotational centre in mm.

RONDCOM NEX High Productivity Roundness—Fully CNC

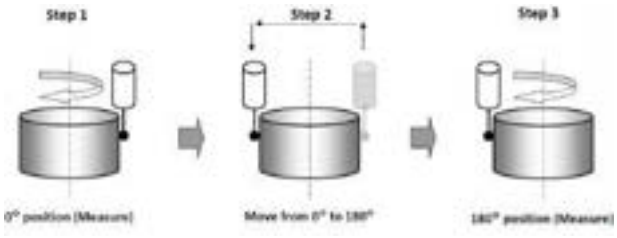
- High Rotation Accuracy: 0.02+3.2H/10000µm
- Measures Roundness, Diameter and Roughness with one system
- Automatic switching of measurement direction and force with the AFD (Automatic Force adjustment Detector)
- Optional XY-Axis automatic stage—for multiple workpiece measurements-in-one-run, saving time and operator effort
- Patented offset type detector holder
- Auto-centering/-tilting/-levelling functions
- R-Axis taper-follow 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 lightweight 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

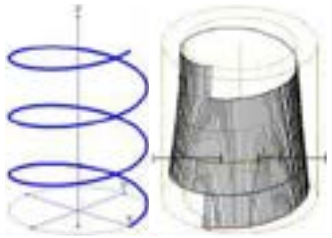
XY-Axis Automatic Stage

3 Measuring Functions in 1

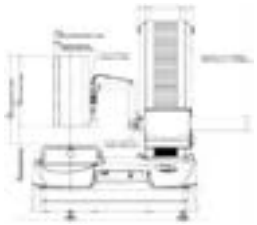
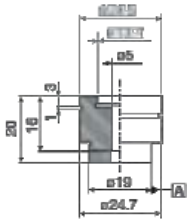


Patented diameter measurement – Opposite Pair Method

R tracking during measurement

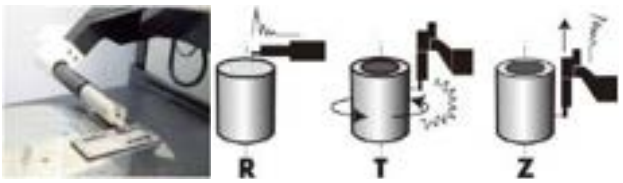


Spiral cylinder measurement

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

RONDCOM NEX Rs High Productivity Roundness Plus Roughness

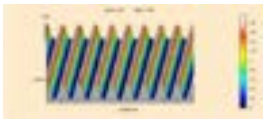
RONDCOM NEX R



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

Lead twist measurement option

0.5°pitch (720 lines) 5°pitch (72 lines)

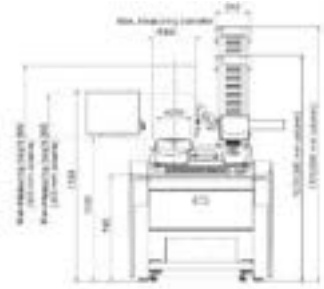


Features (in addition to Rondcom NEX features)

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

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

Measuring crankshaft using designated jig tool



RONDCOM NEX α

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

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

Models and Sizes	100					200					300				
Standard or Deluxe	SD2			DX2		SD2			DX2		SD2			DX2	
RONDCOM NEX (-11, 12)[1]	11	12		11	12	11	12		11	12	11	12		11	12
RONDCOM NEX α (-21, 22, 23)	21	22	23	21	22	21	22	23	21	22	21	22	23	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 mm	300	500	900	300	500	300	500	900	300	500	300	500	900	300	500
Max Loading Diameter	Ø 580mm														
Max Measuring Height in mm	300	500	900	300	500	300	500	900	300	500	300	500	900	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 0.20 µm /100mm (-23 model)														
	0.15µm/300mm for -11/-21 models; 0.23µm/500mm for -12/-22 models, 0.90 µm/900mm for -23 model														
R-Axis Rad 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 model, 2.01.0µm/900 for -23 model														
R-Axis/T-Axis Squareness Acc	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 Meas Speed	1 to 10/min; Rs: 0.01 to 1/min (roughness measurement)														
Z-Axis Up-Down Meas Speed	0.5 to 10mm/s; Rs: 0.1 to 1.5mm/s (roughness measurement)														
R-Axis Radial Meas Speed	0.5 to 10mm/s; Rs: 0.1 to 1.5mm/s (roughness measurement)														
θ-Axis Rotational Speed	max. 20/min														
Z-Axis Up-Down Speed	5 to 60mm/s														
R-Axis Radial Movement Speed	5 to 30mm/s														
Table Dia / 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), NEX -23 (Max loading mass 60kg, 900mm 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 points from the upper table surface, and R = distance from the table rotational centre 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 Sizes	100					200					300				
Standard or Deluxe	SD2			DX2		SD2			DX2		SD2			DX2	
RONDCOM NEX (-11, 12) [1]	11	12		11	12	11	12		11	12	11	12		11	12
RONDCOM NEX α (-21, 22, 23)	21	22	23	21	22	21	22	23	21	22	21	22	23	21	22
Number of Sampling (point)	See **ACCTEE Roundness Measurement Software**														
Digital Filter															
θ-Axis Rotational Dir Lowpass															
θ-Axis Rotational Dir Bandpass															
Z-Axis Rectilinear Dir Lowpass															
Form error roundness Evaluation															
Rotational Direction Meas Items															
Rectilinear Direction Meas 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 & NEX 200 -11/-21 model))														
Display Items	Measuring conditions, measuring parameters, comments, printer output conditions, profile graphics (expansion plan, 3D plan), error messages, etc.														
Installation Width in mm	720		1074	1400		720		1074	1400		720		1074	1400	
Installation Depth in mm	580		824	820		580		824	820		580		824	820	
Installation Ht NEX in mm	925	1125	N/A	1595	1795	925	1125	N/A	1595	1795	925	1125	N/A	1595	1795
Installation Ht NEX α in mm			2125					2125					2125		
Installation Ht NEX Rs in mm	N/A							N/A					N/A		
Installation Ht NEX Rs α in mm								2125					2125		
Machine Weight NEX in kg	180	190	N/A	330	340	180	190	N/A	330	340	180	190	N/A	330	340
Machine Weight NEX α in kg	200	210	570	350	360	200	210	570	350	360	200	210	570	350	360
Machine Weight NEX Rs in kg	180	190	N/A	330	340	180	190	N/A	330	240	180	190	N/A	330	340
Machine Weight NEX Rs α in kg	200	210	570	350	360	200	210	570	350	260	200	210	570	350	360
Power Supply	Single phase AC 100 to 240V. Grounding required. 50/60Hz.														
Power Consumption	Approx. 630VA														
Air Supply	NEX: 0.35 to 0.7MPa / NEX α, NEX Rs, NEX Rs α: 0.45 to 0.7MPa														
Working Pressure	NEX: 0.3MPa / NEX α, NEX Rs, NEX Rs α: 0.4MPa														
Air Consumption	NEX: 30Nℓ/min / NEX Rs, 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 Range	20±2°C														

RONDCOM 65B Ultra-High Accuracy CNC Roundness

RONDCOM 65B

Offset Type CNC Detector Holder (Patented)

- Highest Rotation Accuracy in Class: 0.01µm
- Centering and tilting within 60 secs
- Robust, high accuracy, and high rigidity structure
- Gabbro for age-related durability used in column, base and arm, ensuring top-class high accuracy over time
- Patented Offset-type detector holder option—measure various workpieces easily without interference from the R-Axis arm
- Switch easily between outside diameter and top flatness measurements just by tilting the detector holder

Model	**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
Max Measuring Depth (Throat height)	150mm	
	(limited by the measuring diameter and detector-stylus combination)	
Radial Rotation Accuracy[1]	0.01+4H/10,000µm	
	(H: Height from tabletop 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	1740x875x1755mm/810kg	1740x875x2075mm/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

Model	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 tabletop 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]	1974x924x1950mm/500kg	1974x924x2250mm/520kg

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

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

RONDCOM 43C

RONDCOM 41C

RONDCOM 31C

- Bar Graph aids Centering/Tilting Adjustment
- High-precision straightness R43C/R41C column with high column option
- R31C (without straight Z column) designed for coaxiality and concentricity measurements of centre point deviation
- Integrated ACCTee / Compact, space-saving / Energy-efficient high precision static-pressure air bearings (θ-Axis)

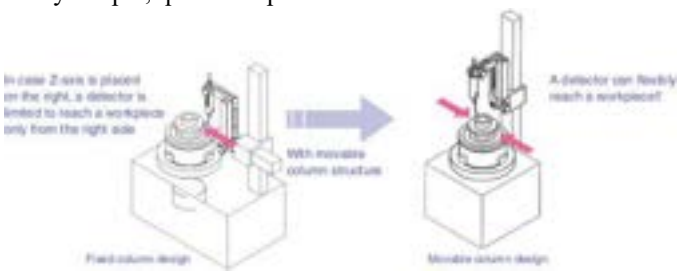
Model	R43C	R41C	R31C
Measuring Method	Manual		
Max Measuring Diameter/Loading Diameter	250mm / 400mm		
R-Axis Right-Left Feed Range	125mm		
Z-Axis Up-Down Feed Range Standard	300mm		200mm
Z-Axis Up-Down Feed Range High Column	N/A	500mm	N/A
Max Measuring Height Standard	300mm		200mm
Max Measuring Height 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 Hi Column	N/A	0.5µm/100mm, 2.5µm/490mm	N/A
R-Axis Radial Straightness Accuracy	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	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	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	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]	1800x1000x1800mm/ 130kg	1800x1000x1700mm/120kg	
Dimensions (Hi Column) W x D x H/Weight[2]	R41C only: 1800x1000x1900mm/140kg		

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

RONDCOM TOUCH Affordable Compact Roundness

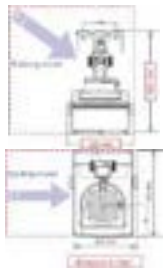
- Compact Design and Small Footprint (Nearly Portable)!
- Only 320x410mm W x D (0.13m^2 footprint); 500mm height!
- Measures workpieces up to Ø 150mm and 15kg weight!
- Movable Column Design (Patented):
  - R-Axis can be moved from side to side
  - Z-Axis column can be moved from side to side
  - Flexibility 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 the 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	320x410x500mm/Approx. 26kg[2]

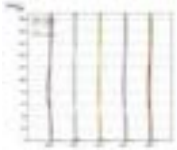
[1]Per JISB7451-1997; Accuracy guaranteed temperature at 15 – 30°C. [2]Excludes printer and tablet PC.

RONDCOM 73A CNC Detector Rotating Roundness

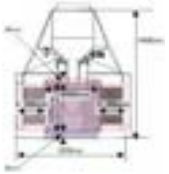
RONDCOM 73A

- 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 the need to change detector position
- 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 recognises 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	600x550mm/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	1235x1455x2500mm/1500kg (Measuring Unit) 800x800x1400mm/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	800x680m/ 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	2200x2050x3200mm/6700kg (Measuring Unit) 800x800x1400mm/100kg (Control Unit)			

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

RONDCOM GRANDE CNC Roundness for Very Large, Heavy Parts

RONDCOM GRANDE

Features: High-precision air bearings. Flexible R-Axis able to measure roughness and contour.

RONDCOM GRANDE DUO Option—Two Rondcom Grand in unison

RONDCOM Grande DUO (Option—combines two Rondcom Grand units working together!)

Model	**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 centre 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	

ROUNDNESS—LINE-UP RECAP

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 Dimension in mm	Feed Range in mm	Cylindricity/	Straightness Accuracy in µm	Max Measuring Ø in mm	Feed Range in mm
Crest		●	-	●	-	●	-	±1000	●	65	0.01+3H / 10000	340	500	✓	0.05/100mm 0.13/350mm	420	250
NEX 100/-α	DX2	-	●	●	-	●	Δ	±1000	●	30/60	0.02+3.2H / 10000	235	300	✓	0.10/100mm 0.15/300mm	300(350)[1]	180
	SD2	-	●	-	●	●	Δ										
NEX 200/300 /-α	DX2	●	-	●	-	●	Δ	±1000	●	30/60	0.02+3.2H / 10000	235	300	✓	0.10/100mm 0.15/300mm	300(350)[1,2]	180
	SD2	●	-	-	●	●	Δ										
NEX Rs 200/300 /-α	DX2	●	-	●	-	●	Δ	±1000	●	30/60	0.02+3.2H / 10000	235	300	✓	0.10/100mm 0.15/300mm	300(350)[1,3]	180
	SD2	●	-	-	●	●	Δ										
Touch		-	●	-	●	-	●	±400	-	15	0.04+6H / 10000	148	162	-	-	150	160 (±80)
65B		●	-	●	-	●	Δ	±1000	Δ	60	0.01+4H / 10000	290	500	✓	0.05/100mm 0.2/500mm	420	220
60A		●	-	-	●	●	Δ	±1000	Δ	60	0.02+6H / 10000	290	500	✓	0.1/100mm 0.25/500mm	420	220
43C		-	●	-	●	Δ	●	±400	-	15	0.02+6H / 10000	148	300	✓	0.25/100mm 0.8/300mm	250	125
41C		-	●	-	●	Δ	●		-	25	0.04+6H / 10000		300	✓	0.5/100mm 1.5/300mm	250	125
31C													200	-	-		

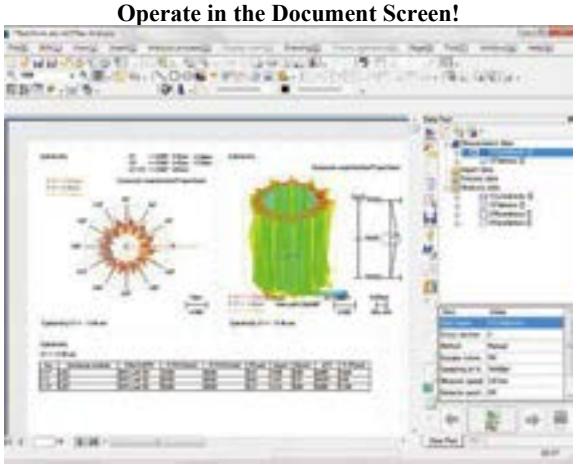
[1]With optional offset-type detector holder E-DH-RB86A. [2]For R NEX 200/NEX α 200. [3]For R NEX Rs 200/NEX Rs α 200.

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	●	-	Δ	●	±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	●	-	●	Δ	±800	-	200	0.06	600	120	600x550	1000	0.9/200mm	450	265
Grande	●	-	●	X	±1000	-	500	0.08+H/1000	X	X	Ø 1650	550	0.15/100mm 0.5/490mm	1650	450

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

ACCTEE for Roundness Metrology

Operate in the Document Screen!



ACCTEE

Easy Mode

Expert Mode

Patented Gear Tip Analysis

- 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

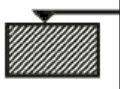
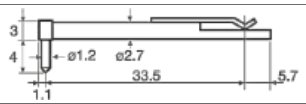
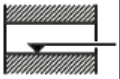
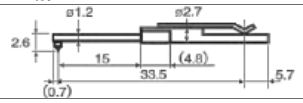
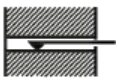
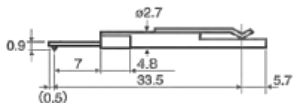
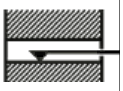
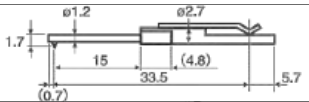
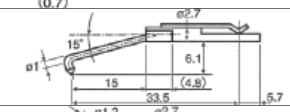
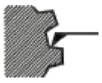
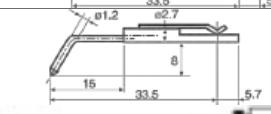
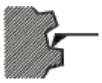
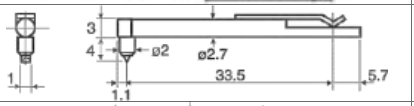
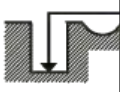
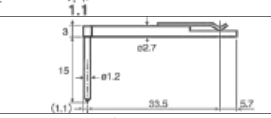
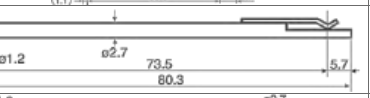
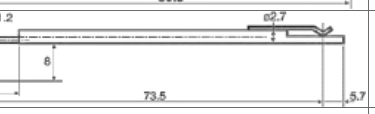
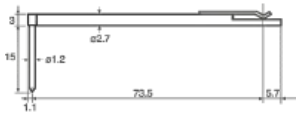
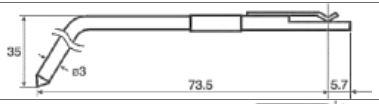
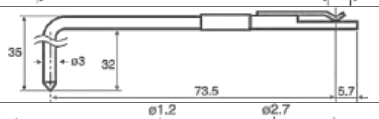
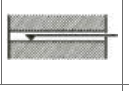
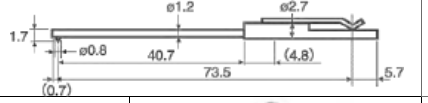
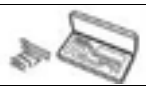
Select calibration artefact (depth/reference specimen or magnification cal unit), input condition ref value, installation method and measurement position to start!

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

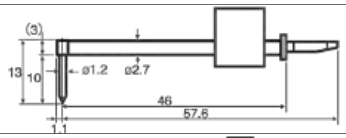
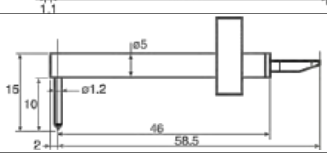
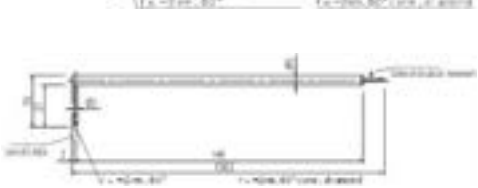
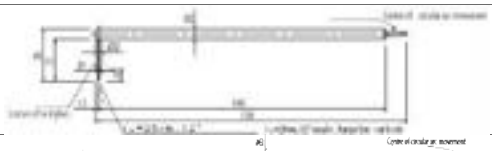
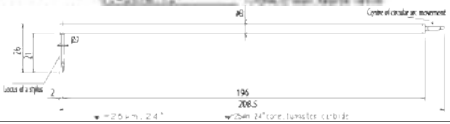
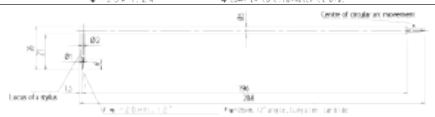
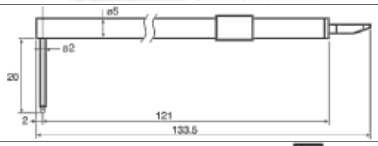
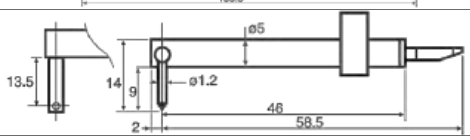
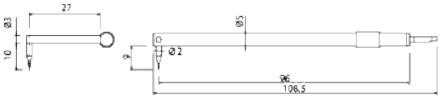
For S-Touch Series/S-1400/S-NEX**2 DX2 SD2/S-NEX**1 (Tip Radius 2 µm)

Applications		Model	External view	Specifications	Remarks
General purpose		DM43801		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			• All orientations • Calibration with the level difference reference specimen is possible *(Optional calibrator E-MC-S50 required)*
Fine holes/thin grooves		DM43812[1]			
Hole bottom/conical surfaces		DM43813			• All orientations • Horizontal tracing possible
Corners/tooth surfaces		DM43814[1]			
Gear tooth profiles, thread flank		DM43818[2]			• All orientations • Magnification: x10000
Fine wires, knife edges		DM43802		60° Knife edge-shaped, Diamond, 0.75mN	• All orientations
Deep/round grooves		DM43815[1]		60° Cone, Diamond, 0.8mN	• Downward measurement • Large waveform distortion
Low mag, long holes		DM43822[1]		60° Cone Diamond, 3mN	• Downward measurement • Sensitivity: 1/2 • Mag: 20000x
Low mag, corners		DM43824		60° Cone, Diamond, 4mN	
Deep hole / O-ring groove bottom surfaces		DM43825		60° Cone, Diamond, 3.4mN	• Downward measurement • Sensitivity: 1/2 • Mag: 20000x • Large waveform distortion
Deep groove corners		DM43827		60° Cone, Diamond, 4mN	• Downward measurement • Sensitivity: 1/2 • Mag: 10000x
Extra deep grooves		DM43826			• Downward measurement • Sensitivity: 1/2 • Mag: 5000x • Large waveform distortion
Fine long holes		DM43821		60° Cone, Diamond, 3mN	
Stylus set		DM43900-A	Pickup E-DT-SS01A·B, E-DT-SSE01A 	Rtip 2 µm	Nosepc DM44026-A Stylus DM43801, -11, -12, -14, 15, -22

[1]Indicates stylus/nose piece set DM43900. Value of measuring force when E-DT-S03A/B / E-DT-SE19A/B / E-DT-SS01A/B / E-DT-SSE01A are mounted. [2]The value of measuring force is when E-DT-S03A·B/E-DT-SE19A·B/E-DT-SS01A·B/E-DT-SSE01A are mounted.

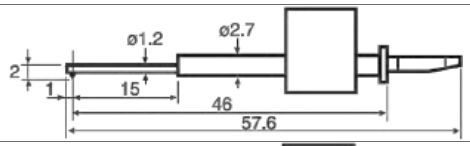
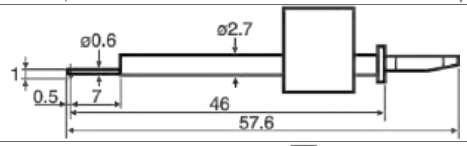
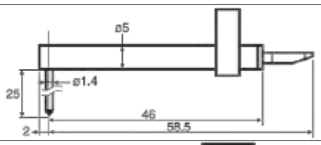
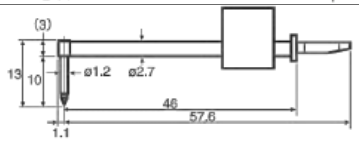
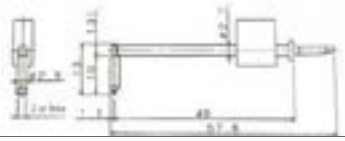
REPLACEABLE STYLI

For S-CREST /S-5000/S-NEX 2**DX2/SD2, S-NEX 1**

Applications	Model	External view	Specifications	Remarks
General purpose	DM48505		2µm radius, 60° Cone, Diamond, 0.75mN	• Stroke: 13mm (S-Crest, S-NEX 2**) 5mm (S-NEX 1**) Stroke: 13mm (S-Crest)[1]
General purpose highly rigid stylus	DM84071			
	DM84145			• For SCREST (Standard Accessory) Stroke: 13mm[1]
	DM48507			
Highly rigid stylus for contours	DM48775		Rtip 25µm, 24°conical carbide, 4mN or less	• Stroke: 26mm (S-CREST, S5000,S-NEX2**DX2/SD2) ,10 mm(S-NEX 1**) •Contour meas. only • Standard accessory for S-NEX 2** DX2/ SD2, S-NEX 1**
General purpose highly rigid stylus	DM48636		Rtip 2µm, 60°conical diamond, 0.75 mN	•Stroke: 26mm (S-NEX 2** DX2/SD2)[1]
	DM84400		Rtip 2µm, 60°conical diamond, 4mN	•Stroke: 39mm (S-NEX 2** DX2/SD2)[1] •25mm ht block gauge required for calibration •Windproof cover recommended
Highly rigid stylus for contours	DM84399		Rtip 25µm, 24°conical carbide, 4.5mN or less	•Stroke: 39mm (S-NEX 2** DX2/SD2) •Contour meas. only •25mm ht block gauge required for calibration •Windproof cover recommended
	DM84409		Rtip 25µm, 12°angle carbide, 4.5mN or less	
	DM84376		Rtip 25µm, 24°conical carbide, 7mN or less	•Stroke: 52mm (S-NEX 2** DX2/SD2) •Contour meas. only •25mm ht block gauge required for calibration •Windproof cover recommended
	DM84377		Rtip 25µm, 12°angle carbide, 7mN or less	
	DM48509		Ø 1 ruby ball, 3.2mN	• Stroke: 12.5mm (S-NEX 1**), 32.5mm (S-CREST, S5000, S-NEX 2** DX2/SD2) • Contour meas. only
Offset measurement Stylus	DM48511		2µm radius, 60° Cone, Diamond, 0.75mN	• Stroke: 13 mm (S-CREST, S5000, S-NEX 2** DX2/SD2), 5 mm (S-NEX 1**) [1]
Offset measurement stylus 2X arm	DM48742		25µm radius, 24° conical carbide, 4mN or less	• Stroke: 26 mm (S-CREST, S5000, S-NEX 2** DX2/SD2) 10 mm (S-NEX 1**) • Contour meas. only

REPLACEABLE STYLI

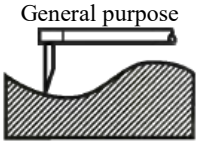
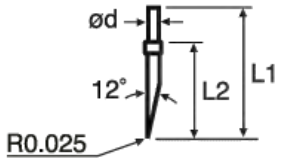
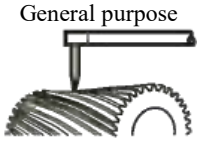
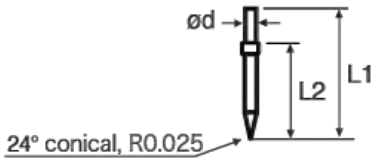
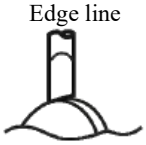
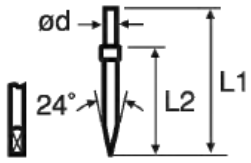
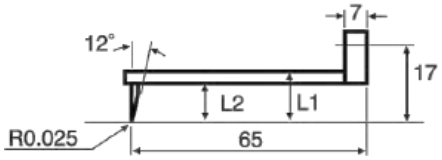
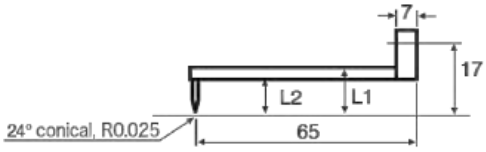
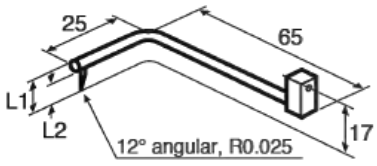
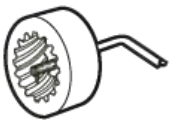
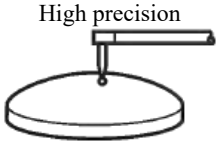
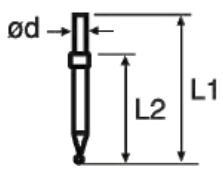
For S-CREST /S-5000/S-NEX 2**DX2/SD2, S-NEX 1**

Applications	Model	External view	Specifications	Remarks
Small hole stylus	DM48513		2µm radius, 60° Cone, Diamond, 0.75mN	• Stroke: 13 mm (S-CREST, S5000, S-NEX 2** DX2/SD2), 5 mm (S-NEX 1**)[1]
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	

[Note]Special stylus will be studied and proposed by customer's workpieces. [1]For Roughness & Contour Measurement

CONTOUR STYLI

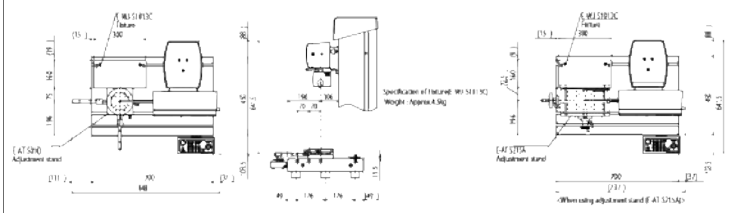
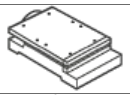
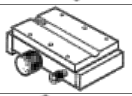
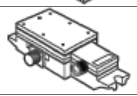
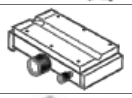
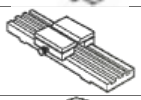
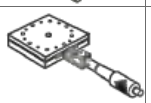
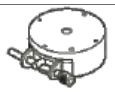
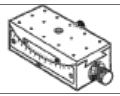
For Contourecord 1600 / Surfcom 1800

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.

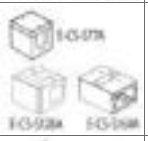
ADJUSTMENT DEVICES

For All Surfcom Series

Name	Model	External view	Orthogonal axis adjustment (mm)			Swivel adj.		Tilt adj.		Table size mm	Load/ Weight kg	Remarks
			X	Y	Z	Fine	Coarse	Fine	Coarse			
Adjustment Stand	E-AT-S01D		± 25	± 25	-	±4°	360°	-	-	Ø 150	20/7	Min reading increment 10µm
	E-AT-S205A			±12.5	-							Min. reading: 10 µm • For S-CREST DX
	E-AT-S215A		±55	±30	-	-	-	-	-	280×180	50/8.5	Attachable: E-ATS217A/ -S02A/ -S64B/ E-WJ-R01C/ -S01B/-S02A/ -S03A
	E-AT-S217A		-	-	-	±5°	360°	-	-	Ø 150	20/2.5	Attachable: E-WJ-S1143A/ -R01C/-S01B/ -S02A/-S03A/ E-AT-S02A/ -S64B/ -S215A
Positioning plate	E-WJ-S1013C*5*6										-/4.5	•Dimensions: 300×160×11.5mm •Usable for adjustable stand E-AT-S01D/-S215A •For S NEX (DX2/SD2) and S-NEX
Levelling 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
	E-AT-S36A		-		-		-	-	-	200 x 120	5/4.5	For E-RM-S77A·C
X-direction movement Adjt. Stand	E-AT-S08B		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’
	E-AT-S64B		-	-	-	-	-	±20°	-	60×120	10/1	

ADJUSTMENT DEVICES

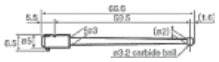
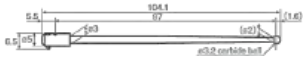
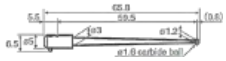
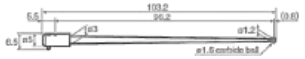
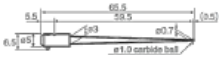
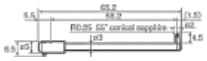
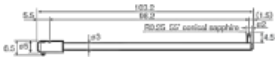
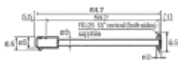
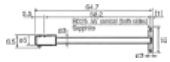
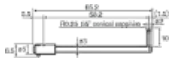
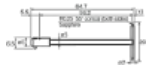
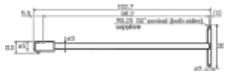
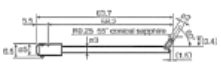
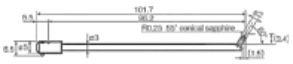
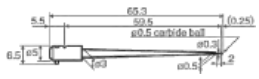
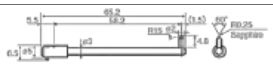
For All Surfcom Series

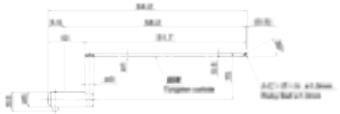
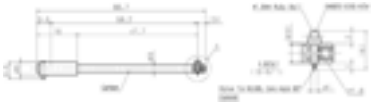
Name	Model	External view	Orthogonal axis adjustment (mm)			Swivel adj.		Tilt adj.		Table size	Load/ Weight	Remarks
			X	Y	Z	Fine	Coarse	Fine	Coarse	mm	kg	
Universal stand	E-WJ-S03A		-	-	-	-	360°	-	±90°	Ø 110	3/2.5	X/Y-direction adj.
Column rotary spacer	E-CS-S76A[2]		-	-	H:100	-	360°	-	-	-	-	Set between table and column
	E-CS-S129A[5]											
	E-CS-S129A[6]											
Column spacer	E-CS-S77A[2]		-	-	H:200	-	-	-	-	-	-	
	E-CS-S128A[5]				H:100							
	E-CS-S169A[6]											
Tracing driver spacer	E-CS-S33A[1]		-	L:70	-	-	-	-	-	-	-	Set between column and tracing driver
	E-CA-S166A[6]		-		-	-	-	-	-	-	-	
Column rotary spacer	E-CS-S31A[1]		-	-	H:100	-	360°	-	-	-	-	Set between table and column
	E-CS-S76A[3]											
Tracing driver tilting device	E-CA-S85B[4] E-CA-S92B[4]		-	-	-	-	-	-	±15°	-	-/5	Tracing driver -S85B: 100mm -S92B: 200mm
	E-CA-S101B[3]								±5			For roughness
	E-CA-S164A[6]								±15			Both 100 & 200mm tracing driver

[1]Cannot be used with S3000A, S5000, S-CREST, S-NEX(DX2/SD2).
[2]For the Linear Series (C1500, C1700, C1710, S1900, S1910, C2700, S2900, S2000, and S1400G, C1600G, S1800G, C2600G, S2800G Series, S-TOUCH550, S480. [3]For the NEX Series, Linear Series (S1500, S1900, S1910, S2900) and S1400G, S1800G, S2800G Series, S-TOUCH550, S480. [4]For the NEX Series, Linear Series (C1700, C1710, S1900, S1910, C2700, S2900) and S1400G, C1600G, S1800G, C2600G, S2800G Series, S-TOUCH550, S480. [5]For NEX Series. [6]For NEX(DX2/SD2) 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

1: 1 Standard Sensitivity L = 59.5 mm		
Small holes (Crank stylus)	 EM46001-S502	Ø 1 mm, Ruby ball *Manufactured after receipt of order*
Roundness & roughness measurement (T-stylus)	 EM46001-S583	Roundness meas. side: Ø1.6 ruby Surface texture meas. side: R0.005 mm, 60° cone, diamond T-type, L=6 mm

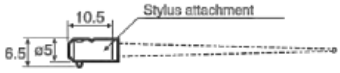
1.5:1 Sensitivity L = 97 mm		
Stylus Attachment		2:1 stylus for detectors E-DT-R32A/-R74A is mounted

TABLE ROTATING RONDCOM STYLI

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

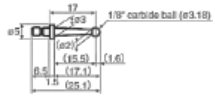
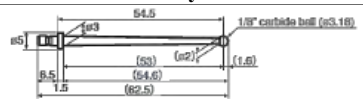
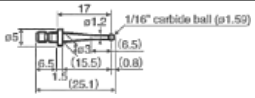
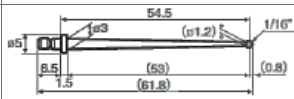
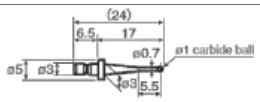
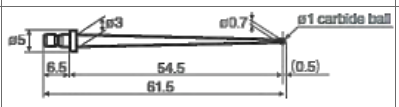
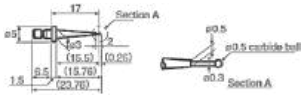
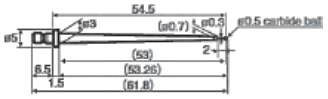
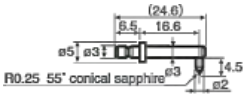
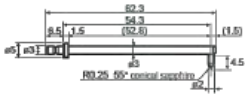
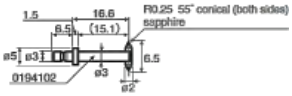
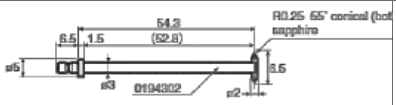
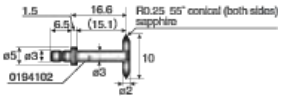
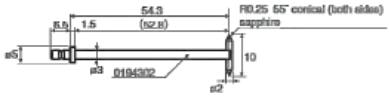
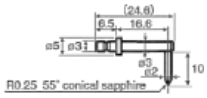
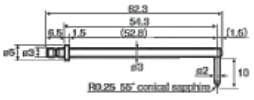
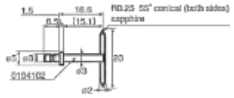
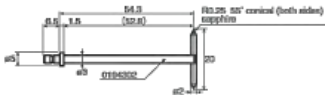
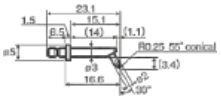
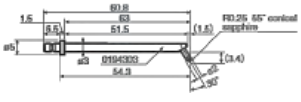
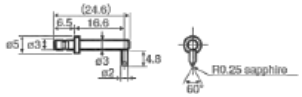
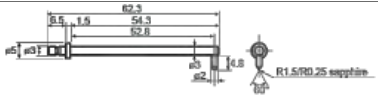
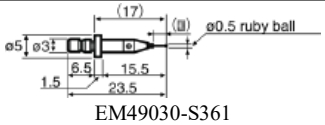
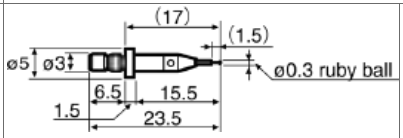
Application	Model with External View		Specifications
	1:1 Standard Sensitivity L = 17mm	2:1 Sensitivity L = 54mm	
General Purpose	 0194 000	 0194 200	Ø 3.2mm Carbide ball
	 0194 002	 0194 202	Ø 1.6mm Carbide ball Standard stylus
Small Holes	 0194 001	 0194 201	Ø 1mm Carbide ball
Extra small holes	 0194 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
Extra Small Holes	 EM49030-S361	-	Ø 0.5 mm Ruby ball

TABLE ROTATING RONDCOM STYLI

Application	Model with External View		Specifications
Extra Small Holes	 EM49030-S381	-	Ø 0.3 mm Ruby ball

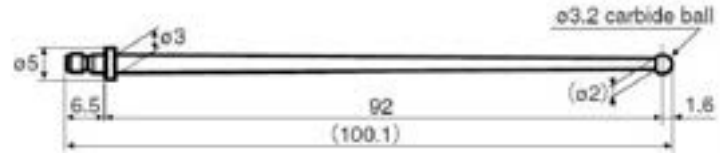
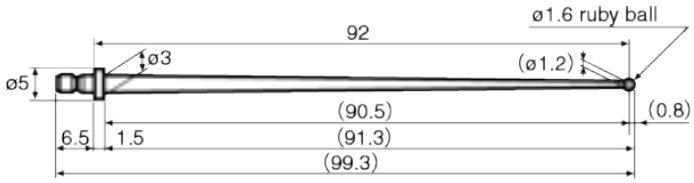
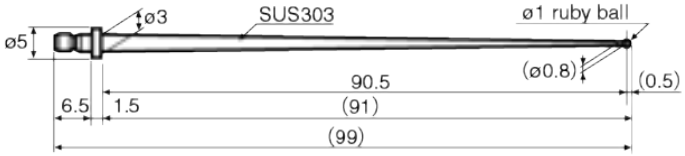
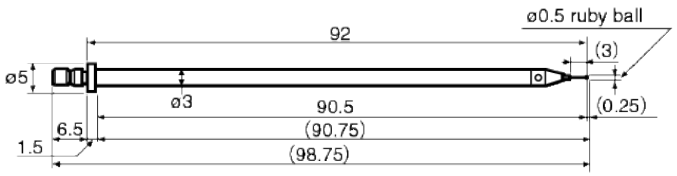
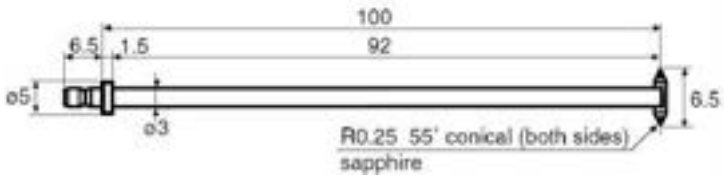
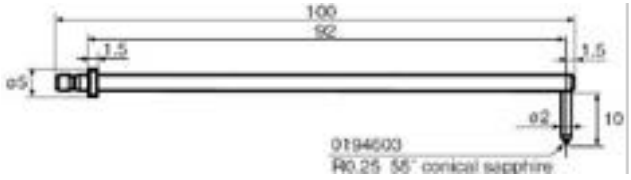
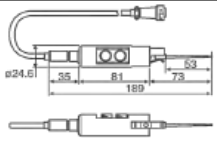
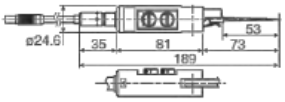
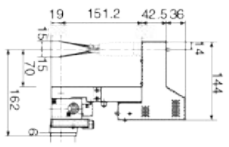
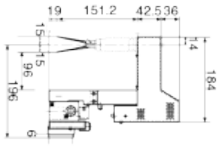
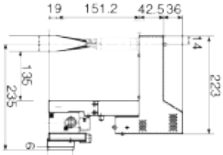
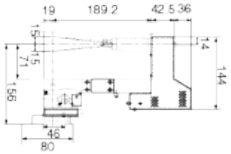
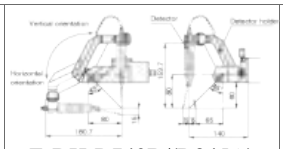
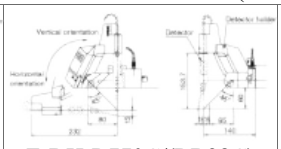
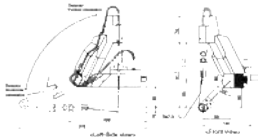
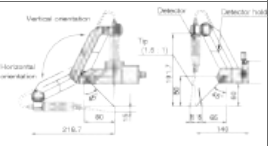
	3:1 Sensitivity L = 92 mm	
General Purpose	 0194 400	Ø 3.2mm Carbide ball
	 EM49201-S374	Ø 1.6 mm Ruby ball
Small Holes	 EM49201-S375	Ø 1mm Ruby ball
Extra small holes	 EM49201-S376	Ø 0.5mm Ruby ball
Grooves	 0194 406	R0.25 mm, 55° conical; Sapphire, T-type, L = 6.5 mm
Deep Grooves	 EM49201-S315	R0.25 mm, 55° conical; Sapphire, L-type, L = 10 mm

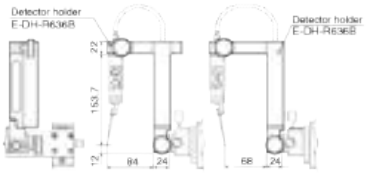
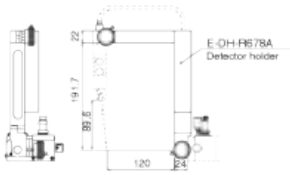
TABLE ROTATING RONDCOM DETECTORS/HOLDERS

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		

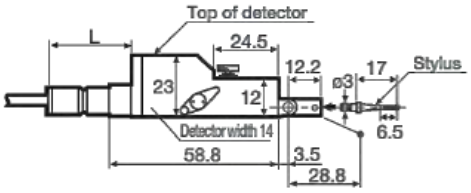
CNC Detector Holders (for E-DT-R120B)				
Model with External View	 E-DH-R665B and -R669B	 E-DH-R720B	 E-DH-R677B	 E-DH-R690A
Applicable for	E-DH-R665B for R60A/R65B and E-DH-R669B for R55	R60A/R65B [1] + 30mm EE74023 combi link cable	R60A/R65B + 70mm EE74017 combi link cable	R55/R60A/R65B + 30mm EE74023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

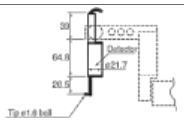
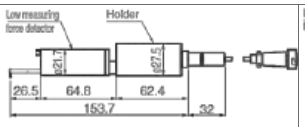
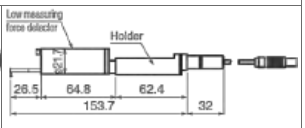
Offset Detector Holders (for E-DT-R120B)				
Model with External View	 E-DH-R749B/(R845A)	 E-DH-R770C/(RB28C)	 E-DH-R779B/(R892A)	 E-DH-R774B/(R900B)
Throat Height	153mm		191mm	
Throat Depth	65mm			
Operation	Manual	CNC		
Others	-		filter 15, 50 peaks/rotation for stylus sensitivity 1.5:1	
Applicable 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-R678A
Applicable for	R636B for R47/R55/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	

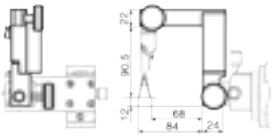
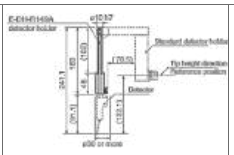
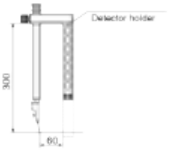
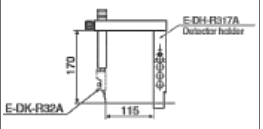
[1]With detectors E-DT-R83B, E-DT-R173B, E-DT-R120B, E-DT-R168C. [2]With detector E-DT-R95B.

TABLE ROTATING RONDCOM DETECTORS/HOLDERS

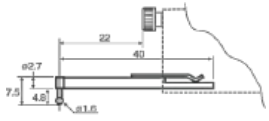
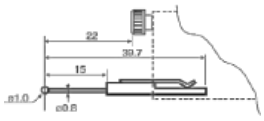
General Purpose Detector			
Model with External View	 E-DT-R32B and -R272C		R32A: L = 25mm R74A: L = 45mm E-DT-R74B
Applicable for	E-DT-R32B for R30/R31/R40/R41/R43 and E-DT-R272C for R Touch		R47/R55/R60A/R65B
Specifications	Meas. Range: ±400µm; Meas. Force: 70mN; Front adjust mechanism: ID/OD switch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

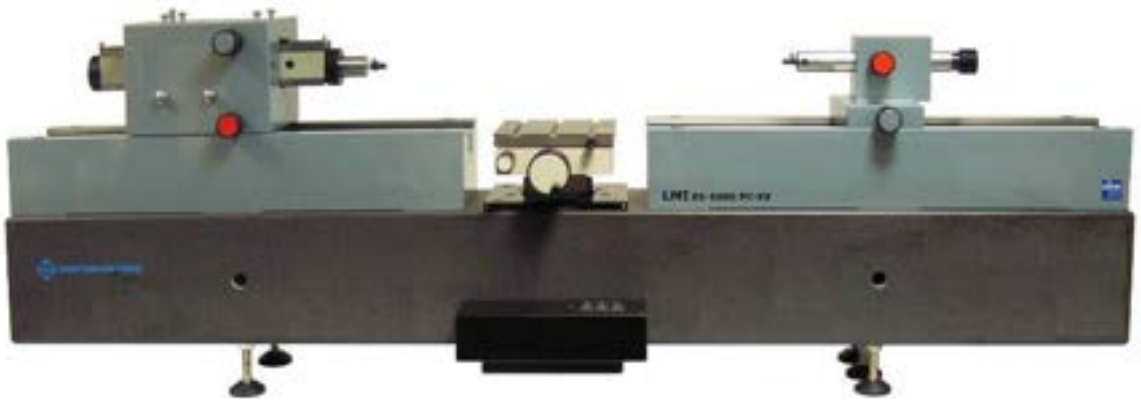
Detector Holders					
Model with External View	 E-DH-R639A and -R384A	E-DH-R617A	 E-DH-R149B	 E-DH-R329A	 E-DH-R317A
Applicable for	R639A for R47/R55/R65B [1,3], R384A for R60A	R31/R41/R43 [2,4]	R31/R41/R43/R47/R55/R60A/R65B [1,2]		R60A [1]
Throat Height	90.1mm		-	300mm	170mm
Throat Depth	68mm		-	60mm	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 / 1500 PC

Universal Length Metrology—accurate length measurements and calibration



LMI 01-1000 PC-EX

Model	400			680			1000			1500		
	S	HA	EX	S	HA	EX	S	HA	EX	S	HA	EX
Full Meas Range	400mm			680mm			1040mm			1520mm		
Direct Meas Range	100mm											
Resolution X/Y/Z	0.1+0.01 µm/1 µm/1µm											
Repeatability	0.2µm	0.1µm	0.05µm	0.2µm	0.1µm	0.05µm	0.2µm	0.1µm	0.05µm	0.2µm	0.1µm	0.05µm
$MPE_{E1} \leq$ in µm	0.3+L/ 1000 20°C±2K	0.15+L/ 1500 20°C±1K	0.1+L/ 2000 20°C± 0.5K	0.3+L/ 1000 20°C±2K	0.15+L/ 1500 20°C±1K	0.1+L/ 2000 20°C± 0.5K	0.3+L/ 1000 20°C±2K	0.15+L/ 1500 20°C±1K	0.1+L/ 2000 20°C±0 .5K	0.3+L/ 1000 20°C±2K	0.15+L/ 1500 20°C±1K	0.1+L/ 2000 20°C±0 .5K
Digital Y/Z Axis	Optional for Y or Z											
Measuring Forces	0-1.0N-1.5N-2.5N. (Optional 2.2N-4.5N-11.1N/8ozs-1lbs-2.5lbs)											
Load Capacity	Manual Z axis: 12 kg / Motorized Z axis: 25 kg (with optional Inclinable table: 15 kg)											
Machine Dimensions (L x W x H in mm) and Weight												
Cast Iron bed model	838x450x480/80kg			960x450x480/100kg			1395x450x480/120kg			N/A		
Granite bed:	950x200x480/160kg			1180x200x480/200kg			1500x200x480/250kg			1960x200x480/350kg		
Power Supply	230 (110)V; 50-60 Hz; ca.300VA											
Humidity	≤60%											
Ambient Temp	15-35 °C											

Calibration of plug/pin gauge

Calibration of slip gauge

Calibration of ring gauge ID

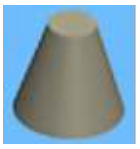
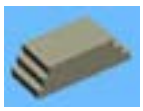
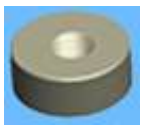
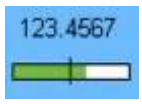
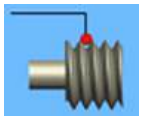
- USB interface plus a retrofitted model
- LMI-MS for Windows® 10 software
- Digital axis in X, Y and Z
- 3D mode for gauges with parallel contact surfaces
- Motorized Z-Axis option / Granite bed option
- Software and kits available as retrofits for older systems

Calibration of thread ring gauge

LMI 01-1500 PC-EX

LMI 01-680 PC-EX

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	

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 centre 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 centres and measuring a test radius. Various outputs including linear and circular graphs. Optional Accessories—master gear and gear with shaft measuring/bevel gear equipment.

Model	**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				
Centre 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
Dimensions L x W x H 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 on 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

Model	**CLP-15SF**	**-35SF**	**-35DDSF**	**-45DDS**	**-85DDS**
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			m1 to 25
Max Gear Outer Diameter	Ø 150mm	Ø 350mm		Ø 450mm	Ø 850mm
Base Circle Diameter / Option	Ø 0 to 130mm	Ø 0 to 300mm		Ø 0 to 400mm	Ø 0 to 800mm
Max Tooth Width	200mm	400mm			600mm
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	30 to 600/ to 800mm	30 to 600/ to 800mm	50 to 500/ to 800mm	50 to 800mm
Resolution	0.0001mm				
Machine / Max Gear Weight	0.8ton	1.5ton		2.0ton	3.5ton
Dimensions W x D x H mm	842.5x893x1670	1095x1007x1935/ 1095x1007x2042	995x966x1900 / 995x966x2200	1251x1059x1899 / 1251x1059x2199	1875x1399x2160
Power Supply/Consumption	AC 100V±10% 50/60Hz±1Hz./2kVA		AC 100V±4% 2KVA		AC 200V±4% 3KVA

AVR200 / 300 Intuitive Affordable Benchtop Vision Metrology

AVR300

AVR FOV 0.14

Precision recirculating ball linear guides for precise X-Y stage and Z column. Stable granite base. Ultra-low 0.001% distortion telecentric FOV measurements (interchangeable) for repeatable, accurate data with MetLogix software. Automatic CAD comparisons. Advanced AVR FOV 0.14—seven interchangeable and one fixed telecentric lens available for rapid quality assurance and inspection in manufacturing, assembly, and research facilities.

Model	**AVR200**	**AVR300**	**AVR 300 FOV 0.14**
System	Vertical Part View Orientation Bench Top System with Optional Workstation		
Control System / Display	MetLogix M3 / 24" Touchscreen Monitor		
Operation	CNC programmable		
X x Y x Z Travel	200x100x200mm	300x200x200mm	
E2 X, Y Accuracy	1.9+5L/1000µm		3.0+5L/1000µm
E1 Z Accuracy	2.5+5L/1000µm		3.5+5L/1000µm
Scale Resolution / Base	0.1µm / Granite		
Zoom Optics – Standard	6.5:1 – 2 LED; 12:1 – 3 LED		
Digital Video Camera	1.3MP Colour Standard: 2.0MP with Telecentric		6.0MP Monochrome
LED Illumination	Surface Ring, Transmitted and Coaxial Illumination Option		Surface Ring/Transmitted
Auxiliary Lens Options	0.5X, 1.5X, 2.0X		
AVR Options	Renishaw Touch Probe / Dark Field Quadrant Illumination (LED only)/Rotary Fixture		Renishaw Touch Probe)/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	520 x 685 x 863mm	740 x 890 x 865mm	
Gross / Net Weight	115kg / 66kg	135kg/ 102kg	

AVR Optical Parameters	**Telecentric Lenses**						**Zoom 12:1**	**Zoom 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	

FOV 0.14 Telecentric Mag	**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
Display Resolution (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 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 depends on many variables. [2]Screen magnification variable based on the Best Fit setting in M3 software.

AV350 / 450 Multi-Sensor Vision Metrology

AV450

Rotary Stage

Renishaw Touch Probe Kit

Part Holding Fixtures

Renishaw Changer Rack

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 seven interchangeable and one fixed telecentric lens.

Model	**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 W x D x H	872x1143x1044mm	
Gross / Net Weight	579kg / 185kg	
[1]Workstation with swing arm may be purchased locally.		

AVX550 Large Format Multi-Sensor Vision Metrology

AVX550

- 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 used in quality control labs in research engineering and manufacturing inspection processes, where large parts with intricate features need inspection

	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 workstation with compact control panel, CNC rotary axis fixtures, Renishaw touch probe kits and changing racks, Calibration standards, Part fixtures and work-holding devices

KMR Video Inspection Metrology

KMR 200

- 6 versatile, affordable inspection and metrology models
- For incoming QC, manufacturing, and assembly
- Measure tiny features within FOV 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	**-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	-				
Measuring Method	X/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, for documentation and traceability					
Image Archiving	Yes, for documentation and traceability					
Video Edge Detection	Yes					

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

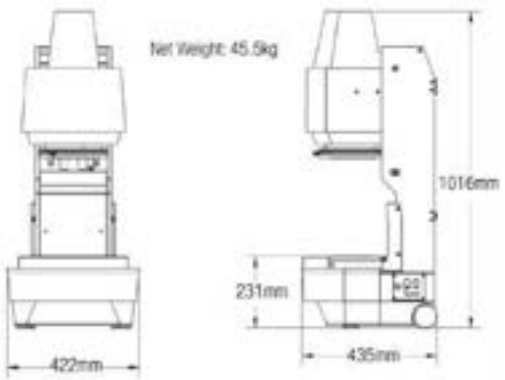
HVR100 FLIP Digital Video Metrology

HVR100 FLIP
Vertical format

Horizontal format

- Versatile measurements by flipping between vertical and horizontal stand-up.
- Rapidly measure features and parts up to 3.65 x 3” with the HVR-Flip’s large FOV and 10” working distance
- Metlogix M3 touch measurement, auto-part recognition, DXF import/export, “Part View” construction
- Option modules: Profile fitting, wire insulation and thread measurement, and CAD comparisons of profiles/data
- Geometric tolerancing with flexible reports
- Multi-language support

HVR100 Flip	
Field of View/Field of View Accuracy	92.7mmx76.2mm/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/Gross/Net Weight	122x66x78cm/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 work stage
- 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

Model	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 / Profile 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	540x130mm/50kg		540x130mm/150kg
Gross/Net Weight	195kg/118kg	200kg/118kg	635kg/600kg

System Parameter	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	4.7x	10x	16.4x	27x	33x	69x	137x	58x	363x
Field of View Width	60mm	28mm	17mm	10.5mm	8.4mm	4.2mm	2.1mm	12mm	18.8mm
Field of View Height	51mm	24mm	14mm	8.9mm	7.1mm	3.7mm	1.8mm	10.1mm	15.7mm
Working Distance	110mm							88mm	

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 work stage with machine slots for fixturing (horizontal projectors)
- Dual mirror design for vertically corrected image
- Rotary work stage 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 work stage options and wide choice of lenses and accessories

HE400

HD400

VB300

VB400

Model	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	475x120mm	540x130mm		400x225mm	225x225mm
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 Centre 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

Model	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 Centres and Vees				
	Helix Centre 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

- Large Centres and Vees
- Rotary Vise
- Magnification Checking Graticule
- Centres and Vees
- Helix Centre Support Fixture
- Vertical Glass Plate Holder
- Rotary Work-stage
- Universal Vee Block on Rotary Base
- Cabinet Stand
- Canopy and Curtains (* not shown)

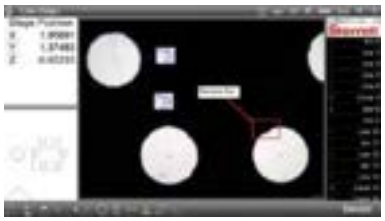
Mx Series *NEW!* Simple and Innovative Readout (Mx100 / Mx200)

- 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" colour screen
- Optical edge detection on Mx200 provides better throughput and removes operator subjectivity
- MetLogix™ control readouts provide 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

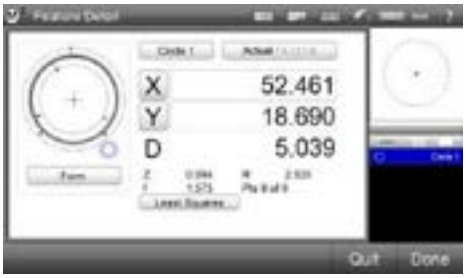


Live video

Part view

Tolerance

MetLogix M1/M2 for Optical Comparators



M2 for Optical Comparators

Crosshair

Report

Geometric

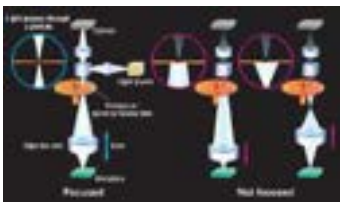
- Touchscreen, large icon buttons and intuitive operation. Mounts and displays vertically/ horizontally
- X and Y Linear Axes and Q angular screen rotation Display. Easy part alignment and datum function
- Geometric tolerance and measurements: point, line, angle, distance, radius and diameter
- Teaching 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

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

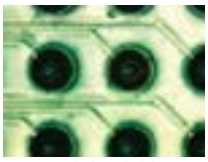
- Simultaneous wide-area height measurements. 2D measurement with 15x brightfield zoom optics
- Handles 300mm Semicon wafers at fabs; measures complex structures such as bump heights on advanced IC packages, probe cards, precise glass micro lens, contact lenses, laser marks on semicon wafers, MEMS, Wire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



Original low flare confocal optics

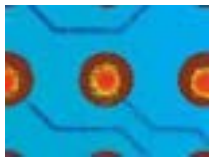
Z scan images reconstructed real-time into 3D contour maps and EDF images

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.



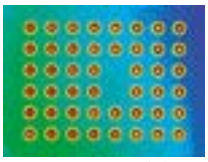
Bright Field

Confocal Image



3D CF Image

EDF Image



CSP-Bump Ht/Size

Bonding Wire-Loop Ht

VMZ-K3040 / K6555 Specifications

Magnification	**1.5x**	**3x**	**7.5x**	**15x**	**30x**
Objective Lens Working Distance	24mm[2]	24mm	5mm	20mm	5mm
Confocal Optics Field of View	8x6mm	4x3mm	1.6x1.2mm	0.8x0.6mm	0.4x.3mm
Confocal Ht Meas. Repeatability (2σ)	0.6	0.35µm	0.25µm	0.25µm	0.20µm
Confocal Ht Meas. Res. / Max Scan Ht	0.01µm / 1mm				
Brightfield Optics Field of View	8x6 to 0.53x0.4mm	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 1.5x to 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 (K3040) 300 x 400 x 150mm / 30kg (K6555)				
Measurement Uncertainty [1] E_{UX}/E_{UY}	1.5+4L/1000µm (K30340) / 1.5+2.5L/1000µm (K6555)				
Measurement Uncertainty [1] E_{UXY}	2.5+4L/1000µm (K3040) / 2.5+2.5L/1000µm (K6555)				
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				
Dimensions W x D x H/Weight	1130 x 1250 x 1970mm (K3040); 1220 x 1600 x 1970mm (K6555) / Approx 800kg Controller: 190 x 450 x 440mm / 20kg				

[1]All measurement uncertainties are given in MPE per ISO 10360. [2]Contact us for permissible floor vibration specifications

NEXIV VMZ-H3030 High Precision NEXIV Model

Measure 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 software with customizable GUI and versatility
- Applications include moulds, mechanical parts (household, automobile), PCB, electronic parts, ceramic parts, electronic parts, high-density package substrate, and wafer pattern

	VMZ-H3030
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”Colour CCD * Colour 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: 1000x1125x1750mm/~500kg Controller: 190x450x440mm/~15kg
Footprint W x D	3000x2800mm

NEXIV VMZ-S Series Real-Time FOV Measurements

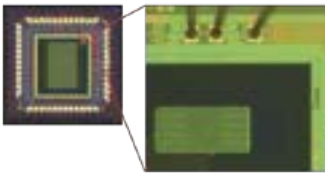
VMZ-S3020

VMZ-S4540

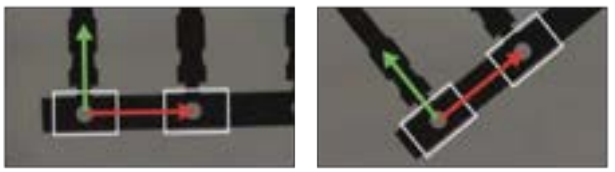
VMZ-S6555

- Measure various samples in the expanding market of in-vehicle electronic components and semiconductors, as well as in precision machined and moulded 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

Model	VMZ-S3020	VMZ-S4540	VMZ-S6555
Stroke X x Y x Z Standard	300x200x200mm	450x400x200mm	650x550x200mm
Stroke X x Y x Z 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 three angles[5]		
Type 4/A Illumination	Episcopic, diascopic, and 8-segment ring with 1 angle[5]		
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 W x D x H/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. [5]All white LED

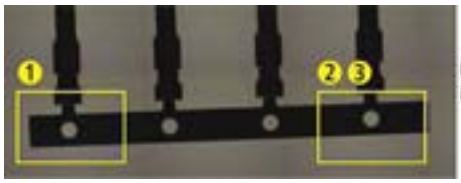
iNEXIV VMA Versatile Multi-Sensor Metrology

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

Model	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 colour; 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 W x D x H/Weight	565x690x740mm/72kg		1000x1340x1553mm/500kg		1200x1640x1553mm/665kg	
Controller Dimensions W x D x H/Weight	145x400x390mm/13kg		145x400x390mm/13kg		145x400x390mm/14kg	
Table Dimensions W x D x H/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.

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
- Option: nosepiece motorization for efficient image capture and observation
- Observation via brightfield, darkfield, polarizing, differential interference, epifluorescence and two-beam interferometry

Eclipse LV100ND

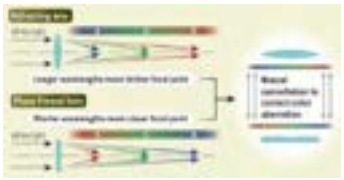
TU Plan ELWD Series

Universal standard objectives for brightfield, darkfield, simple/sensitive polarizing, differential interference, epifluorescence

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 aberration correction with phase Fresnel lens enables longer working distances than with conventional lenses

Model	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 Pre-centered 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 by 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

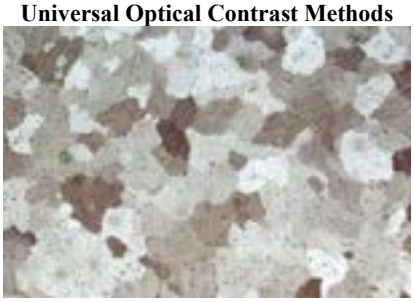
Modular Component Accessories

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

Model	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/Epifluorescence
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/Backport: 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 W x D x H	229x551x404mm	439x521x428mm
Weight	Approx. 10kg	Approx. 26 kg (depends on combination)

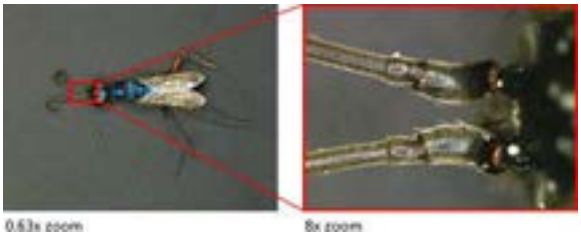
SMZ Versatile to Advanced Stereo Microscopes

- High mag hi-res observation of minute structures
- Improved chromatic aberration correction for bright, sharp images throughout view field through use of semi-apochromatic 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-view field 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 view field 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



Model	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	20º P-B Binocular Tube, 15º P-TL100 Trinocular Tube, 0 to 30º 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-mould, anti-electrostatic design for robust environments

SMZ745/SMZ745T

Features (for both SMZ445 / SMZ460)

- 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

Model	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-400N

MM-800N

- 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 motorised), 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

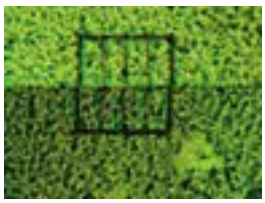
Brightfield

Epi-Fluorescence

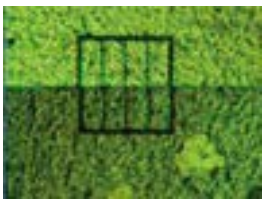
DIC

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-800N/400N	Popular Sizes, with monocular/trinocular optical head
MM-800N/400NU	High Power Magnification for measuring fine geometries
*MM800N/400N/S instead of MM800N/400N available for use with third-party DRO (Quadra-Chek, MetLogix)	

MM800N/400N and /U Measuring Microscopes

Model	**MM-800N/400N**	**MM-800N/400N/U**
Description / Application	Cost performance model for dies and moulds, 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	CFI10x, 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)

Model	**MM-400N**	**MM-800N**
Workpiece Measuring Height	150mm	200mm
Machine Dimensions[1] W x D x H	300x600x638mm	385x785x725mm
Machine Weight	50kg	72kg

Stages	**PS 2x2B**	**PS 4x4B**	**PS 6x4B**	**PS 8x6B**	**PS 10x6B**	**PS 12x8C**
Applicable Models	**MM-400N** and only **MM-800NLV/LVFA**			All **MM-800N Models**		
X x Y Travel Stroke	50x50mm	100x100mm	150x100mm	200x150mm	250x150mm	300x200mm
Glass Stage Area	Ø 107mm	160x160mm	210x160mm	255x190mm	305x190mm	330x230mm
X-Y Table Surface	Ø 174mm	284x230mm	350x230mm	348x260mm	398x260mm	448x320mm
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 Focusing 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 Focusing 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. MM800N/400N /SU instead of MM800N /400N U; SL instead of L; and SLU instead of LU.	

MM800N/400N /L, /LV, /LVFA and /LM 3D Measuring Microscopes

Model	**MM-800N/400N/ L**	**MM-800N/400N/ LV**	**MM-800N/400N/ LVFA**	**MM-800N/400N/ 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			

MM800N/400N /LU and /LMU High Power Mag 3D Measuring Microscopes

Model	**MM-800N/400N /LU**	**MM-800N /400N /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

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

MF-1001

MF-501

MH-15M

Model		MF-1001	MF-501	MH-15M
Measurement Length		0 to 100mm	0 to 50mm	0 to 15mm
Min. 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

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—PC-free operation
- Control and view easily with NIS-Elements L (tablet PC version)
- 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 PCs via a USB3.0 interface directly to the camera head with NIS-Elements series software for image acquisition

DS-Fi3

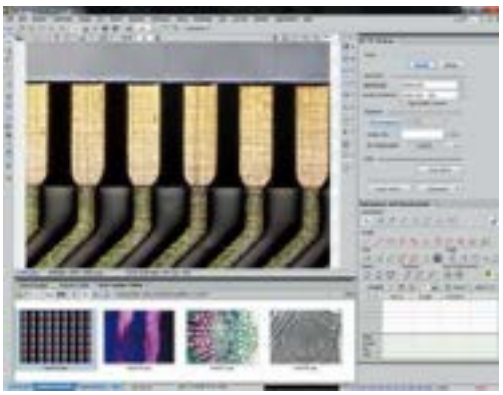
Digital Sight 10 Wide FOV at Ultra-High Definition 6K Resolution

- 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

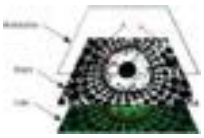
Digital Sight 10

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

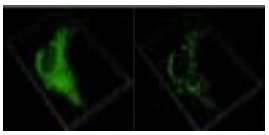
- Integrated Nikon comprehensive microscope control, image capture, analysis, documentation and data management
- Intuitive feature set / large multi-dimensional image files database
- 3 Packages: 1) AR for Advanced Research applications; 2) BR for Basic Research applications; and 3) D for colour Documentation 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



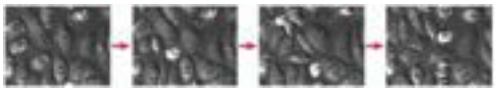
NIS-Elements



Multi-layer document structure



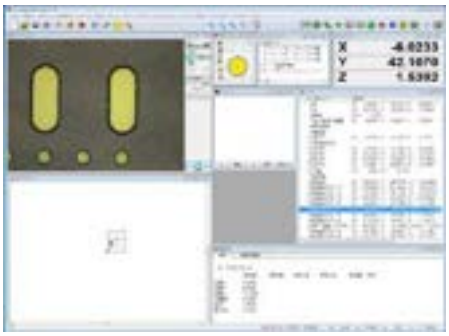
3D Deconvolution



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 teaching 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 measure different workpieces continuously. Separable system admin and inspector environments for dates of manufacture and inspection, lot number, etc.



AutoMeasure

Measurement wizards

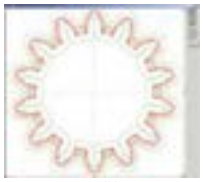
NEXIV Virtual AutoMeasure

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

- 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)

V-20B

- 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

Model	**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 centre 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 – 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	Approx 260kg

Ä9 | 9MP *Introducing!* Fizeau for Mid-Spatial Frequency Surface Metrology

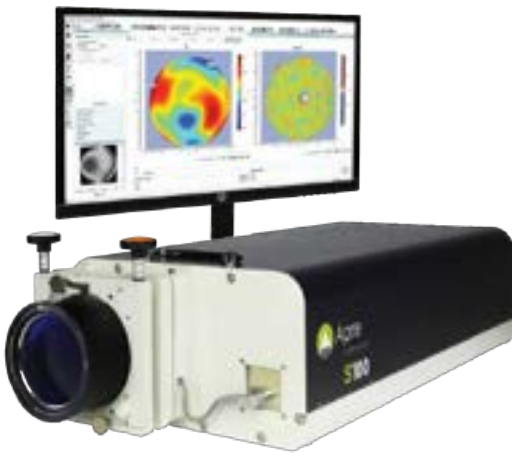
Ä9

- Mid-Spatial Frequency measurement realised via advanced camera limited optical design, controlled spatial and temporal coherence, and rapid data acquisition.
- Low temporal and spatial coherence yield a sub-nanometre noise floor with 10's of picometre repeatability.
- In the short coherence mode, interference fringes are isolated to the measurement surface, eliminating interference fringes produced by other surface back reflections.
- Achieves retrace error performance approaching 30nm, even at max slopes of 1,200 fringes across the field of view
- Advanced PSD Analysis and filtering reports of surface performance with easy-to-understand RMS result over a specified spatial frequency band.

Model	**Ä9**	**Ä100**	**Ä150**
Measurement Capability / Function	Mid-Spatial Frequency Surface Structure	Surface, Wavefront, TTV, and Angle Metrology	
Output Ø / Working distance	9mm / Nominally 40mm	102mm / 108mm	153mm / 133mm
Focus Range	-	±2.0metres	±4.5metres
Interferometer Size L x W x H / Weight	45.6 x 15.3 x 16.4 cm / -	70 x 32 x 26cm / 33kg	90.2 x 40.8 x 23.9cm / 50kg
Alignment System	-	2-Spot with a reticle with ±2° Capture Range	
Phase Measurement Techniques	-	Fast/Sensitive Spectral Synchronous, Vibration-Tolerant PSI; Plus Vibration-Insensitive Carrier Fringe	
Temporal Coherence Control	Variable down to 100 µm	SCI SpectrÄ 2.0 ≤2m; HeNe Laser >100m; ÄTLas ≤3m	
Spatial Coherence Control	Virtual extended source, while averaging	Reduced coherent noise when averaging; Add SpectrÄ for low temporal & spatial coherence performance[8]	
Measurement Techniques	Fast/Sensitive Synchronous and Vibration Tolerant PSI		
		Plus Vibration-Insensitive Carrier Fringe	
Optional Light Sources	SCI SpectrÄ	SCI SpectrÄ 2.0, HeNe Laser, & ÄTLas λ Shifting	
HeNe Laser Frequency Stability	Na	<0.0001 nm	
Measurement Coherence Length	SCI SpectrÄ, <1 mm	-	
Output Polarization	Circular	Circular (Linear optional for birefringent part meas.)	
Max Camera Frame Rate / Resolution	≤ 43Hz / 3000x3000px	90 Hz / 3000x3000px	
Shortest Shutter Speed / Digitization	9µs / 8bit		
Computer and Software	Windows 11 64-bit OS & REVEAL Software		
Mounting Configurations	Horizontal or Vertical (Ä100 & Ä150); Manual, Semi-Automated or Automated		
Performance			
Image Resolution[7] / Image Distortion	-	85µm / <0.06%	125µm / <0.06%
Spatial Frequency Range	0.2 l/mm to 120 l/mm	-	
Fringe Resolution[9]	<1200 fr/aperture	≥900 fr/aperture	
Retrace Error[5]	1200 fringes < λ/15[6]	512 fringes < λ/15 (λ/20 optionally available)	
RMS Simple Repeatability	<0.03 nm RMS 2σ[1]	≤0.6 nm RMS 2σ[2]	
RMS Wavefront Repeatability	<0.15 nm RMS 2σ[4]	≤0.6 nm RMS 2σ[3]	
Environment			
Measurable Part Reflectivity	0.5 to 40% Options avail.	0.1- 40% direct & >41% w/ attenuation filter or coatings	
Temperature / Humidity	15°C to 30C / 5 to 95% relative, non-condensing		
ΔT/Δt	<1.0°C/15 min (Vibration Isolation System Required)		

[1]The RMS variation of 30 sequential meas. with each meas. the average of 30 meas. [2]The RMS for 36 sequential meas with each meas. the average of 16 meas. Each of a short <2 mm Plano cavities. [3]Measure 36 sequential Measurements (M1, M2,...M30) each consisting of 16 averages. Then average all 36 measurements create a synthetic reference, "Ref", RMS wavefront repeatability equals the 2X the standard deviation of all 30 Ref - Mn results.[4]Acquire 30 sequential meas. Average all means, subtract each measurement from the average. The mean plus 2Σ of the subtracted measurements of these 30 is the accuracy. [5]Retrace Error is defined as the PV residual error between a nulled measurement (the reference), subtracted from a measurement with defined fringes of tilt, and expressed by the first 36 Zernike polynomials. [6]System resolution proven using commercially available LNL/NIST developed BPRA resolution test artefact. [7]Resolution is detector limited at 80% Nyquist or 1200 lines/aperture for 9MP sensor. [8]Spatial and Temporal Artifact Reduction for unique low noise performance when combined with SCI SpectrÄ source, with laser alignment ease. [9]Design performance as modelled in Zemax with 2m cavity length.

S-Series 1MP|4MP Fizeau Interferometer for Surface and Wavefront Metrology



S100

Model	S50		S100		S150	
	1MP	4MP	1MP	4MP	1MP	4MP
Output Ø / Optical Centerline	51mm / 108mm		102mm / 108mm		153mm / 133mm	
Focus Range	±0.5m		±2.0m		±4.5m	
Interferometer Size Lx W x H / Weight	63x29x18cm / 25kg		70x32x26cm / 33kg		90.2x40.8x23.9cm/ 50kg	
Measurement Techniques	Fast/Sensitive Spectral Synchronous, Vibration-Tolerant PSI Plus, Vibration-Insensitive Carrier Fringe					
Alignment System	2-Spot with reticle with 2° Capture Range					
Light Source	SCI SpectrÄ 2.0, HeNe Laser, and ÄTLas Wavelength Shifting					
Laser Frequency Stability	<0.0001nm					
Temporal Coherence Length	SCI SpectrÄ 2.0 ≤2m, HeNe Laser >100m, ÄTLas ≤3m					
Output Polarization	Circular (Linear optional for birefringent part measurement)					
Camera Resolution / Max Camera Frame Rate	1MP: 1022x1022px / 90 Hz (25Hz with SCI source) 4MP: 2040x2040px / 180 Hz					
Shortest Shutter Speed / Camera Digitization	9µs / 8 bit					
Computer & Software	Windows 11, 64-bit OS & REVEAL Software					
Mounting Configurations	Horizontal and Vertical					
Accessories	4MP: Optical Accessories and Mounts Available					
Performance						
Image Resolution[5]	100µm	63µm	200 µm	125µm	300µm	188µm
Image Distortion	1MP: <0.1% / 4MP: <0.06%					
Fringe Resolution	1MP: >300 fr/aperture / 4MP: >300 fr/aperture					
Retrace Error[3]	1MP: 256 fringes< λ/15 / 4MP: 512 fringes < λ/15[4]					
RMS Simple Repeatability[1]	<0.6 nm RMS 2σ					
RMS Wavefront Repeatability[2]	<0.6 nm RMS 2σ					
Measurable Part Reflectivity	0.1%to 40% direct and >41% with attenuation filter or coatings					
Environment						
Temperature / Humidity	15°C to 30C / 5 to 95% relative, non-condensing					
ΔT/Δt	<1.0°C/15 min					
Vibration Isolation	Isolation System recommended for VTPSI					

[1]RMS Simple Repeatability Test: The RMS for 36 sequential measurements, with each measurement the average of 16 measurements of a short <2 mm Plano cavity. [2]RMS Wavefront Repeatability Test: Measure 36 sequential Measurements (M1, M2,...M30) each consisting of 16 averages. Then average all 36 measurements create a synthetic reference, "Ref", RMS wavefront repeatability equals the 2X the standard deviation of all 30 Ref - Mn results. [3]Retrace Error is defined as the PV residual error between a nulled measurement (the reference), subtracted from a measurement with 500 fringes of tilt, and expressed by the first 36 Zernike polynomials. [4]λ/20 optionally available. [5]Resolution is detector limited at 800 lines/aperture

S300 4MP for Flat Surface Measurement

- Fizeau Interferometer for Flat Surface Measurement
- **S300 | HR** can be vertically or horizontally mounted
- Vertical configuration for measuring flat components or blocks of parts such as prisms or cubes

With a Complete Line of Accessories

Optics:

- Fizeau reference spheres and flats
- Fizeau divergers and convergers
- Pellicles
- 9mm Twyman-Green divergers
- Beam expanders
- Custom Accessories

Mounts:

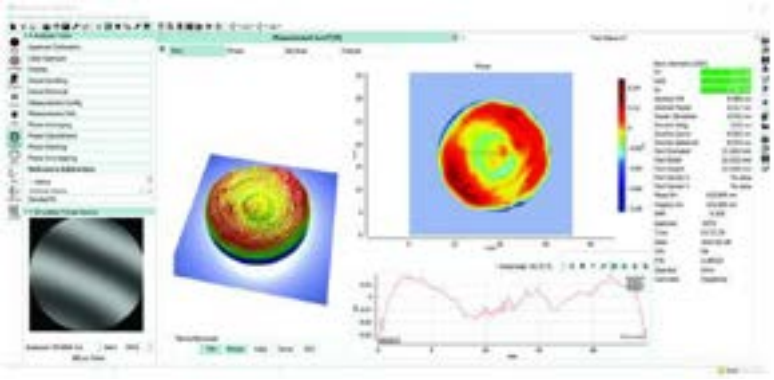
- Multi-axes mounts
- Radius rail with DMI or glass scale
- Vertical workstations
- Customs

S-300

S300 4MP	
Output Ø / Optical Centreline	306 mm[5] / Specify
Focus Range (position readout)	±2meters
Interferometer Size L x W x H / Weight	76 x 40 x 50 cm / TBD
Measurement Techniques	Fast/Sensitive Synchronous, Vibration-Tolerant PSI Plus Vibration-Insensitive Carrier Fringe
Alignment System	2-Spot with reticle with 2° Capture Range
Three Optical Light Sources	SCI SpectrÄ, HeNe Laser, and ÄTLas WSL
Laser Coherence Length	SCI SpectrÄ ≤2m, HeNe Laser >100m, ÄTLas ≤3m
Output Polarization	Circular or Linear, for birefringent materials
Max Camera Frame Rate / Camera Resolution	≤180 Hz (source dependent) / 2044x2044px
Shortest Shutter Speed / Digitization	9 µs / 12 bit
Computer and Software	Hi-Performance PC, Windows 11 64-bit OS & REVEAL Software
Mounting Configurations	Horizontal, Vertical, or Adjustable
Performance	
Image Resolution	230µm
Image Distortion	<0.06%
Fringe Resolution	>500 fr/aperture
Retrace Error[3] @ 200 fringes	< λ/15[4]
RMS Simple Repeatability[1]	<0.6 nm RMS 2σ
RMS Wavefront Repeatability[2]	
Measurable Part Reflectivity	0.5% to 100% Specify
Environment	
Temperature / Humidity	15°C to 30°C / 5 to 95% relative, non-condensing
ΔT/Δt	<1.0°C/15 min
Vibration Isolation	Isolation System Recommended for PSI

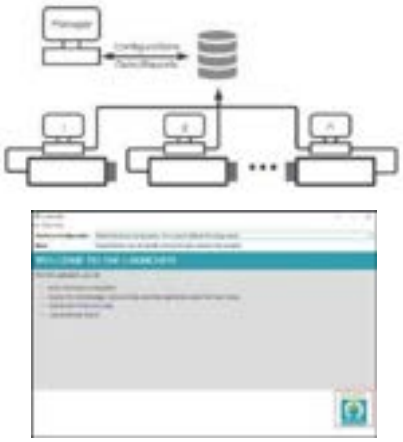
[1]RMS Simple Repeatability Test: The RMS for 36 sequential measurements with each measurement the average of 16 measurements each of a short <2 mm Plano cavity. [2]RMS Wavefront Repeatability Test: Measure 36 sequential Measurements (M1, M2,...M30) each consisting of 16 averages. Then average all 36 measurements creates a synthetic reference, "Ref", RMS wavefront repeatability equals two standard deviation of all 30 Ref - Mn results. [3]Retrace Error is defined as the PV residual error between a nulled measurement (the reference), subtracted from a measurement with 500 fringes of tilt, and expressed by the first 36 Zernike polynomials
[4]λ/20 optionally available. [5]Up to 310mm is available on special request

REVEAL Innovated Interferometer Software



- Traceable metrology via the analysis tree, saved with as-measured (.rvl) data—Apply filters/masks to data along the entire analysis tree
- Data analysis based on international standards and leading labs worldwide; Compatible with historic .dat data files
- Fast, consistent reporting via a default, and customizable report library
- 64-bit operation to handle modern 9MP and larger camera without crashing
- Remote training and debugging via TeamViewer; clean, browser-like, non-overlapping screens

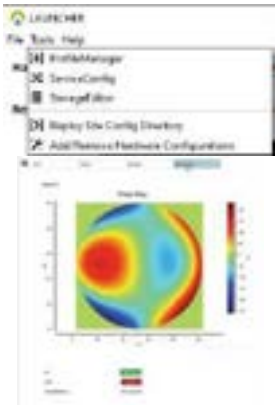
REVEAL 23 Starts with the REVEAL Launcher



Unique and New! No interferometer is an island...
Load measurement recipes and report forms from a centrally controlled library and save data automatically. Eliminates setup errors, and user-to-user variations by standardizing the entire measurement process from a central, password-controlled location.

New! Setup user access and passwords
In the Profile Manager grant or restrict global or individual access to measurements—Assign what can be edited, where data is saved, and then password (encrypted) protection.

New! Configure your hardware with a click
For multiple hardware configurations, just switch the source, click the hardware configuration and launch REVEAL 23.



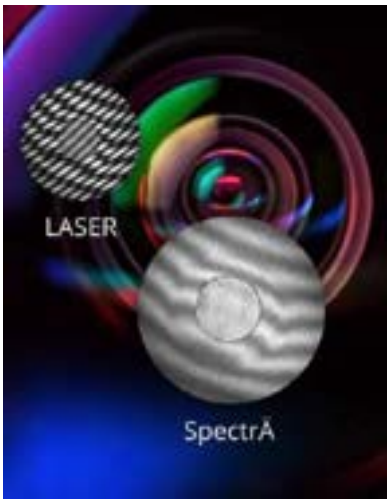
REVEAL Functionality is maintained:
All the menus, results, screens, data, and setups are maintained. So, there is no learning curve.

More Analyses are Standard:
Standard analysis, Optical Shop Testing and Fourier Analysis are included in the standard package so licensing is easier.

NEW! Create your customer Screens:
Display graphs and results required and even get GO/NOGO tolerance flags on important results.

NEW! "Undo" Mask shapes & Event Log:
The new Undo function takes you back one step to retry.

SpectrÄ *PATENTED* Temporal Coherence Controlled Light Source



Measure multiple surface cavities as thin as 0.075mm. Confident accuracy with no back reflections, unique real-time visual feedback and fast electronic fringe positioning via ÄPRE patented SCI Technology.

Typical Applications	
Substrates / Windows / Waveplates	Front/back surface form, Front/back Mid-Spatial Frequencies, Total Thickness Variation (down to .075mm thin), Thickness Wedge, Transmitted Wavefront, Homogeneity
Prisms, any size ≥100 µm per side	Face Flatness, Transmitted Wavefront, Hypotenuse Flatness, Face Parallelism, Homogeneity
Spheres	Form (no vertex bullseye), Mid-Spatial Frequencies, Radius, 30PPM w/o precision rails

Specifications	
Measurement Capability	Mid-Spatial Frequency Surface Structure
Output Ø / Working distance	9mm / Nominally 40mm
Interferometer Size L x W x H / Weight	45.6 x 15.3 x 16.4 cm / -
Temporal Coherence Control	Variable down to 100 µm
Spatial Coherence Control	Virtual extended source, while averaging
Measurement Techniques	Fast/Sensitive Synchronous and Vibration Tolerant PSI
Three Optical Light Sources	SCI SpectrÄ
Measurement Coherence Length	SCI SpectrÄ, <1 mm
Output Polarization/ Camera Resolution	Circular / 3000x3000px
Max Camera Frame Rate	≤ 43 Hz (source dependent)
Shortest Shutter Speed / Digitization	9 µs / 8 bit
Computer and Software	Windows 11 64-bit OS & REVEAL Software
Mounting Configurations	Horizontal or Vertical; Manual, Semi-Automated or Automated
Performance	
Spatial Frequency Range	0.2 l/mm to 120 l/mm
Fringe Resolution	<1200 fr/aperture
Retrace Error[3] @ 1200 fringes	< λ/15[4]
RMS Simple Repeatability[1]	<0.03 nm RMS 2σ
Accuracy[2]	<0.15 nm RMS 2σ
Measurable Part Reflectivity	0.5% to 40% Other options available
Environment	
Temperature / Humidity	15°C to 30C / 5 to 95% relative, non-condensing
ΔT/Δt	<1.0°C/15 min
Vibration Isolation	Isolation System Required

[1]RMS Simple Repeatability Test: The RMS variation of 30 sequential measurements with the average of 30 measurements. [2]Accuracy Test: Acquire 30 sequential measurements. Average all measurements, and subtract each measurement from the average. The mean plus 2Σ of the subtracted measurements of these 30 is the accuracy. [3]Retrace Error is defined as the PV residual error between a nulled measurement (the reference), subtracted from a measurement with 1200 fringes of tilt, and expressed by the first 36 Zernike polynomials. [4]System resolution proven using commercially available LNL/NIST developed BPRA resolution test artefact

Hexagon Absolute Arm World's First IP54-Protected PCMM *IMPROVED!*

For Portable 3D Scanning and Probing Anywhere!

PATENTED! Exclusive Absolute Encoders within every articulated joint make the Absolute Arm the only portable measuring arm that has eliminated warm-up times and encoder referencing before use.

Multi-functional control buttons and a convenient touchscreen OLED wrist display put measurement control directly in the user's hand.

Wide range of probes and high-speed 3D scanners combined with a choice of 7 sizes and 3 accuracy levels deliver endlessly flexible measurement functionality.

Laser Scanners

- Flagship Absolute Scanner **AS1** with IP54 protection
- **AS1-XL** 3D Laser Scanner
- Reliable **RS5** Laser Scanner
- Entry-level **HP-L-8.9** Laser Scanner

Easy user interaction in even harsh industrial environments through visual, acoustic and haptic feedback functions, augmented with Bluetooth technology.

Unique Zero-G Counter-Balance system and low-friction rotating grips reduce user fatigue and maximise accuracy by minimising inertia.

Unique modular wrist designed to make measurements flexible, fast and secure. Pistol grips in three sizes; and completely removable to measure hard-to-reach holes and cavities. Laser scanners are also removable, and quickly replaced later with no recalibration needed, for measurements in tight areas.

High-quality construction and sealing have allowed the Absolute Arm to be the world's first IP54-rated portable arm and operate in environmental temperatures of up to 45°C.

High-tech carbon-fibre tube construction ensures strength and thermal stability under any environmental conditions.

The HomeDock and SmartLock features allow the arm to be stowed and locked in place between measurements, for greater security during transport, set-up and station changes.

True wireless connectivity and hot-swappable batteries give greater flexibility when moving the arm around the shop floor, along with full-speed WiFi scanning performance.

Hexagon Absolute Arm All Models @ a Glance!

Measuring Range		1.2m	2.0m	2.5m	3.0m	3.5m	4.0m	4.5m
Hexagon Absolute Arm 7-Axis Series								
87 Series	E_{UNI} [1]	N/A		0.027mm	0.048mm	0.060mm	0.075mm	0.104mm
	P_{SIZE} [2]			0.011mm	0.016mm	0.019mm	0.025mm	0.035mm
	L_{DIA} [3]			0.042mm	0.072mm	0.087mm	0.106mm	0.125mm
	P_{FORM} [4]			0.021mm	0.032mm	0.038mm	0.043mm	0.050mm
	AS1 SSA [5]			0.041mm	0.054mm	0.065mm	0.076mm	0.115mm
	AS1-XL SSA [5]			0.087mm	0.0103mm	0.121mm	0.138mm	0.155mm
	RS5 SSA [5]			0.042mm	0.056mm	0.068mm	0.078mm	0.121mm
	Max Reach			2.98m	3.48m	3.98m	4.48m	4.98m
85 Series	E_{UNI} [1]	N/A	0.029mm	0.031mm	0.053mm	0.064mm	0.081mm	0.113mm
	P_{SIZE} [2]		0.010mm	0.012mm	0.020mm	0.024mm	0.029mm	0.040mm
	L_{DIA} [3]		0.038mm	0.048mm	0.080mm	0.096mm	0117mm	0.140mm
	P_{FORM} [4]		0.021mm	0.025mm	0.035mm	0.043mm	0.050mm	0.065mm
	AS1 SSA [5]		0.039mm	0.045mm	0.061mm	0.075mm	0.085mm	0.134mm
	AS1-XL SSA [5]		-	0.097mm	0.129mm	0.147mm	0.159mm	0.189mm
	RS5 SSA [5]		0.043mm	0.046mm	0.063mm	0.076mm	0.087mm	0.141mm
	Max Reach		2.48m	2.98m	3.48m	3.98m	4.48m	4.98m
83 Series	E_{UNI} [1]	N/A	0.039mm	0.048mm	0.064mm	0.082mm	0.104mm	0.135mm
	P_{SIZE} [2]		0.015mm	0.019mm	0.027mm	0.035mm	0.043mm	0.053mm
	L_{DIA} [3]		0.048mm	0.057mm	0.086mm	0.108mm	0.134mm	0.168mm
	P_{FORM} [4]		0.033mm	0.038mm	0.049mm	0.060mm	0.073mm	0.090mm
	AS1 SSA [5]		0.057mm	0.062mm	0.078mm	0.095mm	0.113mm	0.155mm
	AS1-XL SSA [5]		-	0.114mm	0.142mm	0.169mm	0.198mm	0.236mm
	RS5 SSA [5]		0.059mm	0.065mm	0.088mm	0.100mm	0.116mm	0.164mm
	Max Reach		2.48m	2.98m	3.48m	3.98m	4.48m	4.98m
Hexagon Absolute Arm 6-Axis Series								
87 Series	E_{UNI} [1]	N/A		0.025mm	0.036mm	0.048mm	0.061mm	0.074mm
	P_{SIZE} [2]			0.009mm	0.012mm	0.015mm	0.019mm	0.026mm
	L_{DIA} [3]			0.028mm	0.044mm	0.061mm	0.075mm	0.094mm
	P_{FORM} [4]			0.017mm	0.025mm	0.032mm	0.036mm	0.046mm
	Max Reach			2.73m	3.23m	3.73m	4.23m	4.73m
85 Series	E_{UNI} [1]	0.018mm	0.023mm	0.028mm	0.040mm	0.053mm	0.065mm	0.080mm
	P_{SIZE} [2]	0.006mm	0.008mm	0.010mm	0.014mm	0.018mm	0.022mm	0.028mm
	L_{DIA} [3]	0.016mm	0.030mm	0.035mm	0.049mm	0.066mm	0.082mm	0.102mm
	P_{FORM} [4]	0.011mm	0.017mm	0.020mm	0.028mm	0.036mm	0.041mm	0.050mm
	Max Reach	1.49m	2.23m	2.73m	3.23m	3.73m	4.23m	4.73m
83 Series	E_{UNI} [1]	0.022mm	0.033mm	0.042mm	0.056mm	0.070mm	0.085mm	0.105mm
	P_{SIZE} [2]	0.009mm	0.012mm	0.017mm	0.022mm	0.030mm	0.037mm	0.048mm
	L_{DIA} [3]	0.021mm	0.040mm	0.047mm	0.062mm	0.079mm	0.095mm	0.110mm
	P_{FORM} [4]	0.014mm	0.024mm	0.034mm	0.048mm	0.059mm	0.069mm	0.086mm
	Max Reach	1.49m	2.23m	2.73m	3.23m	3.73m	4.23m	4.73m

Hexagon Absolute Arm Compact 10360-2

8312 Model	MPE_p [7]: 0.008mm	MPE_e [8]: 5+L/40 < 0.018mm
8512 Model	MPE_p [7]: 0.006mm	MPE_e [8]: 5+L/65 < 0.015mm

Hexagon Absolute Arm All Models @ a Glance!

Hexagon Absolute Arm Technical Specifications	
Operating Temperature	+5° to +45°C
Storage Temperature	-30° to +70°C
Operational Elevation	Up to 2000m
Relative Humidity	10–90% non-condensing
Protection Rating	IP54
Marks of Conformity	CE – FCC – IC
Power Requirement	110–240V

AS1

AS1-XL

RS5

HP-L-8.9

Model	AS1	AS1-XL	RS5	HP-L-8.9
Scanner Type	Blue Laser Line	Blue Laser Line	Red Laser Line	Red Laser Line
Accuracy	0.016mm[9]	0.134 mm[9]	0.028mm (2σ)	0.04mm (2σ)
Point Acquisition Rate	Max 1.2 million pts/s		752,000 pts/s	45,000 pts/s
Points per Line	Max 4000		Max 7520	Max 750
Line Rate	Max 300Hz		Max 100Hz	Max 60Hz
Line Width (mid)	150mm	600mm	115mm	80mm
Standoff	165±50mm	700 ± 300 mm	165±50mm	135±45mm
Minimum Point Spacing	0.027mm	0.080 mm [2]	0.011mm	0.08mm
System Scanning Certification	Yes	Yes	Yes	No
Laser Class	2	2	2M	2
Protection Rating	IP54	IP54	-	-
Operating Temperature	5-45°C		5–40°C	
Weight	0.4kg	0.46 kg	0.4kg	0.32kg
*Grid of raw points, no interpolation available				

[1]Maximum permissible longitudinal error of measurement—ISO 10360-12:2016
[2]Maximum permissible probe deviation, size—ISO 10360-12:2016
[3]Maximum permissible probe deviation, position − ISO 10360-12:2016
[4]Maximum permissible probe deviation, shape—ISO 10360-12:2016
[5]Scanning System Accuracy: L_{DIA}—per ISO 10360-8 Annex D
[6]Weight without scanner
[7]Maximum permissible error, probing—per ISO 10360-2
[8]Maximum permissible error, length measurement—per ISO 10360-2
[9]$P_{Form.Sph.1\times25:ODS}$: Based on a part of the ISO-10360 standard

Hexagon Absolute Arm Machine Tool

Hexagon Absolute Arm Compact

Hexagon Absolute Arm Tube Inspection

Hexagon Absolute Arm 6-Axis Infinite Rotation

For Accurate Probe Measurements!

Hexagon Absolute Arm 6-Axis

Features

- Designed for accurate tactile measurements
- Carbon Graphite tube, RDS, intelligent TKJ, acoustic/haptic feedback, Absolute Encoders, Infinite Rotation in all axes, SpinGrip and SpinKnob (85 and 87 series), Zero G Counterbalance, SmartLock, interchangeable Control Packs for wireless connectivity
- Optional HP-L-8.9 laser scanner
- Compatible with InnovMetric's PolyWorks® Metrology Suite

6-Axis Compact Arm

Hexagon Absolute Arm COMPACT

For Highest Accuracy. Table Top Manual CMM Functionality

Hexagon Absolute Arm Compact

Features

- 1.2m measuring range with MPE E up to 5+L/65≤15µm and MPE P of 6µm
- Just place it on the table top and measure! No clamping or warm-up time required
- Carbon Graphite tube, RDS, intelligent TKJ, acoustic and haptic feedback, Absolute Encoders, Infinite Rotation in all axes, Zero G Counterbalance, interchangeable Control Packs for wireless connectivity and other user aids
- Quick Measure tool: measures circle diameters, 2 planes distance…
- Low profile magnetic anchors / New Integrated Base Plate with 4 mounting options
- Available with ISO 10360-2 certification

Accessories for Hexagon Absolute Arm Compact	RA8312 Compact	RA8512 Compact
Calibration sphere, dust cover, TKJ probes (3, 6,15mm), hard case, magnetic anchors, camera, work light, RDS, Quick Measure	Standard Included	
310mm Certified length bar, spin knob	Option	Yes
Weight (Arm only / Delivered Package)	10.2kg / 25kg	10.8kg / 30kg

Integrated Base Plate (4 Mounting Options)

Just put it on the table

Bolt to table

Magnetic anchor on steel surfaces/milling mc

Hexagon Absolute Arm 7-Axis Infinite Rotation Integrated Scanner

The Standard for Laser Scanning and Probing!

Hexagon Absolute Arm 85 Series
with Hexagon Absolute Scanner AS1-XL

Freeform Structure Scanning

Features

- 7-axis flexibility for versatile laser scanning
- Integrated scanner certified for total system accuracy
- New AS1 laser scanner fully integrated with no cables along tubes, to capture data from almost any object surface
- Carbon Graphite tube, RDS, intelligent TKJ, acoustic and haptic feedback, Absolute Encoders, Infinite Rotation in all axes, SpinGrip and SpinKnob (85 and 87 series), Zero G Counterbalance, SmartLock, interchangeable Control Packs for wireless connectivity
- Compatible with InnovMetric's PolyWorks® Metrology Suite
- Applications include Point cloud inspection, product benchmarking, reverse engineering, rapid prototyping, virtual assembly, etc.

Hexagon Tube Inspection System

Combine choice of Hexagon Absolute Arm, Tube Probe +BendingStudio XT Software

Hexagon Absolute Arm
Dedicated T-Model *(Heavier Base)*

Tube infrared sensor choices

Features

- Measure flexible, malleable tubes of any length and diameter up to 300mm, whether flexible or rigid, freeform or angular
- Accurate scanning on tubes of a wide variety of materials, colours and surfaces without scanning the entire tube surface or using complex fixturing
- Position and orientation measurement of end holders, fittings and fixtures through scanner point cloud analysis with CAD adaptors
- Highly repeatable and user-independent measurement results with full-speed scanning over WiFi and battery power for total portability
- Complete range of accessories includes additional probes, tube clamps, measurement tables and raisers to suit the working environment
- Open Bender Interface ensures easy compatibility with most CNC bender machines for direct production correction.
- Bending Simulation reduces correction loops by simulating proposed corrections within the software before physical application
- Fully certified to ISO-10360 certification

TubeInspect Turnkey Solution for High-End Tube Measurement

TubeInspect

Features

- Multiple-camera optical scanning system in a single-piece cell format
- HRC high-resolution camera delivers improved detail and feature analysis
- Available in industrial-sized TubeInspect P16.2 and smaller TubeInspect P8.2
- Fully Industry 4.0 compatible with possibility of integration within a larger robotic production cell
- Fast and detailed imaging with GigE camera technology, ensuring synchronic capture of the measuring object within milliseconds
- Innovative highly precise 3D glass reference surface offers the reliable stability required for shop-floor use

4 Tube/Pipe production and assemblies inspection, gauging and reverse engineering tasks

Reverse Engineering of Tube Assemblies: Non-contact infrared probes for rapid tube measurement. Touch probes for detailed geometric features. Creates accurate 3D model and saves as 'golden part' for subsequent measurements.

Tube Production: Shop-floor interface to navigate TubeShaper through the Hexagon Absolute Arm. Barcode scanner compatibility to find/load data. Compatible with legacy software (Supravision / DOCS) for continuity.

Tube and Pipe Inspection: Extract CAD nominals and compare with welded features probed after bending, for aligning to any part of a tube assembly. Compare results immediately against different alignment constraints.

Tube Gauging: Advanced CAD engine for rapid import of CAD models of a fixture. Easy measurement of saddles and gates. Feature constructions to build virtual tube to test the setup. Portability for large gauges to be measured.

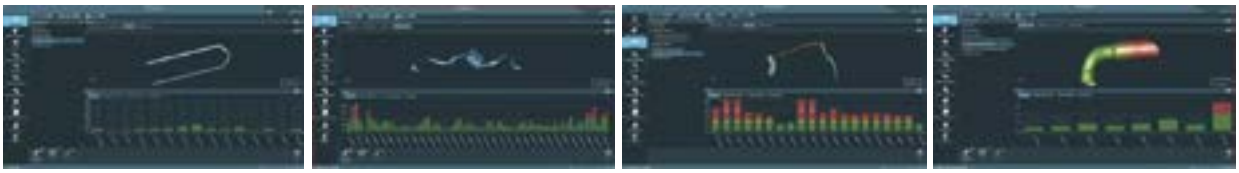
BendingStudio XT

Single Hub for Complete Tube and Wire Inspection

Features

- Complete end-to-end solution for tube and wire inspection and production control
- Links all data and processes related to the production of bent parts, from design and process planning to manufacturing and quality control, with an emphasis on metrological processes
- BendXtract technology allows quick collection and interpretation of measurement data and turns that into actionable customised reporting
- Carry out multiple inspection plans with individual measurement criteria for each part

BendingStudio XT



Specifications with Standard Hexagon Absolute Arm	
Measurement Technology	Infrared Tube Probe
Measurement Volume	1.2 to 4.5m
Arm Volumetric Accuracy	±0.1mm (1σ)
Tube Diameter	4 to 130mm
Bending Angle	1-340°
Operating Temperature	5 to 45˚C
Storage Temperature:	-30 to 70˚C
Relative Humidity	10 to 90% non-condensing
Power Requirement	Universal 110 to 240V

Absolute Arm Tube Model		
Model	**8325T**	**8330T**
E_{UNI}[2]	0.058mm	0.083mm
P_{SIZE}[3]	0.025mm	0.036mm
L_{DIA}[4]	0.066mm	0.089mm
P_{FORM}[5]	0.048mm	0.068mm
Weight without probe	8.1kg	8.4kg
Max. reach	2.73m	3.23m
Specs per ISO 10360-12:2016		

Hexagon Absolute Tracker World's Best Laser Trackers

The Foundation of Absolute Accuracy

Absolute Accuracy

- Absolute Interferometer (AIFM) combines the accuracy of an absolute distance meter (ADM) with the speed of an interferometer
- Scanning accuracy to within as little as 50µm
- Reflector single-point accuracy to within 20µm
- Patented Absolute Encoders ensure angular accuracy performance with no referencing before use
- Systems calibrated in ISO 17025-certified laboratories for accuracy specified to ISO 10360-10 standard

Absolute Reliability

- Integrated MeteoStation environmental monitoring unit
- IEC-certified IP54 sealed unit for challenging environments
- Wide operating temperature range of -15 to 45°C
- Integrated mini variozoom delivers a constant field of view in any light conditions
- Full 24-month factory warranty and guaranteed 10 years of serviceability

Absolute Productivity

- Non-contact measurement data collected at up to 1.2 million points and 300 lines per second
- Orient-to-Gravity for levelling and alignment tasks
- Ultra-large measurement volumes of up to Ø320m
- Real-time 1000Hz data rate
- Hidden-point measurement with a wireless probe can reduce measurement process time by up to 80%

Absolute Portability

- All-in-one integrated design
- Built-in WiFi with true access point functionality
- Portable design weighing as little as 7.3kg
- Independent hot-swappable battery power supply
- Convenient flight cases for simple transportation

ATS600

Groundbreaking direct scanning laser tracker, delivering metrology-grade measurement from a distance of up to 60m

AT960

Flagship model offering full 6DoF measuring functionality capable of both manual and automated inspections

AT930

Premium 3D tracker for high-accuracy reflector measurements that can support a range of applications

AT500

Ultra-long-range tracker designed for rugged use in the most challenging measurement environments

Hexagon Absolute Tracker Groundbreaking Technology

200 Years of Technical Innovation and R&D

Absolute Distance Meter

The foundation of laser tracker distance measurement (first introduced with the LTD500 in 1995) delivers highly accurate 3D measurements over for up to 160 metres distances.

Applicable for ALL Hexagon Absolute Trackers

Absolute Interferometer

Combining interferometer and distance meter technology, the Absolute Interferometer (AIFM) is the foundation of 6DoF measurement, first introduced with the groundbreaking AT901 in 2008.

Applicable for AT960 and ATS600

Enhanced Wave Form Digitiser

An extension of the Wave Form Digitiser technology pioneered by Hexagon in surveying applications (first introduced in 2019 with the ATS600) to deliver the world's first metrology-grade direct scanning laser tracker.

Applicable for ATS600

PowerLock

Automatic beam-targeting was introduced with the AT901 in 2009. This active vision technology made laser tracker operations simple and intuitive, reducing training needs and cutting measurement process times by up to 30 percent.

Applicable for ALL Hexagon Absolute Trackers

SHINE Technology

The Systematic High-Intelligence Noise Elimination introduced with the Absolute Scanner AS1 allows for measurement with no hidden settings that limit speed and scan-line width to deliver peak accuracy – all the performance, all of the time.

Applicable for AT960 with AS1

Automation

Automated inspection based on both 6DoF and 3D laser tracker technology is ground that was broken with Hexagon's LTD systems in the 1990s and has continued through to the development of the AT960 and ATS600 systems.

Applicable for AT960, ATS600

Handheld Sensors

Handheld sensors operated at the point of measurement in conjunction with a laser tracker have delivered enhanced measurement possibilities such as hidden point inspection and point cloud data acquisition since 2004.

Applicable for AT960

Modular Concept

The unique modular construction of the Absolute Scanner AS1 is the basis for the first ever cross-platform scanner, delivering high performance within both laser tracker and portable measuring arm-based systems.

Applicable for AT960

7DoF Control

Allowing for direct control of any robot or numerical control system in real-time, Absolute Tracker 7DoF metrology based on the state-of-the-art EtherCAT protocol has pioneered the development of automated production built on metrology-grade accuracy.

Applicable for AT960

Wide-Angle Reflector

The Super CatEye retroreflector is a unique solution for 3D point measurement, using special materials and a high-accuracy tracker to allow for an increased range of retroreflector measurements without tracker repositioning.

Applicable for ALL Hexagon Absolute Trackers

Hexagon Absolute Tracker All Models @ a Glance!

Model		AT960	AT930	ATS600	AT500
Measurement Distance	5m	Typical ±23µm, MPE ±45µm			
	10m	Typical ±38µm, MPE ±75µm			
	20m	Typical ±68µm, MPE ±135µm			
Absolute Angular Performance e_T [1]		±15µm+6µm/m			
AIFM Absolute Distance Performance		±0.5µm/m			
Dynamic Lock-on		±10µm			
Inclination Sensor		±1.0arcsec			
Orient to Gravity U_Z		±15µm+8µm/m			
Timestamp Accuracy		<5µsec			
Length Measurement 1.5'' RRR $E_{Uni:0:LT,MPE}$ [2]		±21µm+8.5µm/m			
Length Measurement T-Probe $E_{Uni:195:LT,MPE}$		±42µm+7.7µm/m			
Length Measurement AS1 $E_{Uni:0DR:LT,MPE}$		±50µm			
Length Measurement LAS $E_{Uni:ODR:LT,MPE}$		±60µm / ±26µm+4µm/m (>8.5m)			
Length Measurement LAS-XL $E_{Uni:ODR:LT,MPE}$		±150µm			
Length Measurement B-Probe $E_{Uni:0:LT,MPE}$		±300µm			
T-Mac Positional Accuracy		±15µm+6µm/m			

Length Measurement (Length Test in µm)

Measurement Distance	AT960/930/500		ATS600	
	Typical	MPE	Typical	MPE
5m	±32	±64	±40	±81
10m	±53	±106	±53	±106
20m	±96	±191	±96	±191

Distance Measurement (Ranging Test in µm)

Measurement Distance	AT960/930 (IFM)		AT960/930 (ADM) / AT500		ATS600	
	Typical	MPE	Typical	MPE	Typical	MPE
1.5 to 5 m	±1	±1	±7	±14	±71	±142
1.5 to 10 m	±1	±3			±72	±143
1.5 to 20 m	±3	±5			±76	±152
1.5 to 30 m	±4	±8			±83	±165
1.5 to 40 m	±5	±11			±92	±183
1.5 to 50 m	±8	±15			±102	±203

Model	AT960	AT930	ATS600	AT500
Measurement Range (3D)	XR / LR: 0 to 80m MR: 0 to 20m SR: 0 to 6m	0 to 80m	0.8 to 80m 1.5 to 60m (Direct Scanning)	0.8 to 160m
Tracker Size / Weight	477x258x258mm / 14.2kg			477x261x238mm / 13.6kg
Controller Size / Weight	249x148x59mm / 1.65kg			Built-in Controller
Laser Class	Class 2 Laser Product in accordance with IEC 60825-1 Second Edition (2014-05)			
Overview Camera	5MP / 10-degree FOV			
PowerLock Range	60m			80m
ISO 17025 Certified	Yes			
Warranty	2 years | extension possible with Customer Care Packages			
Operating Temperature	0 to +40°C			-15 to +50°C
Relative Humidity	Max. 95% non-condensing			
Operating Elevation	-700 to +5500 m			
Dust / Water	IP54			
Cable / Wireless	TCP/IP (Cat5) / WLAN (IEEE 802.11n)			
Battery Type	Lithium-ion battery | Swappable			
Battery Runtime	6 hours			6 hours
Data Output	1000Hz			100Hz

Hexagon Absolute Tracker All Models @ a Glance!

AS1

AS1-XL

Model	AS1	AS1-XL
Size H x W / Weight	347 x 147mm / 0.43kg	347 x 147mm / 0.46 kg
Accuracy	0.013 mm [3]	0.134 mm [3]
Standoff	165mm	700mm
Working Range	±50mm	± 300 mm
Scan Width (At Standoff)	Max 150mm	Max 600 mm
Maximum Sampling Rate	1.2 million pts/sec	
Maximum Line Frequency	300Hz	
Minimum Point Spacing	0.027 mm [4]	0.08 mm [4]

T-Probe

B-Probe^{plus}

Model	T-Probe	B-Probe^{plus}
Size H x W x D / Weight	310 x 129 x 70 mm / 0.65 kg	230 x 80 x 54 mm / 0.14 kg
Features	Cable-free operation, Multiple programmable buttons, Instant visibility feedback, Automatic stylus recognition, Multiple stylus mounting positions, Acoustic feedback	Cable-free operation
Battery type	1 x Lithium-ion | swappable	2 x AAA (NiMH) | swappable
Typical battery runtime (single charge)	> 5 hours	> 6 hours

Model	AT960	AT500
Measurement Range with Probe/Scanner (6D)	XR: 1.2 to 30m LR: 1.2 to 20m MR: 1.2 to 10m SR: 1.2 to 5m	1.6 to 12m

[1]Angular Performance Transverse e_T according to ISO 10360-10:2016 Annex E, concerning an MPE for the Location Error ($L_{Dia.2x1:P\&R:LT,MPE}$) by chapter 6.3 of ISO 10360-10:2016 of 30µm + 12µm/m. [2]By ISO 10360-10:2016 Chapter 6.4, Table 4, positions 1 to 35. [3]Standard deviation (1σ) of a best-fit plane (78% albedo), distance 1.5 to 30m, standard measurement mode, target aligned. [4]Maximum deviation (MPE) of the absolute position of a plane (78% Albedo), 1.5 to 30m, 0 to ±45° incidence angle. [5]By ASTM E3125-17 Table 2. [6]By ASTM E3125-17 Tables 3 and 4. [7]At default point-to-point and line-to-line distance, measurement distance 10m

Hexagon Absolute Tracker AT960/AT930

Ultra-Compact High-Speed Large-Volume Measurements

Hexagon Absolute Tracker AT960

Hexagon Absolute Tracker AT930

Features

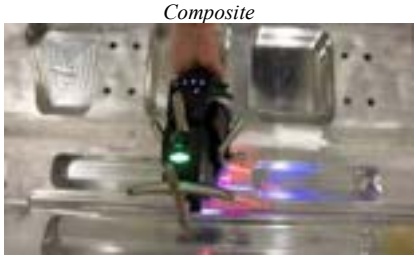
- Robust all-in-one Laser Tracker for Absolute Portability, Speed and Accuracy
- Measurement volumes of 12mØ (AT960-SR) to 160mØ (AT960-LR/-XR)
- Leica Absolute Interferometer (AIFM) ensures precise dynamic measurements to a moving target with dynamic performance at 1kHz data output
- PowerLock instantly re-establishes interrupted beams for ultimate ease-of-use
- Complete 6DOF inspections with probes, scanners and reflectors and for automation
- Wireless communication and battery option. Intuitive touchscreen minimising potential for user error
- IP54 ingress protection against dust and contaminants - allows use in harsh environments
- Integrated environmental unit to compensate for external temperature, pressure and humidity factors
- High-resolution colour overview camera (OVC) for static hidden point devices or documentation
- Orient to gravity (OTG) measures with Z-axis aligned to gravity for levelling/alignment tasks
- Fully ready for automated inspection, assembly and production within a robotic setup when paired with sensors such as the Absolute Scanner AS1, Leica T-Scan 5 and Leica T-Mac
- Ideal for Aerospace, Automotive, Shipbuilding, Manufacturing and many more sectors
- Fully supported by InnovMetric's PolyWorks® Metrology Suite

Automotive

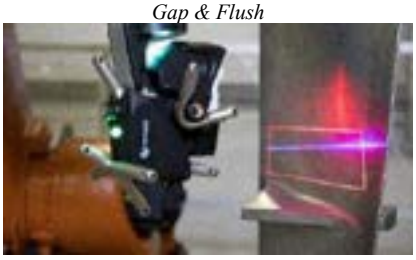
Composite

Gap & Flush

Automation



Mold & Die



Aerospace

Hexagon Absolute Tracker Scanning and Probing Solutions

Laser Scanning Technology with AS1 / AS1-XL

AS1

Features

- SHINE technology for cleaner, higher-quality data, collected faster, even on challenging surface types and finishes
- Wide 150mm scan line at mid-range for 300 line/s data collection speed
- Automation ready with impressive performance on default exposure settings, as well as high-speed data collection of up to 1.2 million points per second
- Ideal for automated manufacturing applications, from systematic inline inspection to statistical QC room checks

AS1-XL

Features

- SHINE technology now available in a device dedicated to large surface area scanning
- Immense stand-off distance of up to an entire metre 700 millimetres at mid-range
- The AS1-XL boasts an ultra-wide scan line—600 mm at mid-range, allowing large surfaces to be easily scanned.

The entire system can be powered from a single source, whether that's a single AC power cable or a hot-swappable battery that individually allows up to 9 hours of continuous scanning time.

Leica T-Probe Dynamic High-Speed Probe

Leica T-Probe

Features

- Completely wireless solution for the probing of hidden and hard-to-reach points
- Minimal setup times and station changes combined with a high point-acquisition rate, automatic stylus recognition and individually assignable multi-function buttons allow for high-productivity single-point data acquisition
- Flexible top-performance probing solution with a range up to 30m from the tracker
- Small, light, user-friendly, cable-free, battery-powered and more accurate than other handheld probes
- Large armless measurement volume of 60m; Relocation volume 160m
- Light, user-friendly and more accurate than other hand-held probes
- Accuracy U_{xyz} 0.035mm [1]
- Increased acceptance angle: Pitch ±45°, Yaw ±45°, Roll 360°
- Accepts Renishaw styli. Output 1,000 pts/s rate
- Precise quick auto-stylus change recognition without re-calibration
- Cable-less operation. Typical 12 hours runtime on 1 battery charge
- Multiple programmable buttons: instant visibility feedback, auto-stylus recognition, multiple styli mounting positions, acoustic feedback

[1] Additional T-Probe uncertainty to be added per ISO/IEC Guide 98-3:2008 to the existing Hexagon Absolute Tracker AT960 "U_{xyz}" uncertainty for a complete "U_{xyz}" uncertainty up to 25m distance.

Hexagon Absolute Tracker AT500 *NEW!*

Measure Anywhere with Enhanced Productivity

Hexagon Absolute Tracker AT500

Dimension Check on Propeller

Features

- From 0.8m to 320mØ ultra-large measurement volume; Continuous measurement sampling rate at 100Hz
- All-in-One Integrated Design with built-in battery-powered controller unit, integrated wireless connectivity, environmental monitoring, all-day battery power, HD overview camera and ergonomic carry handle
- Smart Connectivity with built-in Wi-Fi with true access-point functionality and Bluetooth Control via the AT500 Connect app for quick settings adjustments over Bluetooth direct from a smartphone or tablet
- PowerLock automatically re-establishes interrupted line of sight within a wide field of view with no user interaction required
- Probing with the new cableless, battery-powered Leica B-Probe^{plus} with customisable hidden-point capability
- Hassle-free setup process from transport case to large-scale measurement in just moments
- IP54-rated protection and extended operating temperature range (-15 to +50°C) for working under challenging conditions
- Fully supported by InnovMetric's PolyWorks® Metrology Suite

Leica B-Probe^{plus} *NEW!*

Leica B-Probe^{plus}

Features

- Dedicated handheld probing tool for Hexagon Absolute Tracker AT500
- Gather hidden 3D points across a large measurement volume. Cableless, battery powered.

Meas. Vol Ø	24m
Relocation Vol Ø	Up to 320m
Battery Power	> 6 hours per charge
Hidden Point Capability	150mm

Mounting Hole Location Check

Hidden Point Probing

Hexagon Absolute Tracker ATS600 First Ever Direct Scanning!

Features

- Combines reflector, target accessories and DRO with Wave Form Digitiser (true submillimeter scanning from up to 60m away with accuracy within 300µm)
- Ultimate high-speed direct scanning inspection for large parts and surfaces, hitherto impractical to cover with handheld scanners
- Fast process opens up new applications for metrological quality control
- Measurement data delivered to metrology software at data rate of up to 1000Hz
- Familiar and easy to use like traditional laser tracker. Targets easily identified and results delivered and processed efficiently through established workflows
- Ideal for automated installations with minimal user intervention required
- Data point density fully configurable. User may choose fast process rates to scan whole volume or choose higher density scans for certain specific segments for higher resolution and accuracy level per their application
- Fully supported by InnovMetric's PolyWorks® Metrology Suite

Hexagon Absolute Tracker ATS600

Aerospace

Energy

Transportation

Hexagon Absolute Tracker ATS600	
Reflector Measurement Absolute Angular Performance[1]	±15µm+6µm/m
Reflector Measurement Length Measurement ($E_{Uni:0:LT,MPE}$)[2]	±100µm
Non-Contact Measurement Range Noise[3]	< 80µm
Non-Contact Measurement Absolute Accuracy[4]	<±300µm
Reflector Measurement Range	0.8 to 80m
Non-Contact Measurement	1.5 to 60m
Scanning Rate	1kHz
Scanning Speed[5]	< 10sec/m² in Fast Mode; < 135sec/m² in Standard Mode
Dust/Water / Operating Temperature	IP54 (IEC 60529) / 0°C to 40°C
Relative Humidity	Max 95% (non-condensing)
Environmental Monitor	Temperature, pressure and humidity
Cable / Wireless Interface	TCP/IP (Cat5) / WLAN (IEEE 802.11n)
Overview Camera	4:3 IR enhanced image ≈ 10° FOV
Power	AC power supply, 8-hour Lithium-ion battery
Laser	Class 2 (IEC 60825-1 – Second Edition 2014-05)
Width x Height x Depth / Weight	Machine: 258x477x258mm / 14.2kg Controller: 148 x 249x59mm / 1.65kg

[1]Angular Performance Transverse e_T according to ISO 10360-10:2016, concerning an MPE for the Location Error ($L_{Dia.2x1:P\&R:LT,MPE}$) by chapter 6.3 of ISO 10360-10:2016 of ±30µm+12µm/m. [2]By ISO 10360-10:2016 Chapter 6.4, Table 4, positions 1 to 35. [3]Standard deviation (1σ) of a best-fit plane (78% Albedo), distance 1.5 to 30m, standard measurement mode, target aligned. [4]Maximum Deviation (MPE) of the absolute position of a plane (78% Albedo), 1.5 to 30m, 0 to ± 45° incidence angle. [5]At default point-to-point and line-to-line distance (10m).

StereoScan neo Superior Resolution and Accuracy Model

Hexagon StereoScan neo

- Innovative Smart Data Capture for data acquisition powered by 16-MP twin digital camera at extremely high speed without compromising data quality with variable resolution
- Smart Phase Projection with cutting-edge fringe projection pattern for highest quality data even with challenging surfaces
- Variable Light Projection (VLP) allows the generated measurement results to be instantly projected back onto the measurement surface, for the easy colour-coded visualisation of deviations from CAD right on the part being measured
- Ready for automated robotic inspection thanks to rigid design and double carbon frame.
- Accessories such as turntable and turn-tilt units allow for semi-automated scanning
- Combinable with photogrammetry systems.
- Compatible with InnovMetric's PolyWorks® Metrology Suite

R16.2	
Camera Sensor	Monochrome, CMOS, 4/3"
Camera Resolution	2x 16.8 MP (5472 x 3084)
Projection Unit	Digital Projector
Light Source	3 x 100 W high-power LEDs (red + green + blue)
Operating Temperature	0 to 50 °C ambient (without condensation)
Sensor Weight	12kg[1]
Power Supply / Control Unit	Internal, AC 110/230 V, 50-60 Hz, 600 W / Integrated
Operating System	Windows 10, 64 Bit
Probing	Compatible with MI.Probe mini

Measurement Specifications

R16.2	Triangulation Angle 30° Base Length 450mm Working Dist. 840mm				Triangulation Angle 30° Base Length 150mm Working Dist. 350mm		
Field of View[2]	L-350mm	L-500mm	L-850mm	L-1000mm	S-75mm	S-125mm	S-200mm
Field of View Size[3]	295x165mm	445x255mm	730x440mm	890x545mm	70x40mm	105x60mm	170x110mm
Measuring Depth[4]	175mm	250mm	420mm	500mm	36mm	54mm	100mm
X, Y Resolution[5]	55µm	83µm	143µm	180µm	12µm	19µm	33µm
Sphere Spacing Error	10µm	16µm	30µm	32µm	5µm	7µm	8µm
Length Measuring Error	20µm	28µm	60µm	64µm	10µm	15µm	18µm
Probing Error Size	6µm	12µm	16µm	18µm	6µm	7µm	6µm
Probing Error Form	7µm	12µm	16µm	18µm	5µm	6µm	7µm

[1]Weight may vary depending on the measuring fields. [2]Designation of the scanner bases (S, L) and the diagonal in the centre of the measuring volume. [3]Lateral expansion (X x Y) in the centre of the measuring volume. [4]Depth of the measuring volume (Z). [5]Values for the lateral resolution have been calculated theoretically (ratio of the size of the FOV and number of pixels of the camera chip).

SmartScan VR800 *NEW!* Combine 3D resolutions in one setup

Hexagon SmartScan VR800

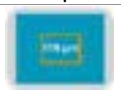
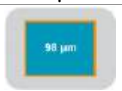
- Patented dual stereo camera setup with **four 20MP** cameras plus mechanical optical zoom projection unit setup.
- Multi-camera processing allows for near-simultaneous measurement data and part orientation capture with **Smart Snap**—reducing data weight and processing times when combining scans.
- Change the data resolution across a constant measurement volume with **Smart Resolution** to get more detail.
- Adapt measurement volume and resolution while maintaining 5million data points with **Smart Zoom.**
- Offers unmatched accuracy values in its class—passes the acceptance test based on the VDI/VDE2634 Part 3.
- Combine the scanner with a DPA add-on camera system to extend the measurement volume for the measurement of larger parts.

SmartScan VR800	
Camera Sensor	4x Monochrome, CMOS 1”
Camera Resolution	4x 20MP (5544 x 3694)
Projection Unit	Digital Projector
Light Source	50 W high-power LED (blue)
Operating Temperature	0-40 °C ambient (without condensation)
Sensor Weight	9.8kg
Power Supply / Control Unit	External, AC110/230V, 50-60Hz, 270W / Integrated
Operating System	Windows 10, 64-bit
Probing	-

Scanner Configuration

Accuracy	Large Base	Small Base
Measurement Volume[1,2]	800	320
Sphere Spacing Error	28µm	9µm
Length Measuring Error	48µm	18µm
Probing Error Size	8µm	3µm
Probing Error Form	10µm	6µm

Measurement Specifications

Smart Zoom[6]						
Measurement Volume[2]	800	660	430	320	250	160
Measurement Area[3]	666x443mm	544x372mm	357x238mm	269x169mm	214x140mm	137x89mm
Measurement Depth[4]	400mm			160mm		
X,Y Resolution[5]	238µm	179µm	119µm	98µm	74µm	49µm
Software Symbol						

Smart Resolution[7]						
Measurement Volume[1,2]	800			320		
Effective Sensor Resolution	5MP	12MP	20MP	5MP	12MP	20MP
Measurement Area[3]	666x433mm			269x169mm		
Measurement Depth[4]	400mm			160mm		
X,Y Resolution	238µm	179µm	119µm	98µm	74µm	49µm
Software Symbol						

[1]Values apply to all measurement volumes related to a base. [2]Naming of measurement volume represent the measurement diagonal of the measurement area. [3]Lateral expansion (XxY) in the centre of the measurement volume. [4]Depth of the measurement volume (Z). [5]The values for the lateral resolution have been calculated based on the ratio of the measurement area and the number of pixels of the camera chip. [6]Change resolution and keep output constant at 5 MP. [7]Change resolution (20, 12, 5 MP) and keep measurement volume constant

SmartScan Powerful and Compact 3D Scanning

Hexagon SmartScan

MI.Probing with SmartSCAN and stereoSCAN

- Smart Data Capture technology allows for high-speed data acquisition at extremely high levels of detail
- Compact and low-weight design for work in the most challenging workshop conditions
- High-tech carbon-fibre structure for extremely stable and reliable performance even under temperature fluctuations
- Available in high-end twin 12MP camera arrangements; Fully upgradeable modular system configuration
- Ideal for large complex surface geometries and fragile or deformable parts
- Easy changeable measuring fields when combined with high-end photogrammetry
- Compatible with InnovMetric's PolyWorks® Metrology Suite

	R12
Camera Sensor	Monochrome CMOS, 1.1"
Camera Resolution	2x 12.4 MP (4112 x 3008)
Projection Unit	Miniaturized Projection Technique
Light Source	100 W high-power LED (blue)
Operating Temperature	0 to 50 °C ambient (without condensation)
Sensor Weight	4kg[6]
Power Supply / Control Unit	External, AC 110/230 V, 50-60 Hz, 150 W / External
Operating System	Windows 10, 64 Bit
Probing	Compatible with MI.Probe mini

Measurement Specifications

R12	Triangulation Angle 27° Base Length 470mm Working Dist. 1000mm				Triangulation Angle 29° Base Length 260mm Working Dist. 500mm			
Field of View[2] (mm)	M-350	M-450	M-750	M-1000	SL-90	SL-200	SL-300	SL-500
Field of View size[3](mm)	285x205	380x275	590x435	825x630	70x55	145x105	240x160	420x325
Measuring Depth[4]	180mm	240mm	370mm	500mm	44mm	90mm	144mm	250mm
X, Y Resolution[5]	69µm	92µm	143µm	201µm	17µm	35µm	57µm	102µm
Sphere Spacing Error	16µm	20µm	30µm	44µm	6µm	9µm	12µm	21µm
Length Measuring Error	36µm	40µm	60µm	88µm	15µm	18µm	24µm	42µm
Probing Error Size	9µm	10µm	15µm	22µm	6µm	6µm	8µm	15µm
Probing Error Form	9µm	10µm	15µm	22µm	6µm	6µm	8µm	15µm

[1]Weight may vary depending on the measuring fields. [2]Designation of the scanner bases (S, SL, M, L,) and the diagonal in the centre of the measuring volume. [3]Lateral expansion (X x Y) in the centre of the measuring volume. [4]Depth of the measuring volume (Z). [5]Values for the lateral resolution have been calculated theoretically (ratio of the size of the FOV and number of pixels of the camera chip).

PrimeScan For Simple, Precise Scanning

Hexagon PrimeScan

- Innovative fringe projection technology delivering high luminous power and excellent projection quality
- Compact and lightweight design perfect for scanning in special application areas or in difficult to access parts of the shop floor
- Scans glossy and dark surfaces without pre-treatment
- Automated measurement and easy data acquisition possible within both smaller and larger volumes
- Smart Data Capture technology allows for high-speed data acquisition at extremely high levels of detail
- 8 configurations for diverse range of measurement tasks
- Short working distance ideal for applications in narrow environments
- Compatible with InnovMetric's PolyWorks® Metrology Suite

	R5
Camera Sensor	Monochrome, CMOS 2/3"
Camera Resolution	2x 5.0 MP (2448 x 2048)
Projection Unit	Miniaturized Projection Technique
Light Source	100 W high-power LED (blue)
Operating Temperature	0 to 50 °C ambient (without condensation)
Sensor Weight	3.8kg
Power Supply / Control Unit	External, AC 110/230 V, 50-60 Hz, 150 W / Integrated
Operating System	Windows 10, 64 Bit
Probing	Compatible with MI.Probe mini

Measurement Specifications

R5	Short Working Distance Triangulation Angle 26° Working Dist. 370mm				Long Working Distance Triangulation Angle 18° Working Dist. 540mm
Field of View	50mm	125mm	200mm	400mm	700mm
Field of View Size[1]	40x30mm	100x80mm	150x125mm	300x275mm	500x450mm
Measuring Depth[2]	24mm	64mm	100mm	200mm	350mm
X, Y Resolution[3]	16µm	40µm	63µm	125µm	208µm
Sphere Spacing Error	4µm	7µm	12µm	20µm	56µm
Length Measuring Error	10µm	16µm	24µm	40µm	112µm
Probing Error Size	6µm	6µm	6µm	10µm	28µm
Probing Error Form	4µm	6µm	7µm	10µm	28µm

[1]Lateral expansion (X x Y) in the centre of the measuring volume. [2]Depth of the measuring volume (Z).[3]The values for the lateral resolution have been calculated theoretically (ratio of the size of the FOV and number of pixels of the camera chip).

PartInspect L Automated Inspection Powered by SLS Technology

PartInspect L

- Straight-forward measurement cells that simplify and accelerate repetitive inspection tasks
- Move vital inspection processes into the world of smart manufacturing with the minimum of expertise and effort
- OfflineProgramming allows for a wide range of measurement preparation functionality within an easy-to-learn user interface with an intelligent guidance process
- Specialised ‘one button’ interface for simple execution of prepared measurement programs
- User guidance through robot pose and scan path planning using smart process
- automation
- In-process planning creates scan plans up to 16 times faster than fully manually programmed systems
- Available in HiRes, HiEnd or Efficient configurations based on StereoScan neo R8/R16 or PrimeScan
- Compatible with InnovMetric’s PolyWorks® Metrology Suite

Applications of Structure Light Scanner Solutions

Automotive

General Manufacturing

Tooling, Mould and Die

Aerospace

Heavy Industry

Power & Energy

Arts & Culture

Other Unique Applications

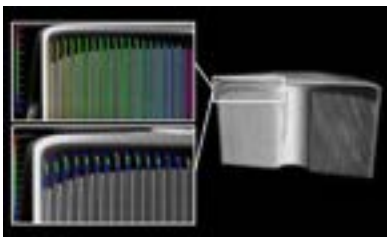
Notes

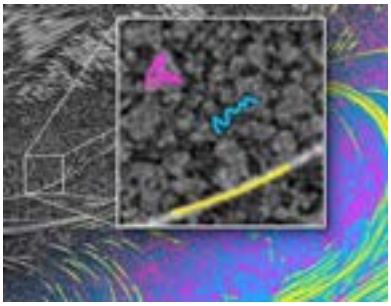
VGStudio Max CT Visualisation and Analysis Software

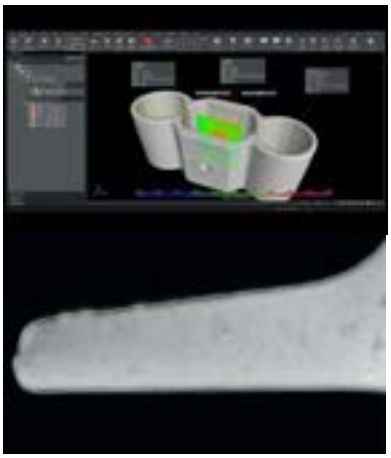
VGStudio is the industry-leading Computed Tomography analysis and visualisation software, processing voxel and mesh data using Windows® 11 multi-processor/multi-core PCs linked directly to CT scanners.

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!

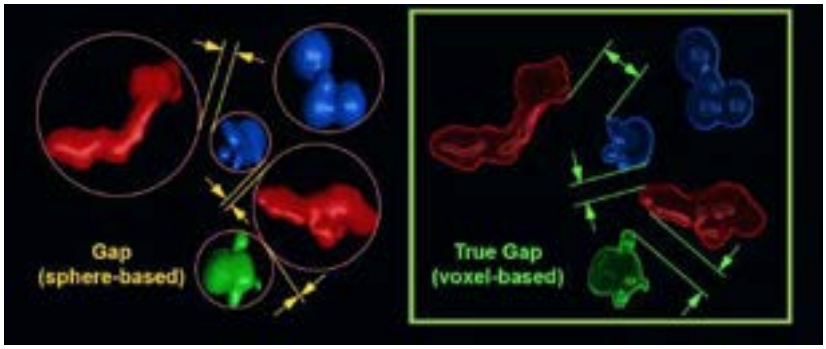
New and Improved Features in VGStudio Max







- New battery inspection feature enables measure and tolerance 2D anode overhang, shape-following lengths, electrode counts, and curvature of the overhang—you can visualize desired property in various ways
- Paint & Segment labelling on extracted ROIs to speed up workflow
- Geometric tolerances for extracted median elements of cylinders, cones, or parallel planes—now easy to include a slew of measurements on a single part
- New voxel-based gap calculation measures precise distances between pore surfaces—accurately determine the smallest gap for subsequent evaluation
- New Options for Handling Particles and Voids in the Advanced Surface Determination
- Enhanced Visualization of Tolerance Zones
- Reworked UI with easy access to the main application functions; includes all reporting-related functions, access to advanced customization capabilities, preview gallery to recent used files, and shortcut editors
- Consolidate disparate reporting tools into one central location
- Real-time status of measured parts, get failure details, and view metrology reports on any device at any time
- New interactive 3D images in Reporting for porosity analyses provide additional context to the 2D indication images—easier to locate indicated part
- Windows 11 Supported



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

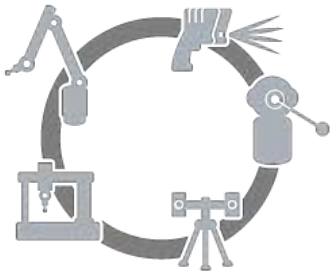
VGMetrology Maximum Precision, Minimal CT Data Set Sizes

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

PolyWorks® Smart 3D Metrology Digital Ecosystem *NEW!*

Supports all your industrial manufacturing organization's 3D measurement processes, from measurement planning by the design and manufacturing teams to the measurement execution by the quality control team, and the enterprise-wide sharing of 3D measurement data and results.



Universal Platform

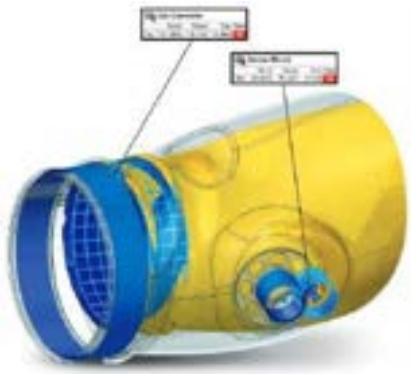
Interface with all 3D measurement devices and perform all inspection tasks using one universal workflow.

Digital Connectivity

Interconnect all of the people who capture or need access to 3D measurement information.

Collaborative Workflows

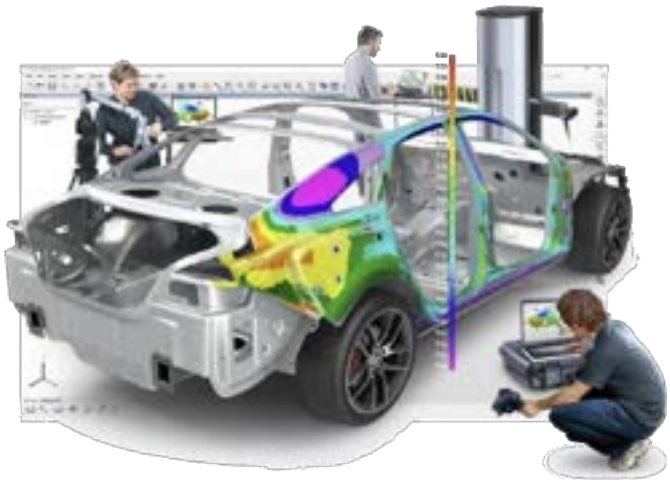
Facilitate digital collaborative teamwork at every stage of the product development process.



Accelerate feature extraction on a batch of highly deviated pieces

Create smart first-article inspection reports in Excel

PolyWorks|Inspector™ Dimensional Analysis and Quality Control



PolyWorks|Inspector™ is a universal 3D dimensional analysis and quality control software solution to control tool or part dimensions, diagnose and prevent manufacturing and assembly issues, guide assembly building through real-time measurements, and oversee the quality of assembled products by using portable metrology devices and CNC CMMs.

- Interface with all 3D measurement devices thanks to a universal digitizing hub
- Bring all relevant data under one roof through a universal data hub
- Perform all inspection tasks with or without CAD data using a universal 3D metrology workflow
- Deploy universal inspection projects playable on any 3D measurement device
- Complete Dimensional Analysis and Quality Control Toolbox, allowing users to extract meaningful information from their measured 3D data, automate the inspection process when more than one piece is measured, and structure the presentation of measurement results to facilitate enterprise-wide digital collaboration.

Market-leading Portable Metrology Platform

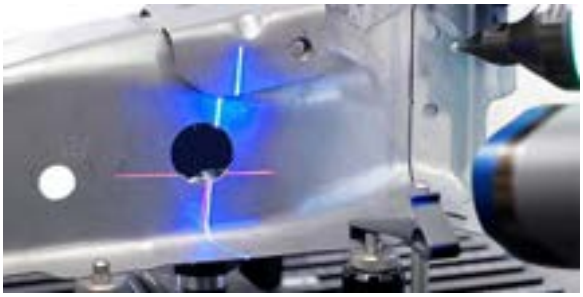
- Generate high-quality surface scans
- Ensure sufficient scanned data for reliable feature extraction
- Implement repeatable probing workflows
- Guide assembly building with real-time measurements
- Maximize the productivity of your scanning arms
- Leverage our disruptive laser tracker innovations
- Scan large structures rapidly using spherical digitizing
- Tailor measurement methods to your processes

High-productivity CNC CMM Solution

Reduce the complexity of CMM programming tasks

Accelerate the sequencing process while staying in control

Add measurement objects to a sequence effortlessly

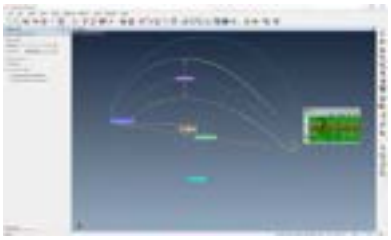


Complement CNC CMM projects with portable metrology data

Airfoil Gauge Module for PolyWorks|Inspector™

Comprehensive Dimensional Analysis of Fan, Compressor, and Turbine Blades

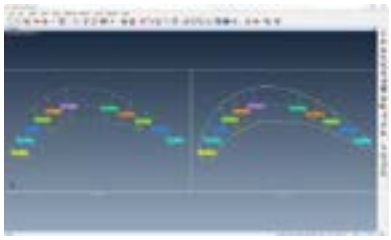
- Most robust camber line fitter in the industry
- Process datasets from any 3D measurement principle
- Flexible reverse engineering/adaptive manufacturing
- Extract key features and dimensions on a blade to create a model in your corporate CAD
- Fully customizable/programmable for specific needs



Geometric Primitives

- Camber line
- Leading edge point
- Trailing edge point
- Centre of gravity
- Maximum thickness point
- Smallest enclosing circle
- Tangent vector
- Leading edge tangent point

Trailing edge tangent point



Dimensional Measurements

- Leading and trailing edge radii
- Camber line length
- Maximum thickness
- Chord length
- Maximum width (aerodynamic/tangential)
- Twist and stagger angles
- Smallest enclosing circle
- Inlet and exit angles
- Unlimited thickness measurements along camber line from leading or trailing edge points
- Distance between airfoils in a ring or blisk
- Area

Data-to-CAD Deviations

- Leading edge point deviation
- Trailing edge point deviation
- Centre of gravity deviation
- Maximum thickness point deviation
- Leading edge tangent point deviation
- Trailing edge tangent point deviation

PolyWorks|Inspector™ Probing Package

Universal 3D Metrology Platform for Single-Point Probing Devices

Operate all your probing devices from a common software platform. Supports arm-based, hand-held probing, digitizers, trackers and manual/CNC CMMs.

Multiple Device Positions automatic probed target matching, complete target analysis toolbox, temp compensation and large volume metrology bundle.

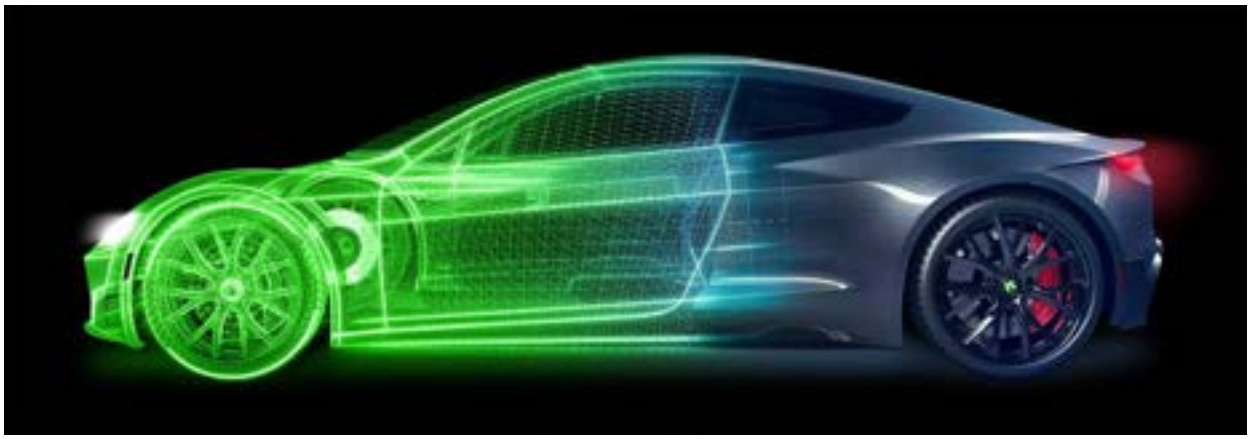
Universal workflow for performing all inspection tasks. Integrated Play Inspection measurement tool to automatically measure a new piece without teaching or scripting.

Repeatable operator-driven measurement workflows

Offers a complete toolset for large-volume metrology

PolyWorks|Modeler™ Point Cloud Reverse Engineering

True Interoperability between Digitized Polygonal Models and CAD/CAM Applications



PolyWorks|Modeler™ is a comprehensive reverse-engineering software solution that allows extracting optimal CAD entities—curves, surfaces, parametric sketches, and prismatic features—from polygonal models of digitized parts to serve as the starting point in your professional CAD modelling solution. Interface with all 3D measurement devices with a universal digitizing hub.

Polygonal Modelling

Create polygonal models of digitized parts in real-time. Repair and optimize imperfectly digitized geometry. Apply CAD operations to polygonal models.

Surface Modelling

Create meaningful curves on polygonal surfaces. Create surface patches from curves automatically. Automate the creation of curves and surface patches.

Solid Modelling

Create sketches from digitized models. Create sketch entities and dimensions. Transfer PolyWorks sketches to your CAD solution.

Get CAD-Friendly Surface Models from Automatic Surfacing Technology

With a single click, automatically turn your 3D scans into high-quality surface models directly usable in your preferred downstream applications, including FEA and mechanical simulation, machining, and CAD design, thanks to our revolutionary surface modelling approach.

Simplify your Reverse-Engineering Workflow

For even greater flexibility, the automatic surfacing technology is perfectly integrated within our intuitive curve-based surfacing workflow, letting you interactively edit the curve network to create optimal surface models.

PolyWorks Applications


Automotive


Aerospace


Consumer Products


Energy

PolyWorks Packages

PolyWorks|Inspector™ Packages

Package	Premium	Standard	Probing++	Probing
Standard for all Packages	Measurement collection for digital gauges Manual measurement data entry and visual checks IGES/STEP neutral CAD file translator Part alignment toolset Dimensional control toolset Smart GD&T toolset Reporting toolset Simulation mode for offline project setup Repeatable multipiece measurement workflows Statistical Process Control toolset (SPC) One-year support/maintenance			
Single-point measuring device for portable metrology	√	√	√	√
Single-point measuring device for CNC CMMs	√		√	
Point cloud digitizer for portable metrology	√	√		
Point cloud digitizer for CNC CMMs	√			
Real-time quality meshing and offline point cloud meshing	√	√		
PolyWorks|Modeler™ Light module	√			
PolyWorks|AR™ plug-in	√			Option
Native CAD file translators	Option	Option	Option	Option
Airfoil gauges	Option	Option	Option	Option
Two complimentary seats for Basic classroom training	√	√	√	√

PolyWorks|Modeler™ Packages

Package	Premium
Standard for all Packages	Point cloud digitizer for portable metrology Single-point measuring device for portable metrology Real-time quality meshing and offline point cloud meshing Polygonal editing Parametric sketching One-year support/maintenance Two complimentary seats to attend Basic classroom training
NURBS surfacing	√

PolyWorks|ReportLoop™ Smart 3D Inspection Data Review

Digital Interoperability Solution for Reporting and Advanced Analysis

PolyWorks|ReportLoop™ is a free interoperability solution that allows you to inject smart 3D inspection data into Excel spreadsheets to complete your preformatted corporate reports or to analyse the performance of your 3D measurement processes.

Direct Access to Smart 3D Inspection Data

- Spreadsheets linked to dynamic 3D inspection data
- Automated spreadsheet updates
- Ideal for collaborative teamwork

Advanced Analyses at Your Fingertips

- Create reusable templates
- Leverage the power of Excel
- Analyse your measurement systems

PolyWorks|Talisman™ Smart Remote Control

Boosts Measurement Efficiency on the Shop Floor

The free PolyWorks|Talisman™ app is a smart remote-control solution that allows measurement specialists to operate PolyWorks|Inspector™ from mobile computing devices, through a secure Wi-Fi connection. Work more efficiently by eliminating those back-and-forth trips to the computer. Just take your smartphone or tablet and your 3D measurement device to the parts to be inspected, and control your measurement session from beginning to end.

- Control PolyWorks® remotely
- Get live feedback anywhere
- Total confidentiality with encrypted communications

LaserGauge® DSP Handheld Sensors with Integral Processors

HS702

- Smallest most rugged DSP sensor
- High volume applications e.g. automotive and aerospace gap and flush
- Automatic Gain Adjustment measures all colour surfaces. Image optimized through sophisticated gain algorithm
- Available in either Red or Blue laser

HS703

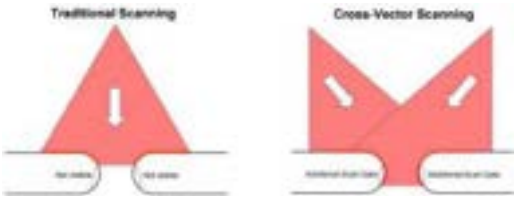
- Fastest, most versatile DSP sensors
- Horizontal scanning resolution of 1280 surface points within FOV; 2.5X better than most other profilers on the market
- Run complex inspections or use as GO/NO GO Gauge. Full range of aerospace applications
- Available in either Red or Blue laser

HS763

- Equipped with two blue lasers to scan transparent, translucent surfaces and opaque surfaces
- Plug a TS800 into the HS763 and use it as a controller
- Ideal for automotive body panels, headlamps, tail lamps, window glass, chrome, etc.

HS761

- Complete surface profile
- Unique cross-vector scanning with multiple lasers/views at crossing angles, to see around edges of radii to the vertical tangent and beyond
- Integral barcode reader scans a VIN/identifying number for traceability of part or inspected assembly



Cross-Vector Scanning (HS761)

Fully portable (HS703)

Model	HS702	HS761	HS703	HS763
Processor	Digital Signal Processor, 1GHz Speed; measures in < 1 second			
Size W x H x L	58x97x257mm	91x114x257mm	91x97x257mm	91x150x257mm
Weight / (with battery)	595g / (709g)	907g / (992g)	737g / (822g)	964g / (1077g)
Colour Display	2.4”	3.5” touchscreen	3.5” touchscreen	3.5” touchscreen
User Interface	2 sets of 3 LEDs, 5-Way Joystick and 2 Buttons			
Communications	Wireless – 2.4GHz with USB Stick; Cable – USB 2.0A to Mini 5-pin USB, 6’ length			
Operating Modes	**Gauge** uses one algorithm per scan to calculate multiple measurements and display values. **Routine** designed with LG Works to measure different features on an assembly with files sent to the sensor.			
Memory / Battery	8GB of data/scans/routines / Rechargeable lithium-ion			
FOV Options	30mm	38mm	30mm	38mm
Horizontal Scanning Res	20µm	30µm	25µm	30µm
Depth Accuracy	±20µm	±25µm	±20µm	±25µm
Shock Protection	Cast urethane housing			
Environment	0° – 70°C			

Pop-Top/Burst Disc Score Depth

Contour

Scratches

LaserGauge® USB Sensors Ultra-Fast, Hi-Resolution 2D Scanning

TS800

- Blue laser inspects and measures small features in hard-to-access areas even on shiny or opaque surfaces
- Unique removable standoff guides for correct alignment to ensure accurate measurement
- Small and light, narrow tapered stem for access to highly restricted areas
- Measurements: Edge Radius, Break Angles, Chamfer Angles, etc.
- Available in either Red or Blue laser

HS730LE

HS733LE

- Inspects leading edge of aircraft and power system engine blades/vanes
- Scans both sides of blade simultaneously and plots whole profile around blade radius for comparison to nominals. Blade thickness and edge radius can also be analysed
- Real-time raw video and plotted profile display
- Measurements recorded when trigger is released
- Out-of-spec conditions flagged in colour
- Measurements: Blade Thickness, Profile Deviation, Edge Radius

RS750

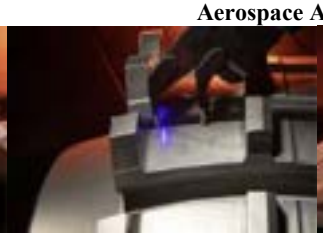
- High-res profiling for online, robotic and remote customer applications with LG algorithms
- Rugged, compact, with mounting ports for positioning sensor. Single USB power and data cable
- Multiple sensors can be calibrated, synchronized to capture scans from every angle simultaneously to view 360° around a complex part

Model	TS800			HS730LE	HS733LE	RS750			
Sensor Type	USB – Handheld			USB 2.0, Windows		USB - Remote Mounted			
Size W x H x L	44x66x165mm			46x79x239mm	44x114x191mm	41x64x89mm			
Weight	184g			425g	340g	227g			
User Interface	2 sets of 3 feedback LEDs (Red Laser), 3 Pitch/Yaw feedback LEDs (Blue Laser)			3 LEDs, 2 tactile buttons, finger trigger		-			
Communications	USB 2.0A to Mini 5-Pin USB, 6' straight cable (can be increased with power cable or hub)								
FOV	13mm	25mm	51mm	6mm	4mm	13mm	30mm	50mm	65mm
Horizontal Scanning Res	10µm	20µm	41µm	10µm	5µm	10µm	20µm	38µm	50µm
Depth Accuracy	6µm	10µm	25µm	12µm	12µm	20µm	20µm	37µm	51µm
Shock Protection	Cast urethane housing								
Environment	0° – 70°C								

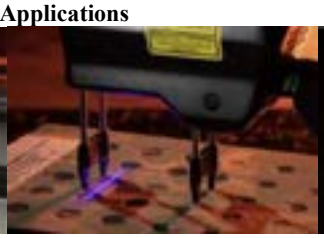
Applications

Aerospace Applications

Scratches, Gouges, & Dents



Radius, Break Edge, Chamfers



Fastener Height, Pin Protrusion, Dielectric Fill

Pitting & Corrosion

Automotive Applications

Gap & Flush

Laser Welds and Lap Weldss

Sheet Metal – Roof to Door

Curved Hood

LaserGauge® Controllers Powerful User Functionality

LG7000

- Used with all LaserGauge® controller-based and USB sensors
- 7-inch graphical touchscreen display
- Supports maximum functionality of the sensor and is rugged and portable for measurements to be made anywhere
- Measurement data and scan images saved to onboard memory for analysis on the controller or transferred to a computer using a USB cable or a wireless ZigBee connection
- Integrated barcode scanner and reader

LG5000

- Used with all LaserGauge® controller-based and USB sensors
- Smallest, lightest LG controller 539g
- 3.5” colour touchscreen and joystick
- USB, null modem cable or wired/wireless Ethernet comms
- 4-way rotational screen; High contrast scanning on dissimilar surface colours
- Integrated barcode scanner and reader

Routine Mode and Gauge Mode – Automatic Data Saving

Routine Mode

Gauge Mode

Model	LG7000	LG5000
Operating Use	Algorithm only or Algorithm and Routine modes	
Processor	1GHz ARM	
Memory	8GB of data/scans/routines	
Sample Rate	Up to 10 processed samples per second for many applications	
Display	800x480 / 256 colours, 7” display with touchscreen	320x240 / 256 colours
User Interface	2 multi-function buttons, 5-way joystick	
Interface Port	USB 2.0 ports (2 Type A, 1 Mini-B) and 13pin circular DIN	USB 2.0 (1 Type A, 2 Mini-B)
Power Requirements	7.2VDC @ <2.5Amps	12VDC @<2.5 amps
Power Supply	Lithium-ion (non-metal) rechargeable battery, 7.2VDC	Worldwide 60W A/C adapter (optional 12V rechargeable battery)
Environment	0° – 70°C	
PC Software Interface	LGWorks, Windows 10	LGWorks, Windows 10
Log File Output	User-defined, ASCII text format	
Size W x H x L	213x159x44mm	165x92x60mm
Weight	0.82kg without battery	0.45kg without battery
Housing	Cast urethane case with reinforced mounts. Nylon carrying case with shoulder strap.	

LMI G-FORCE Closing Effort System

Energy, Force, and Velocity in One Tool!

G-Force

Measurement Display

Green/Red LED Display

Quickly measure doors and liftgates

- Wireless device designed to measure closure Velocity, Force, and Energy and wirelessly send reading to a PC or Assembly Information System Controller
- Easily attached to a closure using the vacuum cup that makes placement on the closure fast and secures regardless of material: aluminium, composite, or steel
- Wireless data transmission with robust design – simple to program and use
- Multiple outputs: Velocity (meters/second or feet/second), Force (Newtons), Work (Joules, Nm)
- Comparison to limited for immediate feedback with a green/red LED and measurement displayed to the user
- Designed to measure and re-measure quickly for 100% in-line measurement
- Long-life rechargeable battery lasts well over 1 shift of continuous usage
- Configurable using convenient utility

Easy Test Push Button & Vacuum Cup

Easy Generated Data Curves

LIGHTSTAR™ Torque Wrench

Precise torque measurement for auditing standards

The LightStar™ Torque Wrench technology is designed for auditing quality and is positioned inside an entire ecosystem of quality products to meet all your continuous quality improvement needs.

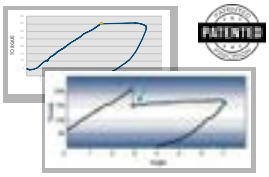
- Equipped with SMARTWRENCH™ TECHNOLOGY for precision auditing
- Patented Angle Restart Algorithm eliminates false high and low readings
- Lightweight, durable construction designed for all manufacturing environments

Wrench Specifications									1200 Nm*
Drive Size (SQ)	¼"	¼"	⅜"	⅜"	½"	½"	¾"	¾"	1"
Weight USB (No Cable)	N/A	325g		379g	903g	1011g	2435g	2668g	3991g
Weight Wireless	363 g	430g		484g	1008g	1116g	2540g	2773g	4082g
Head Width	N/A	25mm		29mm	42mm	42mm	56mm	56mm	64mm
Head Height		22mm		24mm	30mm	30mm	48mm	48mm	55mm
Head Height w/ Drive		32mm	36mm	37mm	51mm	51mm	75mm	75mm	85mm
Head Length	10mm	45mm		53mm	67mm	67mm	147mm	147mm	167mm
Overall Width	50mm	50mm		50mm	50mm	50mm	56mm	56mm	64mm
Overall Length	257mm	286mm		387mm	540mm	790mm	1037mm	1290mm	1568.5mm
Pull Length	N/A	178mm		280mm	425mm	675mm	915mm	1168mm	1446.5mm
Min/Max Range Nm	.5 - 5	1-10	2.5-25	7.5 - 75	15 - 150	30 -300	50 -500	80 - 800	120-1200
Min/Max Range ft-lb	.37 - 3.69	.74 - 7.38	1.84 - 18.44	5.53 - 55.32	11.06 - 110.63	22.13 - 221.27	36.88 - 368.78	59.00 - 590.05	88.5 - 885.07
Torque Accuracy: 0.25% FSR (Full Scale Range) *Available only in wireless									

Colour Coding System			
	5 Nm No colour		150 Nmn Gold
	10 Nm Silver		300 Nm Black
	25 Nm Red		500 Nm Orange
	75 Nm Blue		800 Nm Green
			1200 Nm Purple

SMART WRENCH™ TECHNOLOGY

- Patented Angle Restart Algorithm
- Identifies Gage (Tool # or ID)
- Verification of NM size
- Calibration tracking (usage and time)
- Insensitive to Point of Load
- Haptic vibration capability



LIGHTSTAR™ WRENCH MEASUREMENTS

- **Patented Angle Restart Algorithm** – measures torque the instant the fastener starts retightening after overcoming static friction.
- **Breakaway** (first movement) – first recorded reading is residual torque in the joint.
- **Loosening Test** – Torque applied to loosen the fastener is the recorded reading.
- **Angle Breakaway** – captures the torque needed to set a fastener in motion.
- **Peak** – records the highest torque applied.
- **Set** – assembly applications.

LIGHTSTAR™ EV Torque Wrench

Insulated for Electric Vehicle and Battery Assembly Applications

- Precise torque measurement for production and quality control
- Patented insulated design and angle restart algorithm for accuracy
- Ensure safety in potential hazardous electrical work environments

The body components of the DataMyte LightStar EV Torque Wrench are comprised of only non-conductive materials. This insulation delivers reliable, consistent and long-lasting protection against electrical shock and injuries.

RATING AND STANDARD COMPLIANCE

- Insulated 1,000 AC volt and 1,500 DC volt rated
- Meets ASTM F1505, EN/IEC 60900

NON-CONDUCTIVE BODY MATERIALS

- Torque Head
- Transition Ring
- Cover Plate
- Power button assembly
- Torque handle assembly
- End Cap
- External Fasteners

SAFETY AND DURABILITY TESTING

- Dielectric test – Insulated Torque wrench assembly has been tested to 10,000V - both AC and DC
- Durability and deflection tests -96000 cycles at 100% load, 10000 cycles at 150% load and the wrench still being within calibration and functional.
- Withstands robust impact testing

Wrench Specifications			
10 Nm			
25 Nm			
Drive Size (SQ)		¼”	⅜”
Weight		430 g	
Head Width		25mm	
Head Height		22mm	
Head Height w/ Drive		32mm	36mm
Head Length		45mm	
Overall Width		50mm	
Overall Length		286mm	
Pull Length		178mm	
Min/Max Range	Nm	1-10	2.5-25
	ft-lb	.74 - 7.38	1.84 -18.44
Torque Accuracy: 0.25% FSR (Full Scale Range)			

DATAMYTE™ Revolution

Portable Data Intelligence Device for measurement applications

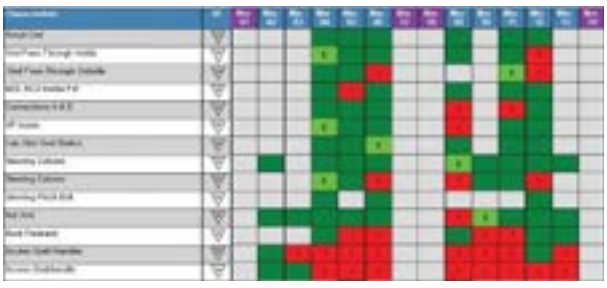
- Connects to 1000s of gages, wired or wireless
- High-resolution LCD colour display now with touch screen
- High-definition camera; intuitive image zoom, pan, rotate
- Operates with or independent networks
- Configurable automatic data upload to database
- WIFI enabled option to download inspection plans and/or upload collected data

GAGE INTERFACE OPTIONS

Specifications	
Width x Length (Depth)	10.4 x 29.7cm (4.6cm)
Operating temp. range	0 to +50 C; 10%-90% non-condensing humidity
Non-operating temp. range	-20 to +60 C
Display	480 x 854 FWVGA IPS colour backlit LCD touch screen
Audible Output	Dual speakers with volume control
Power	7.4V-3400 mAh Li Ion rechargeable; 8-hour battery life
Construction	8GB memory; Alphanumeric Silicon Rubber Keypad; Case - ABS plastic with TPE grips
Certifications	CE & FCC (47 CFR Part 15 Class A)

DATAMETRICS DATABASE

Increase your data collection and reporting capabilities on the DataMyte™ Revolution

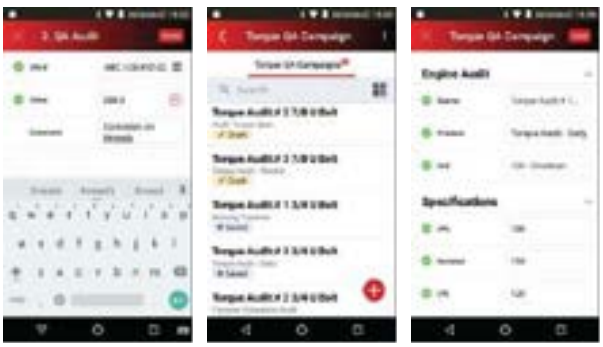


ESCALATE™

- Software solution that assures non-conformities are handled timely in a closed loop process
- Configurable and can set the time intervals and who gets notified if issues are not handled on time
- Offers rich reporting capabilities to enable quality improvement

DIGITAL CLIPBOARD™

- Eliminates the manual processes of collecting data with a digital checklist solution from DATAMYTE
- Turn checklists into actionable workflow to get instant feedback if a measurement is out of specification
- Saves time and reduce costs with workflow automation, reporting, and action-based prompts that will drive process improvement and increase team collaboration



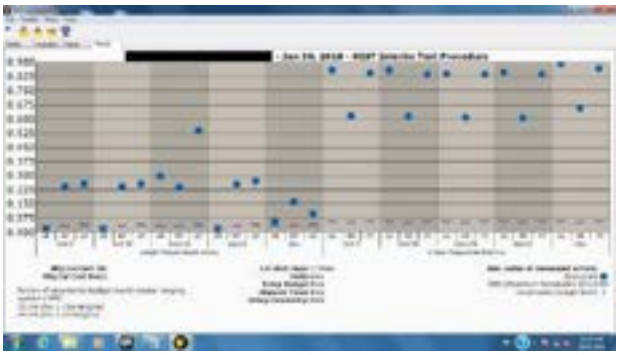
KinAiry Interim Field Check for Laser and Optical Trackers

How is Your Tracker Performing Right Now?

Why IR-8016?

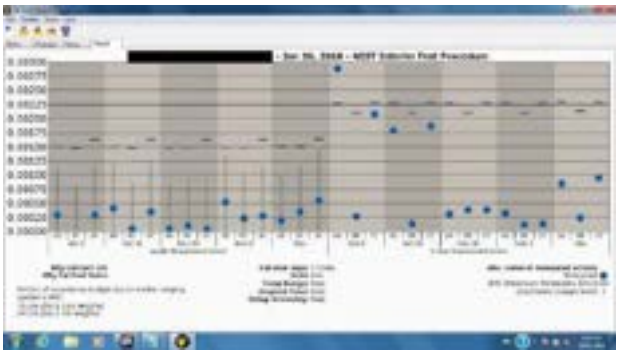
- Evaluate Tracker before & after calibration
- Labor hours saved by reducing field errors via 30-minute NIST test on every tracker, every month?
- Rework hours saved by not having to retake incorrect measurements?
- Hours saved by producing monthly interim NIST tests, if failure is noticed in between calibration
- Best Practice Procedure to determine Cal cycle based on independent solution controlled by you!

KinAiry – before running compensation routine



Example: Data values ran out on high side. To capture all data points, the scaling plot vertical axis is compressed, dropping the MPE line

KinAiry – AFTER running compensation routine



Example: After running compensation, data points within MPE Line

Interim Field Testing of a Laser Tracker's 3-D Length Measurement Capability based on B89.4.19

KinAiry is an independent laser tracker evaluation solution based on NIST's Interim Field Test Procedure IR-8016. Comprehensive testing with measurement sets taken on a 2.3m calibrated scale bar used as a traceable reference artefact per B89.4.19 in strategic orientations located to fully exercise both the ranging and angular measurement components of a tracker. Volumetric performance results are presented in colour graphical analysis above, showing the overall health of your tracker.

1 Positioner
2 Mirror and Gimbal Mount
3 Software Flashdrive
4 Spanner Wrench
5 EasyConnect Base
6 Retroreflector Counterweights (2)
7 Position and Accessories Case
8 Length Artefact Case

KinAiry	
Artefact Length 2.43m	Artefact Rotation: 360° with 45° stops
Positioner / Length Artefact weight	11.2kg / 12.8kg
Packed Small Case / Long Case weight	21.2kg / 42.7kg

TetraLock™ Industrial Stand

Ultimate stability via pre-stressed tetrahedron structure with no possible joint movement when locked in open position.

Light weight 9.6kg. Check-in as luggage, store in car trunk and use on tables/platforms. 119cm adjustable height via quick-action levers. Extend/retract each telescoping leg with handy index guide.

Cross-braces rotate down and “snap” in place for easy set-up.

TetraLock Lite provides the same ease of use and portability without the ultimate rigidity - only 7.3kg with 119cm max height. Deploys rapidly by tightening a locking plate under its mounting ring.

TetraLock

TetraLock Lite

EasyConnect™

Point Feet

Wheels

Laptop Shelf

M-Series Lightweight Portable Stands

Available in aluminium or graphite (lower weight and better thermal stability) double upper legs; with an adjustable instrument column or an adapter fixed directly to the tribrach at the top of the stand (increase lateral stability when fine vertical adjustment is not necessary). The stand height is adjustable by extending and locking the lower legs.

The M-series is also available in short or tall (longer double upper leg section and adjustable instrument column to provide the additional height) versions.

The lower legs are equipped with interchangeable trivet point or swivel pad feet (with thin, textured bottom rubber pads). The points work well on uneven surfaces; the pads on smooth or soft surfaces resist sliding. Pads are outfitted with a hole for semi-permanent mounting.

M-Series Stand

Fixed Instrument Mount

Adjustable Height Collar

Trivet Point Feet

Swivel Pad Feet

Rock Steady 231 Short Mobile Stand

Product Enhancements (patent pending): Larger casters/better ground clearance means improved mobility—rolls unimpeded over power cords, floor tracks and most uneven surfaces. Unique 'hidden trivet' design featuring tool-less levelling adjusters

Improved foot-pedal operation. Use for Portable-CMMs, laser trackers, scanners and laser alignment devices, particularly when working with surface plates, machine tables, way checking and assembly operations. Stability is very well maintained. Drop-down casters are located under the heavy-duty tribrach base, engaged or released by a foot pedal for shop floor mobility. An air-check mechanism provides backup protection to prevent sudden drops of the instrument column in case the collar lock and main handle are released simultaneously while disengaging the ratchet pawl.

STASIS Scanning Instrument Positioner

STASIS is the only gimbal-style instrument mount that allows you to directly reposition your scanner point-to-point, adjusting the roll, pitch and yaw of your shot, within a 10ft horizontal range and a maximum 8ft height.

Typical industry stands require mounting your scanner in a fixed position. With STASIS, you could have already taken at least three shots within the same time, without moving the base!

Max Instrument Weight	15.5kg
Horizontal Reach	3,048mm
Max Height	2,438mm
Min Height	356mm
Axes of Movement	6 rotations / Base (azimuth) – 360° / Hand (roll, pitch, yaw) – 360°
Weight excluding Base	45kg

Thermally Stable Invar Scale Bars

Invar material provides a thermally stable reference length during laser tracker or scanner jobs. A low thermal expansion (LTE) scale bar is also available as an option.

1.5LRB Length Reference Bar for laser tracker or scanner jobs. NIST-traceable certification to ±0.003mm; length of bar within ±0.79mm of length. Max Length: 2.3m

1.5LTE-1000MM low thermal expansion Length Reference Bar. Length within 1.5mm of 1 meter with expanded uncertainty of ±0.007mm at 95% confidence interval

Target Holder Kits

Laser tracker target holder kits fitting 0.5" and 1.5" reflectors to measure the position of holes, edges, corners, surfaces, diameters, etc. Made of hardened stainless steel, certified and serialized. In English (THK-CE) and Metric (THK-CM) units.

Approx. weight of Case and contents: 3.2kg; Case: Foam-lined, injection moulded, waterproof.

THK-.5E or THK-.5M
for 0.5" Reflectors

THK-1.5E or THK-1.5M
for 1.5" Reflectors

Sight Level The Level that thinks it is an Alignment Telescope

Why Sight Levels?

Levels are great for a variety of tasks revolving around the requirement for establishing planes that are orthogonal to the gravity vector.

- Precision elevation measurement (±0.001")
- Tremendous flexibility and reliability in various applications and environments
- Quick set-up and measurement time
- Both survey and build operations
- On-site calibration capability

Variety of applications

Use the 545-190 to establish a line of sight that is dead level (within ±1 arcsecond). Then use the optical micrometre (not included) on the instrument to measure the deviation of any object from this optical line to within ±0.001". Our optical tooling scales are the perfect complement for this measurement technology, extending the "reach" of the optical reference line to almost any distance required. This instrument is great for several applications, such as:

- Leveling Machine bases
- Evaluating structural or machinery foundations
- Assessing machine tool ways and table movement
- Checking level of rolls and rolling machinery for plastics, steel, paper, & printing operations
- Checking or setting of sole plates
- Substituting for an alignment telescope when outfitted with a coordinate optical micrometre (see picture above) to perform alignments on engine bores, bearing journals, etc.
- Substituting for transit when holding a horizontal reference line

Telescopes

Each level has telescope adjustments which will maintain a straight line of sight throughout the focusing range. This straightness is maintained at ±0.001" at near focus range, and within one arcsecond from 17 feet to infinity.

Filar/bifilar reticle pattern

The eyepiece end of the telescope tube has a removable section to facilitate conversion to autocollimation and/or autoprojection capabilities, as mentioned above or the installation of a right-angle eyepiece. The objective end of the telescope barrel is machined so you can mount an optical micrometre.

The reticle used in our levels is the standard optical tooling filar/bifilar design. This design makes our optical tooling scales easy to read at various distances and is designed specifically for performing optical techniques such as autocollimation and auto reflection.

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

ISO/IEC 17025 CALIBRATION LABORATORY ACCREDITATION

We are certified to ISO/IEC 17025:2017 Laboratory Accreditation by SAC-Singlas for Singapore, Malaysia, Thailand and Philippines and by Komite Akreditasi Nasional (KAN) for Indonesia. The common scope for all our offices is the calibration of CMMs (contact and non-contact), Surface Roughness, Contour and Roundness Testers, Profile Projectors and Universal Length Metroscopes. In addition, Singapore, Malaysia and Indonesia are also accredited for the calibration of in-line high-speed weighing systems. **ISO/IEC 17025** is the international standard for the competence of testing and calibration laboratories, which include the requirements of ISO9001 for management system plus technical competence in testing and calibration. Calibration 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 Activities and Goals

Our **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

Equipment maintenance is customers' responsibility. Our responsibility is to support you to minimize downtime on your equipment supplied or serviced by us. To do this, we identify tasks that customers can perform and help you to do so by providing basic preventive maintenance training to your staff to perform first level and urgent repairs yourselves, with our remote help. We thus focus on the more involved work that customers do not perform, where we constantly work to improve our levels of capabilities. This way, we walk the quality journey together.

seconds (s): is the SI unit of time defined by taking the fixed numerical value of the caesium frequency, Δv_{Cs}, the unperturbed ground-state hyperfine transition frequency of the caesium 133 atom, to be 9 192 631 770 when expressed in the unit Hz, which is equal to s^{-1}.

metre (m): is the SI unit of length defined by taking the fixed numerical value of the speed of light in vacuum, c, to be 299 792 458 when expressed in the unit m s^{-1}.

kilogram (kg): is the SI unit of mass defined by taking the fixed numerical value of the Planck constant, h, to be 6.626 070 15 x 10^{-34} when expressed in the unit J s, which is equal to kg m^2 s^{-1}.

ampere (A): is the SI unit of electric current defined by taking the fixed numerical value of the elementary charge, e, to be 1.602 176 634 x 10^{-19} when expressed in the unit C, which is equal to A s.

kelvin (K): is the SI unit of thermodynamic temperature defined by taking the fixed numerical value of the Boltzmann constant, k, to be 1.380 649 x 10^{-23} when expressed in the unit J K^{-1}, which is equal to kg m^2 s^{-2} K^{-1}.

mole (mol): The mole is the SI unit of the amount of substance where one mole contains exactly 6.022 140 76 x 10^{23} elementary entities. This number is the fixed numerical value of the Avogadro constant, N_A, when expressed in the unit mol^{-1} and is called the Avogadro number. The amount of substance, symbol n, of a system is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles.

candela (cd): is the SI unit of luminous intensity in a given direction defined by taking the fixed numerical value of the luminous efficacy of monochromatic radiation of frequency 540 x 10^{12} Hz, K_{cd}, to be 683 when expressed in the unit lm W^{-1}, which is equal to cd sr W^{-1}, or cd sr kg^{-1} m^{-2} s^3.

20 May 2019 Redefinition of the SI

From 20 May 2019, the SI base units are defined in terms of 7 natural physical constants.

Base Unit		Defining Constant		Constant Values	Unit
Second	s	Unperturbed ground state hyperfine transition freq. of Cs133 atom	Δv_{Cs}	9 192 631 770	Hz
Metre	m	Speed of Light in Vacuum	c	299 792 458	m/s
Kilogram	kg	Planck Constant	h	6.626 070 15x10^{-34}	J s
Ampere	A	Elementary Charge	e	1.602 176 634x10^{-19}	C
Kelvin	K	Boltzmann Constant	k	1.380 649x10^{-23}	J/K
Mole	mol	Avogadro Constant	N_A	6.022 140 76x10^{23}	mol^{-1}
Candela	cd	Luminous efficacy of monochromatic radiation of freq. 540x10^{12}Hz	K_{cd}	683	lm/W

Practical Realisation of the SI

The highest-level experimental methods used for the realization of units using the equations of physics are known as primary methods. The essential characteristic of a primary method is that it allows a quantity to be measured in a particular unit by using only measurements of quantities that do not involve that unit. In the present formulation of the SI, the basis of the definitions is different from that used previously, so that new methods may be used for the practical realization of the SI. Instead of each definition specifying a particular condition or physical state, which sets a fundamental limit to the accuracy of realization, a user is now free to choose any convenient equation of physics that links the defining constants to the quantity intended to be measured. This is a much more general way of defining the basic units of measurement. It is not limited by today's science or technology; future developments may lead to different ways of realizing units to a higher accuracy—in principle, there is no limit to the accuracy with which a unit might be realized. The exception remains the definition of the second, in which the original microwave transition of caesium must remain, for the time being, the basis of the definition.

For more comprehensive explanation of the realization of SI, visit www.bipm.org/en/publications/si-brochure.