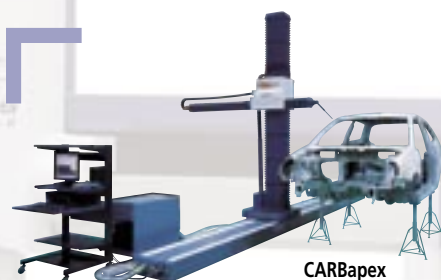




Coordinate Measuring Machines

New Products



Vision Measuring System

New Products



Neo-Derm / Digi-Derm

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Beyond-Crysta C Series

SERIES 191 — Standard CNC CMM

Designed and constructed with Mitutoyo's experienced CNC CMM technology, Beyond-Crysta C features lightweight materials and innovative machine structure, providing high travel stability, high accuracy, and affordability. The temperature correction function (16°C to 26°C) can yield accurate measurements even on the shop floor. In addition to the point-to-point measurement, the MPP-100 and Metris Laser Probe provide contact/non-contact scanning function.

*Z-axis = 800mm models (9108/9168/9208) are available.



Beyond-Crysta C544



Beyond-Crysta C776



Beyond-Crysta C9106



Temperature compensation system (photo: temperature sensors)



CMM calibration tool using the virtually zero thermal expansion glass gage



Mitutoyo original standard type glass scale (above) and ultra-high accuracy glass scale with virtually zero thermal expansion (below)



Joystick controller



Optimum machine structure has been determined through the FEM (Finite-Element Method) and modal analysis.

Technical Data

Length standard:	High accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	520mm/sec
Max. acceleration:	0.17G
Air pressure:	0.4MPa
Air consumption:	50L/min (500 series) 60L/min (700, 900 series) 100L/min (1200 series) 150L/min (1600, 2000 series)

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	2.0K	2.0K
	Per 24 hours	2.0K	5.0K
Temperature gradient	Vertical	1.0K/m	1.0K/m
	Horizontal	1.0K/m	1.0K/m

*When using temperature compensation system.

SPECIFICATION

Model No.		Beyond-Crysta C544	Beyond-Crysta C574	Beyond-Crysta C776	Beyond-Crysta C7106	Beyond-Crysta C9106 [Beyond-Crysta C9108]	Beyond-Crysta C9166 [Beyond-Crysta C9168]	Beyond-Crysta C9206 [Beyond-Crysta C9208]
Range	X-axis	505mm	505mm	705mm	705mm	905mm	905mm	905mm
	Y-axis	405mm	705mm	705mm	1005mm	1005mm	1605mm	2005mm
	Z-axis	405mm	405mm	605mm	605mm	605mm [805mm]	605mm [805mm]	605mm [805mm]
Resolution		0.1μm	0.1μm	0.1μm	0.1μm	0.1μm	0.1μm	0.1μm
Accuracy*	MPE _E	(1.7+3L/1000)μm, (1.7+4L/1000)μm**		(1.7+3L/1000)μm, (1.7+4L/1000)μm**		(1.7+3L/1000)μm, (1.7+4L/1000)μm**		
	MPE _P	1.7μm		1.7μm		1.7μm		
	MPE _{THP}	2.3μm		2.3μm		2.3μm		
Work table	Material	Granite	Granite	Granite	Granite	Granite	Granite	Granite
	Size	638 x 860mm	638 x 1160mm	880 x 1420mm	880 x 1720mm	1080 x 1720mm	1080 x 2320mm	1080 x 2720mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	545mm	545mm	800mm	800mm	800mm [1000mm]	800mm [1000mm]	800mm [1000mm]
	Max. load	180kg	180kg	800kg	1000kg	1200kg	1500kg	1800kg
Mass (main unit)		515kg	625kg	1675kg	1951kg	2231kg [2261kg]	2868kg [2898kg]	3912kg [3942kg]

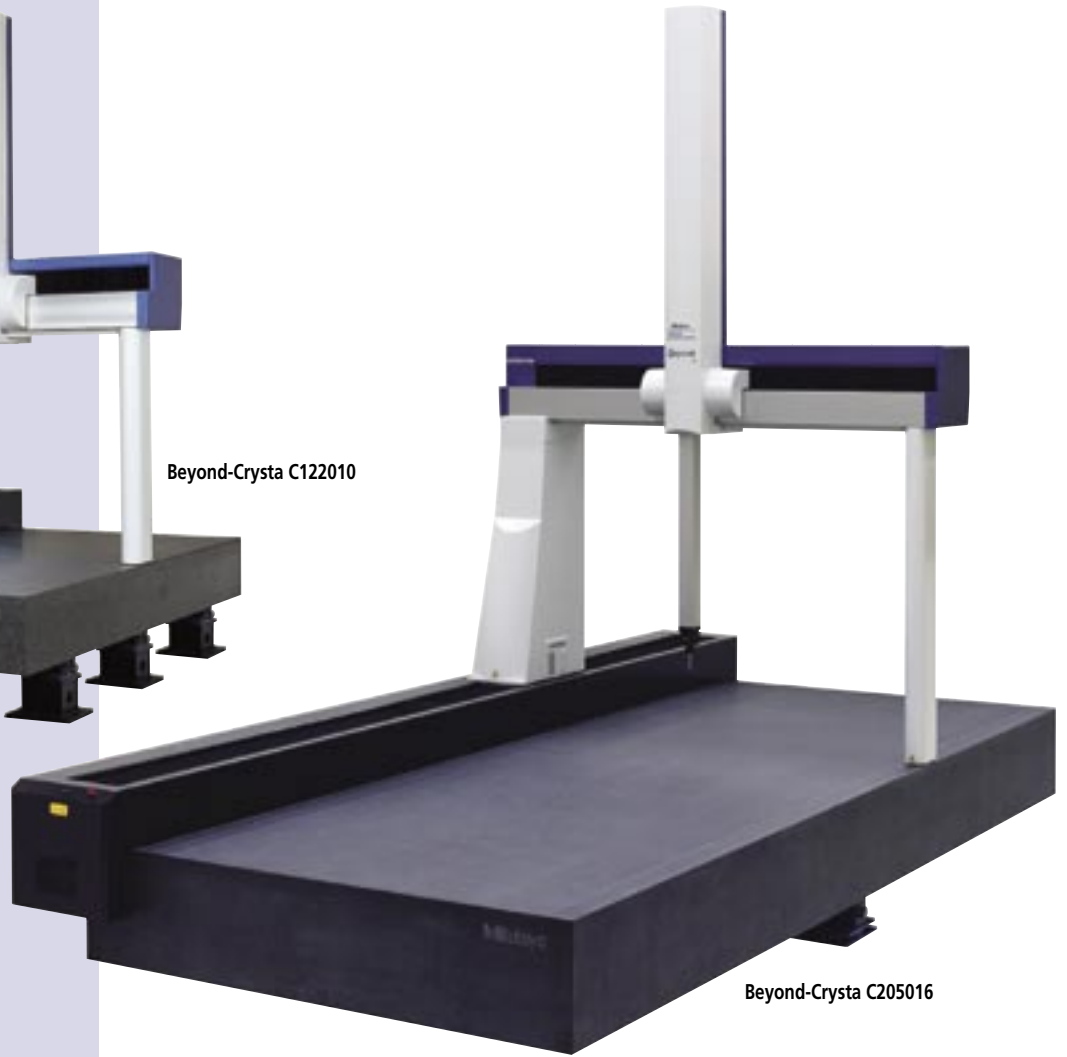
* The machine is equipped with the temperature compensation system.

Conformed standard: ISO10360-2 Used probe system: SP25M with ø4 x 50mm stylus L: Measuring length (mm)

**Guaranteed accuracy temperature range: 16°C - 26°C.



Beyond-Crysta C122010



Beyond-Crysta C205016

SPECIFICATION

Model No.		Beyond-Crysta C121210	Beyond-Crysta C122010	Beyond-Crysta C123010	Beyond-Crysta C163012 [Beyond-Crysta C163016]	Beyond-Crysta C164012 [Beyond-Crysta C164016]	Beyond-Crysta C165012 [Beyond-Crysta C165016]
Range	X-axis	1205mm	1205mm	1205mm	1605mm	1605mm	1605mm
	Y-axis	1205mm	2005mm	3005mm	3005mm	4005mm	5005mm
	Z-axis	1005mm	1005mm	1005mm	1205mm [1605mm]	1205mm [1605mm]	1205mm [1605mm]
Resolution		0.1μm	0.1μm	0.1μm	0.1μm	0.1μm	0.1μm
Accuracy*	MPE _E	(2.3+3L/1000)μm, (2.3+4L/1000)μm**			(3.3+4.5L/1000)μm, (3.3+5.5L/1000)μm**, [(4.5+5.5L/1000)μm, (4.5+6.5L/1000)μm**]		
	MPE _P	2.0μm			5.0μm [6.0μm]		
	MPE _{THP}	2.8μm			6.0μm [7.0μm]		
Work table	Material	Granite	Granite	Granite	Granite	Granite	Granite
	Size	1400 x 2165mm	1400 x 2965mm	1400 x 3965mm	1800 x 4205mm	1800 x 5205mm	1800 x 6205mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	1200mm	1200mm	1200mm	1400mm [1800mm]	1400mm [1800mm]	1400mm [1800mm]
	Max. load	2000kg	2500kg	3000kg	3500kg	4500kg	5000kg
Mass (main unit)		4050kg	6150kg	9110kg	10600kg [10650kg]	14800kg [14850kg]	19500kg [19550kg]



Refer to the BEYOND-CRYSTA C Series leaflet (E4248) for more details.

Model No.		Beyond-Crysta C203016 [Beyond-Crysta C203020]	Beyond-Crysta C204016 [Beyond-Crysta C204020]	Beyond-Crysta C205016 [Beyond-Crysta C205020]
Range	X-axis	2005mm	2005mm	2005mm
	Y-axis	30005mm	40005mm	5005mm
	Z-axis	1605mm [2005mm]	1605mm [2005mm]	1605mm [2005mm]
Resolution		0.1μm	0.1μm	0.1μm
Accuracy*	MPE _E	(4.5+8L/1000)μm, (4.5+9L/1000)μm** [(6+9L/1000)μm, (6+10L/1000)μm**]		
	MPE _P	6.0μm [7.5μm]		
	MPE _{THP}	6.0μm [7.5μm]		
Work table	Material	Granite	Granite	Granite
	Size	2200 x 4205mm	2200 x 5205mm	2200 x 6205mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	1800mm [2200mm]	1800mm [2200mm]	1800mm [2200mm]
	Max. load	4000kg	5000kg	6000kg
Mass (main unit)		14100kg [14150kg]	19400kg [19450kg]	28000kg [28050kg]

* The machine is equipped with the temperature compensation system.

Conformed standard: ISO10360-2 Used probe system: SP25M with ø4 x 50mm stylus L: Measuring length (mm)

**Guaranteed accuracy temperature range: 16°C - 26°C.

LEGEX Series

SERIES 356 — Ultra-high Accuracy CNC CMM

Achieving premium performance, the fixed bridge structure and precision air bearings resting on the rigid guideways ensure superior stability of motion and ultra-high measuring accuracy. It is suitable for a complex small to medium size workpieces such as a gear, bearing, lens, die, scroll rotor which require severe dimensional accuracy. The MPP-300Q probe adds a scanning function to the standard point-to-point measurement.



LEGEX 322

FEATURES

- The ultra most accurate CNC CMM family is launched, made possible by rigorous analysis of all possible error-producing factors and elimination or minimization of their effects.
- A newly developed, ultra-high accuracy crystallized glass scale with the ultra-low expansion coefficient of $0.01 \times 10^{-6}/^\circ\text{C}$ is used on each axis.
- The fixed bridge structure and precision air bearings* running on highly rigid guideways ensure superior motion stability and ultra-high geometrical accuracy.
- A wide variety of optional probes such as touch-trigger probes, laser scanning probes, and a vision measuring probe are available.

*Linear bearing: LEGEX 322



LEGEX 12128

SPECIFICATION

Model No.		LEGEX 322	LEGEX 574	LEGEX 774	LEGEX 776	LEGEX 9106	LEGEX 12128
Range	X-axis	300mm	510mm	710mm	710mm	910mm	1210mm
	Y-axis	200mm	710mm	710mm	710mm	1010mm	1210mm
	Z-axis	200mm	455mm	455mm	605mm	605mm	810mm
Resolution		0.01μm	0.01μm	0.01μm	0.01μm	0.01μm	0.01μm
Accuracy*	MPE _E	(0.8+2L/1000)μm	(0.35+L/1000)μm	(0.35+L/1000)μm	(0.35+L/1000)μm	(0.35+L/1000)μm	(0.6+1.5L/1000)μm
	MPE _P	0.1μm	0.45μm	0.45μm	0.45μm	0.45μm	0.6μm
	MPE _{THP}	—	1.4μm	1.4μm	1.4μm	1.4μm	1.8μm
Work table	Material	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron	Cast iron
	Size	399 x 271mm	550 x 750mm	750 x 750mm	750 x 750mm	950 x 1050mm	1250 x 1250mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	210mm	706mm	696mm	862mm	856mm	1056mm
	Max. load	15kg	200kg	500kg	500kg	800kg	1000kg
Mass (main unit)		260kg	3900kg	5000kg	5100kg	6500kg	10500kg

* The machine is equipped with the temperature compensation system.
 Conformed standard: ISO10360-2
 Used probe system: MPP-300Q (TP7M: LEGEX 322)
 L: Measuring length (mm)

Technical Data

Length standard:	Ultra high accuracy linear encoder (glass scale with virtually zero thermal expansion coefficient)
Guide system:	Air bearing (linear guide: LEGEX 322)
Max. drive speed:	200mm/sec
Max. acceleration:	0.1G (0.06G: LEGEX 322)
Air pressure:	0.4MPa (0.5MPa: LEGEX 9106)
Air consumption:	120L/min

Guaranteed accuracy temperature environment*

Temperature range		20±2°C
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.



Refer to the LEGEX 300/500/700/900/1200 leaflet (E4172) for more details.

Beyond-STRATO / Bright-STRATO Series

SERIES 355 — High Accuracy CNC CMM

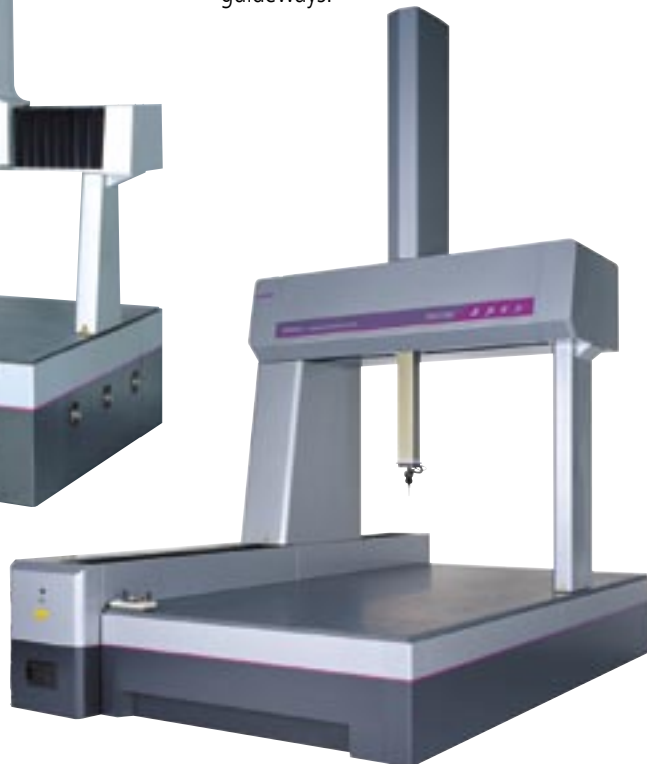
High performance models in the Beyond-STRATO / Bright-STRATO series. It is a high-end moving-bridge type CNC CMM with upgraded kinematic accuracy.

FEATURES

- High measuring accuracy and high-speed motion.
- Full-digital motion control.
- Improved rigid air bearings on all axial guideways.



Bright-STRATO 9106



Bright-STRATO 163012

Technical Data

Length standard: High accuracy linear encoder
 Guide system: Air bearing
 Max. drive speed: 430mm/sec (500mm/sec: 1600 series)
 Max. acceleration: 0.17G (0.13G: 1600 series)
 Air pressure: 0.4MPa
 Air consumption: 120L/min (150L/min: 1600 series)

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.



Refer to the BRIGHT-STRATO Series leaflet (E4173) for more details.

SPECIFICATION

Model No.		Bright-STRATO 776	Bright-STRATO 7106	Bright-STRATO 9106	Bright-STRATO 9116
Range	X-axis	705mm	705mm	905mm	905mm
	Y-axis	705mm	1005mm	1005mm	1605mm
	Z-axis	605mm	605mm	605mm	605mm
Resolution		0.1μm	0.1μm	0.1μm	0.1μm
Accuracy*	MPE _E	(1.2+3L/1000)μm			
	MPE _P	1.6μm			
	MPE _{THP}	2.2μm			
Work table	Material	Granite	Granite	Granite	Granite
	Size	840 x 1320mm	840 x 1620mm	1040 x 1720mm	1040 x 2320mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	740mm	740mm	740mm	740mm
	Max. load	500kg	800kg	800kg	1200kg
Mass (main unit)		1405kg	1635kg	1940kg	2960kg

Model No.		Bright-STRATO 162012	Bright-STRATO 162012	Bright-STRATO 162012
Range	X-axis	1605mm	1605mm	1605mm
	Y-axis	2005mm	3005mm	4005mm
	Z-axis	1205mm [1505mm]		
Resolution		0.1μm	0.1μm	0.1μm
Accuracy*	MPE _E	(3.8+4L/1000)μm [(4.8+5L/1000)μm: Z-axis = 1505mm]		
	MPE _P	2.8μm [3.3μm: Z-axis = 1505mm]		
	MPE _{THP}	2.8μm [3.8μm: Z-axis = 1505mm]		
Work table	Material	Granite	Granite	Granite
	Size	1850 x 3280mm	1850 x 4280mm	1850 x 5280mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	1350mm [1650mm]		
	Max. load	3500kg	4000kg	4500kg
Mass (main unit)		9500kg [9600kg]	14000kg [14050kg]	25000kg [25050kg]

* The machine is equipped with the temperature compensation system.
 Conformed standard: ISO10360-2
 Used probe system: SP25M with ø4 x 50mm stylus
 L: Measuring length (mm)

Bright-STRATO Series

SERIES 355 — High Accuracy Large CNC CMM

FEATURES

This giant CNC CMM provides a huge measuring range of 2000mm x 3000mm x 1500mm to 3000mm x 5000mm x 2000mm with the large size CMM accuracy.



FALCIO-Apex 305015

SPECIFICATION

Model No.		FALCIO-Apex 203015	FALCIO-Apex 204015	FALCIO-Apex 205015	FALCIO-Apex 305015
Range	X-axis	2005mm	2005mm	2005mm	3005mm
	Y-axis	3005mm	4005mm	5005mm	5005mm
	Z-axis	1505mm	1505mm	1505mm	1505mm
Resolution		0.1μm	0.1μm	0.1μm	0.1μm
Accuracy*	E	(4.8+5L/1000)μm			(5.5+5L/1000)μm
	R	5μm			5μm
Mass (main unit)		12000kg	14000kg	15000kg	16000kg

* The machine is equipped with the temperature compensation system.
Conformed standard: ISO10360-2 L: Measuring length (mm)

Technical Data

Length standard:	High accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	430mm/sec (500mm/sec: 1600 series)
Max. acceleration:	0.17G (0.13G: 1600 series)
Air pressure:	0.4MPa
Air consumption:	120L/min (150L/min: 1600 series)

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.

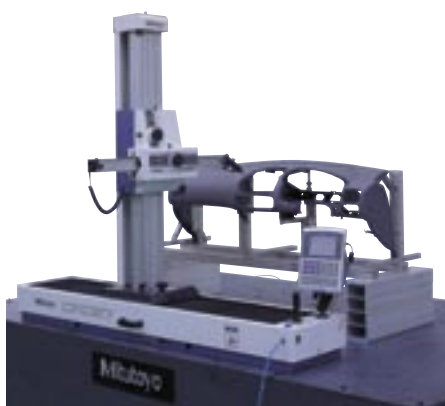
CP Series

SERIES 355 — Horizontal-arm Type Manual CMM

SPECIFICATION

Model No.		CP1057
Range	X-axis	1000mm
	Y-axis	500mm
	Z-axis	750mm
Resolution		0.5μm
Accuracy*	E	(15+10L/1000)μm
	R	12μm
Probe positioning		Manual via control wheels
Air supply	Pressure	0.4MPa
	Consumption	40L/min
Mass (main unit)		225kg

* The machine is equipped with the temperature compensation system.
Conformed standard: ISO10360-2 Used probe system: TP20
L: Measuring length (mm)



Guaranteed accuracy temperature environment*

Temperature range		15°C - 30°C
Temperature change	Per hour	2.0K
	Per 24 hours	5.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.

- Operating Convenience
The user makes a measurement by simply operating the X, Y, and Z control wheels to bring the touch-trigger probe into contact with target points on the workpiece.
- Measuring Large Workpieces
Large workpieces that exceed the measuring range of the CP1057 can be measured, indirectly, by moving the CP1057's main unit along the surface plate and linking the measurement results obtained before and after movement.
- A Choice of Probes
Various probes are available for the CP1057, such as a point probe that can be used for scribed line pointing measurements, in addition to the standard touch-trigger probe.
- Temperature Compensation System (Option)
An optional temperature compensation system can be installed in the CP1057 to ensure measuring accuracy is maintained over a wide temperature range (15°C to 30°C).

CARBstrato / CARBapex Series

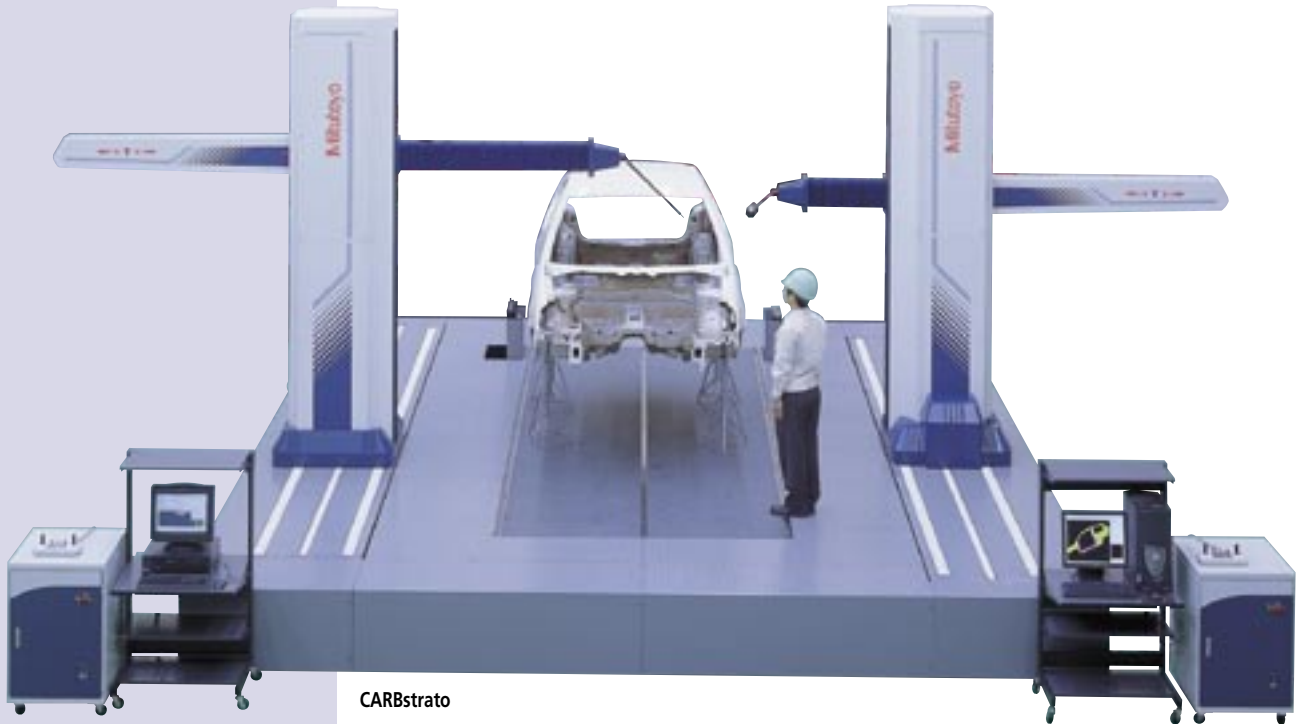
SERIES 355 — Car Body Measuring System

FEATURES: CARBstrato

A large and high-precision, horizontal-type CNC CMM for measuring car bodies. A single/dual-head types are available; a dual-head type which measures by controlling two heads simultaneously, one from each side.

FEATURES: CARBapex

A large and affordable, horizontal-type CNC CMM for measuring car bodies. A single/dual-head types are available; a dual-head type which measures by controlling two heads simultaneously, one from each side.



CARBstrato



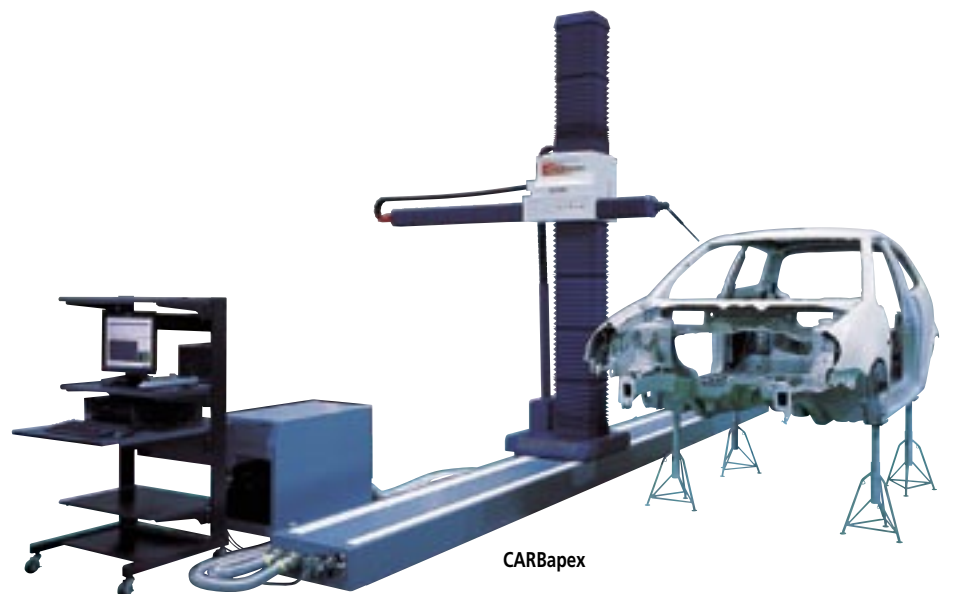
Technical Data

Length standard: High accuracy linear encoder
Guide system: Air bearing
Max. drive speed: 866mm/sec
Max. acceleration: 0.2G

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.



CARBapex

SPECIFICATION

Model No.		CARBstrato	CARBstrato	CARBstrato	CARBstrato
Range	X-axis	6000mm	6000mm	6000mm	6000mm
	Y-axis	1600mm	1600mm	1600mm	1600mm
	Z-axis	2400mm	2400mm	2400mm	2400mm
Resolution		1μm	1μm	1μm	1μm
Accuracy*	MPE _E	(25+28L/1000)μm	(25+28L/1000)μm	(25+28L/1000)μm	(25+28L/1000)μm

* The machine is equipped with the temperature compensation system.

Conformed standard: ISO10360-2

Used probe system: SP25M with ø4 x 50mm stylus

L: Measuring length (mm)

MACH 403 / 806, MACH-V565 / 795 / 9106

SERIES 360 — In-line Type CNC CMM

FEATURES

The MACH and MACH-V maximize machining operations by performing in-line, high speed coordinate measuring in conjunction with your CNC machine tools. These high throughput machines can be incorporated right into the manufacturing line and can provide pre/post machining feedback to your machine tool for machining adjustments.



MACH-V9106



MACH-806



MACH-403



SPECIFICATION

Model No.	MACH 403	MACH 806	MACH-V565	MACH-V796	MACH-V9106
Range	X-axis	460mm	1021mm	505mm	705mm
	Y-axis	460mm	818mm	605mm	905mm
	Z-axis	300mm	615mm	505mm	605mm
Resolution		0.1μm	0.1μm	0.1μm	0.1μm
Accuracy*	MPE _E	(3.5+4L/1000)μm, (3.5+4L/1000)μm**		(2.5+3.5L/1000)μm / (2.9+4.3L/1000)μm / (3.6+5.8L/1000)μm	
	MPE _P	4μm		2.5μm (2.2μm: using SP25M)	

* The machine is equipped with the temperature compensation system.
Conformed standard: ISO10360-2 Used probe system: TP7M with ø4 x 50mm stylus L: Measuring length (mm)

** Guaranteed accuracy temperature range: 15°C - 35°C

*** Guaranteed accuracy temperature range: 19°C - 21°C / 15°C - 25°C / 5°C - 35°C

Technical Data

Length standard: High accuracy linear encoder
Guide system: Air bearing (linear guide: MACH-V)
Max. drive speed: 1800mm/sec (866mm/sec: MACH-V)
Max. acceleration: 1.8G (0.86G: MACH-V)

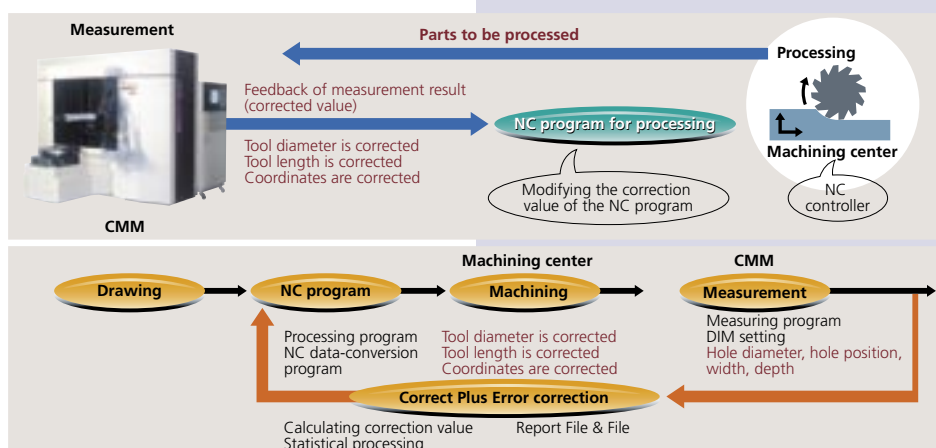
Guaranteed accuracy temperature environment (MACH)*

Temperature range	Per hour	15°C - 25°C	15°C - 30°C
	Per 24 hours	2.0K	2.0K
Temperature gradient	Vertical	1.0K/m	1.0K/m
	Horizontal	1.0K/m	1.0K/m

*When using temperature compensation system.

Correct Plus (Data Feedback System)

After measuring the components mass-produced by a machining center, the Correct Plus system feeds the compensation data calculated from the measurement result and nominal value back to the machining center. This data feedback system maintains and improves the accuracy of processing.



Crysta-Plus M400 / 500 / 700 Series

SERIES 196 — Manual-Floating Type CMM



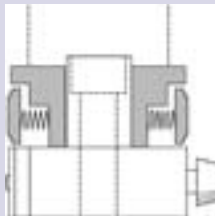
One-touch air clamp for rapid positioning



Ergonomically designed guide grip on Z-axis for constant measurement (except for Crysta-Plus M443)



Probe illumination (optional) to illuminate the probe and styli directly and brighten the working field



Technical Data

Length standard:	High accuracy linear encoder
Guide system:	Air bearing
Axis clamp:	One-touch air clamp
Fine feed range:	Entire range
Air pressure:	0.4MPa (0.35MPa: M443)
Air consumption:	50L/min

Guaranteed accuracy temperature environment*

Temperature range	16°C - 26°C (15°C - 30°C)
Temperature change	Per hour 2.0K
	Per 24 hours 5.0K
Temperature gradient	Vertical 1.0K/m
	Horizontal 1.0K/m

*When using temperature compensation system.
(): Crysta-Plus M443



Refer to the CRYSTA-PLUS M443 leaflet (E4307) and CRYSTA-PLUS M (E4276) for more details.

Manual floating type CMMs developed in quest for high-accuracy, low-cost and easy operation. The Crysta-Plus M is applicable to the wide range of applications from a simple dimension to complex form.

FEATURES

- Smooth operation because of the high-precision air bearings and lightweight moving members.
- Continuous fine feed over the entire measuring range.
- One-touch air clamp for each axis.

Crysta-Plus M544



Crysta-Plus M443



Crysta-Plus M7106



SPECIFICATION

Model No.		Crysta-Plus M443	Crysta-Plus M544	Crysta-Plus M574	Crysta-Plus M776	Crysta-Plus M7106
Range	X-axis	400mm	500mm	500mm	700mm	700mm
	Y-axis	400mm	400mm	700mm	700mm	1000mm
	Z-axis	300mm	400mm	400mm	600mm	600mm
Resolution		0.5μm	0.5μm	0.5μm	0.5μm	0.5μm
Accuracy*	E	(3.0+4.0L/1000)μm	(3.5+4.5L/1000)μm		(4.5+4.5L/1000)μm	
	R	4.0μm	4.0μm		5.0μm	
Work table	Material	Granite	Granite	Granite	Granite	Granite
	Size	624 x 805mm	638 x 860mm	638 x 1160mm	880 x 1420mm	880 x 1720mm
	Tapped insert	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm	M8 x 1.25mm
Workpiece	Max. height	480mm	510mm	510mm	800mm	800mm
	Max. load	180kg	180kg	180kg	500kg	1000kg
Mass (main unit)		360kg	495kg	615kg	1390kg	1630kg

*The machine is equipped with the temperature compensation system.

Conformed standard: ISO10360-2 Used probe system: TP20 L: Measuring length (mm)

QM-Measure and QM-Data

SERIES 198 — Flexible Measuring Gage/Data Processor

Flexible measuring gage/data processing system for workshop use, employing a unique "open space" structure. The QM-Measure can provide "Gage-like" operation and "CMM-like" data processing capability

in the temperature condition from 15°C to 30°C. From the very simple measurement of height, depth, diameter, etc to very complicated 3-D dimensions can be processed.

SPECIFICATION

Model No.		QM-Measure 333	QM-Measure 353
Range	X-axis	300mm	300mm
	Y-axis	300mm	500mm
	Z-axis	300mm	300mm
Resolution		0.5µm	0.5µm
Accuracy*	E	(3.0+4.0L/1000)µm	
	R	4.0µm	
Work table material		Cast iron	Cast iron
Workpiece	Max. height	410mm	410mm
	Max. load	30kg	30kg
Mass (main unit)		130kg	170kg

* The machine is equipped with the temperature compensation system.
Conformed standard: ISO10360-2
E: Error of indication of volumetric length measurement
R: Probing error (with TP2 touch signal probe)
L = Measuring length (mm)

QM-Measure 333



Technical Data

Length standard: High accuracy linear encoder
Guide system: Air bearing
Axis clamp: Screw clamp
Fine feed range: ±5mm (micrometer head)
Air pressure: 0.35MPa
Air consumption: 50L/min

Guaranteed accuracy temperature environment*

Temperature range		15°C - 30°C
Temperature change	Per hour	2.0K
	Per 24 hours	5.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.

SpinArm II

SERIES 198 — Multi-axis Portable Coordinate Measuring System

FEATURES

- Manufacturing measurement on the shop floor with a CAD drawing
- Carbon graphite arms that are stronger-than-steel and dimensionally stable regardless of temperature.
- Infinite rotation of the arm's principal axes. This allows the inspection of difficult-to-reach details and avoids arm damage caused by hitting the arm against a rotational hard-stop.
- Removable counterbalance allows for one-handed operation of the SpinArm II. It is lightweight and easily installed and removed.
- Linear rail system utilizes a heavy-duty extrusion with linear measurement applications.



- Manufacturing Measurement
With the SpinArm II, parts are measurable against a CAD drawing on the shop floor during production cycle.
- Reverse Engineering
The SpinArm II is the perfect data collection tool for rapid prototyping and reverse engineering applications.
- Tooling Setup
One of the most valuable uses of the SpinArm II is setting up tooling or collecting production performance data.
- Tube Manufacturing
The optional probe can provide non-contact tube measurement data much faster and more accurately than contact inspection.

SPECIFICATION

Model No.	SA2-40-18	SA2-40-24	SA2-40-30	SA2-40-36	SA2-50-18	SA2-50-28	SA2-50-36
Measuring envelope	1850mm	2400mm	3000mm	3500mm	1800mm	2800mm	3600mm
Resolution	1µm	1µm	1µm	1µm	1µm	1µm	1µm
Repeatability*	±0.040mm	±0.050mm	±0.080mm	±0.110mm	±0.020mm	±0.032mm	±0.055mm
Indication accuracy	±0.080mm	±0.090mm	±0.112mm	±0.135mm	±0.035mm	±0.045mm	±0.076mm
Mass (main unit)	10.5kg	11.0kg	11.2kg	11.4kg	14.1kg	14.5kg	15.2kg



CMM Probes

Dynamic measuring probe system



MPP-300Q
MPP-300
Ultra-high accuracy and low measuring force type



SP80
High accuracy type and available with 500mm long extension



SP25M
Compact and high accuracy type



MPP-100
High accuracy type for high-speed scanning



MPP-10
for effective screw depth measurement

Optical (non-contact) measuring probe system



LC15 / LC50 / LC100 / XC50
Line laser probes



WIZprobe
Point laser probe

QVP (Quick Vision Probe)
for video measurement



CF20
Centering microscope system



Touch-trigger measuring probe system



MTP2000
Ultra-high accuracy type



TP7M
High accuracy type



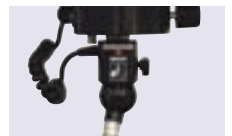
TP200
Compact and high accuracy (stylus change) type



TP20 Compact type



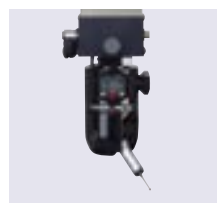
MH20i / MH20 High accuracy type



Probe heads



PH10M / PH10MQ
Motor drive index type



MIH
Manual index type



PH1
Simple manual type



Refer to the LEGEX 300/500/700/900/1200 leaflet (E4172) for more details.

MCOSMOS

Software for Manual / CNC Coordinate Measuring Machine

Three levels of module configuration

MCOSMOS has three choices of module configuration. From the simple set of MCOSMOS-1 to the advanced set of MCOSMOS-3, you can choose a best configuration for your measurement applications.



GEOPAK (Geometry module)

"Geopak" is our universal geometric measurement program, which allows you to control the measurement of your workpiece from drawing to completion, or simply to run existing measurement programs on a repeat basis.



CAT1000S (free form surface evaluation module)

In addition to the online/offline part program creation, CAD model based generation of surface measurement points, and comparison of actual/nominal data, with graphical output.



GEARPAK (gear measurement and analysis module)

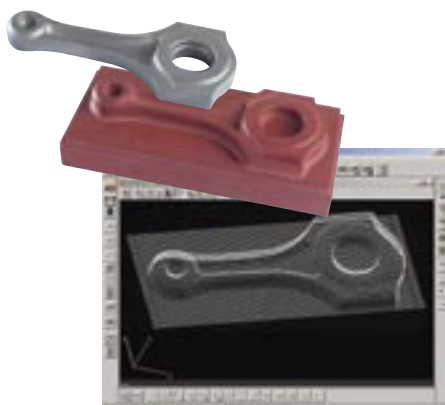
Advances in CMM controller techniques make the measurement of gears feasible, and the "GEARPAK" module takes advantage of this to bring sophisticated measurement capabilities within easy reach.

Module included	GEOPAK	CAT1000P	CAT1000S	SCANPAK
MCOSMOS-1	✓	—	—	—
MCOSMOS-1	✓	✓	—	—
MCOSMOS-1	✓	✓	✓	✓



CAT1000P (offline part program module)

For online/offline part program creation, using the measurement of geometric elements directly from the CAD model, with automatic collision avoidance.



SCANPAK (2D profile evaluation module)

For the scanning and evaluation of workpiece contours (2D), and data transfer to CAD system.



MAFIS (Mitutoyo Airfoil Inspection System)

Evaluation and analysis of airfoil shape such as Turbine Blades require special calculations according to the particular design specifications. The "MAFIS" system uses cross sectional data of the shape obtained by "SCANPAK" to perform these calculations, and output the result via the standard geometry program.



ULTRA Quick Vision

SERIES 361 — Ultra-high Accuracy CNC Vision Measuring System

Standard type glass scale



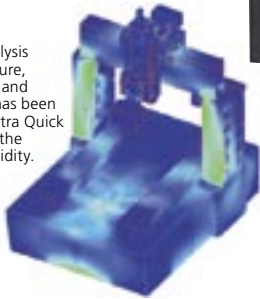
Ultra-high accuracy crystallized glass scale with virtually zero thermal expansion thermal changes.

The Ultra Quick Vision is equipped with a this crystallized glass scale having a resolution of $0.01\mu\text{m}$ and linear expansion coefficient of $0.08 \times 10^{-6}/\text{K}$. This virtually zero thermal expansion coefficient means the Ultra Quick Vision can minimize accuracy fluctuation resulting from thermal changes.



Ultra-precision manufacture eleven meters underground

By using FEM (Finite-Element Method) analysis of the machine structure, the placement of ribs and allocation of weight has been determined for the Ultra Quick Vision. This results in the ultimate structural rigidity.



Hydrostatic air bearing



Refer to the QUICK VISION leaflet (E4125) for more details.

FEATURES

- Minimizes straightness errors through the use of a precision air-bearing style linear guide system.
- Utilizes a 0.01 mm resolution glass scale manufactured at an ultra-precision facility located eleven meters underground.
- Minimizes accuracy fluctuation against thermal change through the use of a virtually zero thermal expansion glass scale.
- Optimizes the mechanical structure of the main unit in Finite Element Method analysis.
- Stabilizes the geometrical accuracy (i.e straightness of each axis and perpendicularity) to lessen thermal effects.



ULTRA QV350-PRO

SPECIFICATION

Model No.	ULTRA QV350-PRO	
Range	X-axis	350mm
	Y-axis	350mm
	Z-axis	150mm
Resolution		$0.01\mu\text{m}$
High-sensitivity CCD camera		B&W
Accuracy* ($20^\circ\text{C} \pm 0.2^\circ\text{C}$)	E _{1XY}	$(0.3 + L/1000)\mu\text{m}$
	E _{1Z}	$(3 + 2L/1000)\mu\text{m}$
	E _{2XY}	$[(1 + 2L/1000)\mu\text{m}: 10 - 60\text{mm}]$ $(0.5 + 2L/1000)\mu\text{m}$
Max. drive speed (X/Y/Z-axis)		100mm/sec
Illumination (PRL: Programmable Ring Light)	Surface	Halogen
	Contour	Halogen
	PRL	Halogen
Magnification change system		Programmable power turret
Stage glass size		438 x 509mm
Max workpiece load		40kg
Dimensions (W x D x H)**		890 x 1326 x 1650mm
Mass**		1320kg

* The measuring accuracy is defined at the following conditions
Programmable power turret: 1X, Objective set: 5X
L = Dimension between two arbitrary points (mm)

**Including machine stand

Optional Accessory

- 02ALA400:** 1X objective
02ALA150: 1X objective (SL type)
02ALA410: 2.5X objective
02ALA170: 2.5X objective (SL type)
02ALA420: 5X objective
958448: Calibration glass chart
960707: Joystick box

Quick Vision Apex / Hyper Quick Vision

SERIES 359 — CNC Vision Measuring System



QV Apex 202



QV Apex 303



QV Apex 404



QV Apex 606



Refer to the QUICK VISION leaflet (E4125) for more details.

Optional Accessory (Quick Vision Apex /Hyper Quick Vision / Quick Vision ACCEL)

Automatic multi-plane measurement is possible with the optional index table. (not available with QV ACCEL models)



By using the optional touch signal probe Quick Vision is capable of 3D measurement of a side face or an oblique plane.



The laser auto-focus unit is optimal for high-speed height measurement and can be installed as an option (factory set option).



Optional Accessory

- 02ALA400: 1X objective
- 02ALA150: 1X objective (SL type)
- 02ALA410: 2.5X objective
- 02ALA170: 2.5X objective (SL type)
- 02ALA420: 5X objective
- 958448: Calibration glass chart
- 960707: Joystick box

SPECIFICATION

Model No. and Type		QV Apex 202 [HYPER QV202]			QV Apex 302 [HYPER QV302]			QV Apex 404 [HYPER QV404]			QV Apex 606 [HYPER QV606]		
		PRO	PRO2	PRO3	PRO	PRO2	PRO3	PRO	PRO2	PRO3	PRO	PRO2	PRO3
Range	X-axis	200mm			300mm			400mm			600mm		
	Y-axis	200mm			200mm			400mm			650mm		
	Z-axis	200mm			200mm			250mm			250mm		
Resolution		0.1μm [0.02μm]			0.1μm [0.02μm]			0.1μm [0.02μm]			0.1μm [0.02μm]		
High-sensitivity CCD camera		B&W	B&W	Color	B&W	B&W	Color	B&W	B&W	Color	B&W	B&W	Color
Accuracy* (20°C±0.2°C)	E1xY	(1.5+3L/1000)μm [(0.8+2L/1000)μm]			(1.5+3L/1000)μm [(0.8+2L/1000)μm]			(1.5+3L/1000)μm [(0.8+2L/1000)μm]			(1.5+3L/1000)μm [(0.8+2L/1000)μm]		
	E1z	(3.0+4L/1000)μm [(3.0+2L/1000)μm]			(3.0+4L/1000)μm [(3.0+2L/1000)μm]			(3.0+4L/1000)μm [(3.0+2L/1000)μm]			(3.0+4L/1000)μm [(3.0+2L/1000)μm]		
	E2xY	(2.5+4L/1000)μm [(1.4+3L/1000)μm]			(2.5+4L/1000)μm [(1.4+3L/1000)μm]			(2.5+4L/1000)μm [(1.4+3L/1000)μm]			(2.5+4L/1000)μm [(1.4+3L/1000)μm]		
Max. drive speed	X/Y-axis	300mm/s [200mm/s]			300mm/s [200mm/s]			300mm/s [200mm/s]			300mm/s [200mm/s]		
	Z-axis	300mm/s [200mm/s]			150mm/s [100mm/s]			150mm/s [100mm/s]			300mm/s [200mm/s]		
Illumination (PRL: Programmable Ring Light)	Surface	LED, RGB	Halogen	Halogen	LED, RGB	Halogen	Halogen	LED, RGB	Halogen	Halogen	LED, RGB	Halogen	Halogen
	Contour	LED, white	Halogen	Halogen	LED, white	Halogen	Halogen	LED, white	Halogen	Halogen	LED, white	Halogen	Halogen
	PRL	LED, white	Halogen	Halogen	LED, white	Halogen	Halogen	LED, white	Halogen	Halogen	LED, white	Halogen	Halogen
Magnification change system**		Turret	Zoom	Turret	Turret	Zoom	Turret	Turret	Zoom	Turret	Turret	Zoom	Turret
Stage glass size		329 x 271mm			399 x 271mm			493 x 551mm			697 x 758mm		
Max workpiece height		200mm			200mm			250mm			250mm		
Max workpiece load		15kg [10kg]			20kg [15kg]			40kg [30kg]			50kg [40kg]		
Dimensions (W x D x H)***		714 x 860 x 1535mm			784 x 860 x 1535mm			1040 x 1220 x 1765mm			1310 x 1861 x 1821mm		
Mass***		353kg			383kg			662kg			1848kg		

* The measuring accuracy is defined at 20°C

** Turret: Programmable Power Turret, Zoom: Programmable Power Zoom Lens

*** Including machine stand

PRO2 and PRO3 types are not available for HYPER model.

Quick Vision ACCEL

SERIES 359 — CNC Vision Measuring System

FEATURES

Moving-bridge type structure

Designed with primary focus on measurement efficiency, the machine adopts a more rigid construction and drives the X and Y axes at 400 mm/s (QVA404 / 606 /

808), which is approximately 30% faster than that of a normal Quick Vision models. The moving-bridge type structure also eliminates the need for a moving stage. This facilitates a more simplified design of the workpiece fixture, resulting in a significant reduction in the man-hours required for fixture fabrication and inspection.



QV Apex 404



QV ACCEL 606



QV ACCEL 808



QV Apex 1212



QV ACCEL 2021

SPECIFICATION

Model No. and Type		QV ACCEL 404	QV ACCEL 606	QV ACCEL 808	QV ACCEL 1212	QV ACCEL 1517	QV ACCEL 2021
Range	X-axis	400mm	600mm	800mm	1250mm	1500mm	2000mm
	Y-axis	200mm	650mm	800mm	1250mm	1750mm	2100mm
	Z-axis	150mm	150mm	150mm	100mm	100mm	100mm
Resolution		0.1μm	0.1μm	0.1μm	0.1μm	0.1μm	0.1μm
High-sensitivity CCD camera		Color	Color	Color	Color	Color	Color
Accuracy* (20°C±0.2°C)	E1XY	(1.5+3L/1000)μm	(1.5+3L/1000)μm	(1.5+3L/1000)μm	(2.2+3L/1000)μm	(2.2+3L/1000)μm	(3.5+5L/1000)μm
	E1Z	(3.0+4L/1000)μm	(3.0+4L/1000)μm	(3.0+4L/1000)μm	(4.0+5L/1000)μm	(4.0+5L/1000)μm	(4.0+5L/1000)μm
	E2XY	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(3.5+4L/1000)μm	(3.5+4L/1000)μm	(4.5+5L/1000)μm
Max. drive speed (X/Y/Z-axis)		400mm/s	400mm/s	400mm/s	300mm/s	300mm/s	300mm/s
Illumination (PRL: Programmable Ring Light)	Surface	Halogen	Halogen	Halogen	Halogen	Halogen	Halogen
	Contour	Halogen	Halogen	Halogen	Halogen	Halogen	Halogen
	PRL	Halogen	Halogen	Halogen	Halogen	Halogen	Halogen
Magnification change system**		Turret	Turret	Turret	Turret	Turret	Turret
Stage glass size		493 x 551mm	697 x 758mm	883 x 958mm	1440 x 1440mm	1714 x 1968mm	2460 x 2460mm
Dimensions (W x D x H)		982 x 1095 x 1578mm	1183 x 1336 x 1578mm	1475 x 1716 x 1578mm	2166 x 2340 x 1554mm	2440 x 2868 x 1554mm	3400 x 3950 x 1800mm
Mass		665kg	958kg	2570kg	3600kg	4500kg	9300kg

* The measuring accuracy is defined at t

** Turret: Programmable Power Turret

Quick Vision STREAM

SERIES 359 — CNC Vision Measuring System



SPECIFICATION

Model No. and Type		QV STREAM 302	QV STREAM PLUS 302	QV STREAM 404	QV STREAM PLUS 404	QV STREAM 606	QV STREAM PLUS 606
Range	X-axis	300mm		400mm		600mm	
	Y-axis	200mm		400mm		650mm	
Range / laser (type 1 / type 2)	X-axis	176 / 162mm		276 / 262mm		476 / 462mm	
	Y-axis	200 / 195mm		400 / 395mm		650 / 645mm	
Range	Z-axis	200mm (50mm)*		250mm (50mm)*		250mm (50mm)*	
Resolution		0.1μm		0.1μm		0.1μm	
High-sensitivity CCD camera		B&W, progressive scan CCD		B&W, progressive scan CCD		B&W, progressive scan CCD	
Accuracy** (20°C±0.2°C)	E1xy	(1.5+3L/1000)μm		(1.5+3L/1000)μm		(1.5+3L/1000)μm	
	E1z	(3.0+4L/1000)μm		(3.0+4L/1000)μm		(3.0+4L/1000)μm	
	E1z (laser)	(2.5+4L/1000)μm		(2.5+4L/1000)μm		(2.5+4L/1000)μm	
	E2xy	(2.5+4L/1000)μm		(2.5+4L/1000)μm		(2.5+4L/1000)μm	
Max. drive speed (X/Y/Z-axis)		300mm/s		300mm/s		300mm/s	
Max. measuring speed		5mm/s	40mm/s	5mm/s	40mm/s	5mm/s	40mm/s
Illumination*** (PRL: Programmable Ring Light)	Surface	Hi-intensity LED, R/G/B/W		Hi-intensity LED, R/G/B/W		Hi-intensity LED, R/G/B/W	
	Contour	Hi-intensity LED, R/G/B/W		Hi-intensity LED, R/G/B/W		Hi-intensity LED, R/G/B/W	
	PRL	Standard LED, R/G/B/W	Hi-intensity LED, R/G/B/W	Standard LED, R/G/B/W	Hi-intensity LED, R/G/B/W	Standard LED, R/G/B/W	Hi-intensity LED, R/G/B/W
Magnification change system		Programmable power turret		Programmable power turret		Programmable power turret	
Stage glass size		399 x 271mm		493 x 551mm		697 x 758mm	
Max workpiece load		20kg		40kg		50kg	
Dimensions (W x D x H)****		784 x 860 x 1535mm		1040 x 1220 x 1765mm		1310 x 1861 x 1821mm	
Mass****		383kg		662kg		1848kg	

* Using surface illumination in the STREAM mode
 ** The measuring accuracy is defined at the following conditions
 Programmable power turret: 1X
 Objective set: 5X
 L = Dimension between two arbitrary points (mm)
 *** Continuous / stroboscopic switchable
 **** Including machine stand

Gantry types of
 QV ACCEL STREAM 404 / Plus 404
 QV ACCEL STREAM 606 / Plus 606
 are available.



FEATURES



Non-stop Vision Measurement Drastic Improvement in Throughput

Conventional vision measuring systems endlessly repeat the cycle of stage displacement, stage stop, measurement, stage start and stage displacement again. This mode of operation is a fundamental limitation on improving measurement throughput.

In contrast, the Quick Vision Stream system uses an innovative image capture technique that avoids the need to repeatedly stop the stage so measurement can be continuous, but measuring accuracy is retained. By eliminating the time needed to accelerate, decelerate and then hold the stage motionless while a measurement is made achieves a drastic improvement in productivity.

Measurement Throughput Comparison between QV STREAM and the Conventional System

STREAM PLUS series: more than 5 times

STREAM series: 3 times

* Comparison of measurement throughput using a Mitutoyo sample workpiece with that of Mitutoyo conventional systems

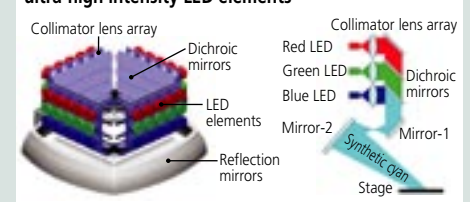
STREAM Mode

The measurement mode of a non-stop vision measuring system is referred to as the STREAM mode.

Newly Developed Stroboscopic Illumination System

It was the development of a high-intensity LED flash illuminator that enabled non-stop vision measurement to be realized. At the precise moment the stage reaches a measurement point the illuminator creates an extremely short, high-intensity flash that effectively freezes all motion. The illuminator turns on and off so fast that no image blur occurs and the image is captured in full and accurate detail. This innovative design takes full advantage of high-density, high-intensity LED arrays aided by collimating lenses and dichroic mirrors to produce ultra bright, directional and efficient illumination.

High-density mounting of ultra-high intensity LED elements



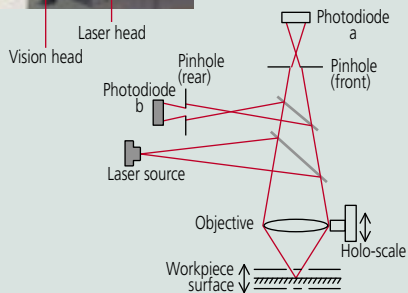
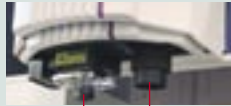
Refer to the QUICK VISION STREAM leaflet (E4295) for more details.

Quick Vision HYBRID

SERIES 359 — CNC Vision Measuring System

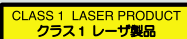
Features of HYBRID Type 1

- This type uses a focusing method that suppresses effects due to surface reflection coefficient variation to provide high measurement reproducibility.
- A proprietary laser holoscale reads displacement to enable high-accuracy, high-resolution measurement.
- The double pinhole method with minimum directivity has been adopted as the measurement principle. This method suppresses the influence of diffused light and hence allows stable data collection even on ceramic or machined surfaces.



Safety Precautions against Laser Beam

This system uses a low-power invisible laser beam (780nm) which corresponds to a CLASS 1 (invisible light) of IEC60825-1 for measurement. The CLASS 1 laser warning label as shown above is attached to the main unit.



Features of HYBRID Type 2

- This type is equipped with a non-contact laser probe that uses the interference fringe principle to make scanning measurements that are unaffected by workpiece surface inclination angle up to 85°.
- Optimal for form measurement of workpieces with low reflection coefficient, such as plastic or rubber molded parts.
- Single-point measurements are possible.
- The principle of operation is that a CCD camera detects interference fringes generated by emitting a laser beam through a crystal plate and polarizer system onto a surface and the distance from that surface is obtained by analyzing the number of fringes.



Light intensity distribution



Interference fringe



CCD

Polarizer

Crystal plate

Polarizer

Workpiece surface

Safety Precautions against Laser Beam

This system uses a low-power visible laser beam (655nm) which corresponds to a CLASS 2 (visible light) of IEC60825-1 for measurement. The CLASS 2 laser warning label as shown above is attached to the main unit.



QVH Apex 404



FEATURES

Quick Vision HYBRID series provides an ideal combination of vision measurement by CCD camera and high-speed scanning measurement using a laser probe head. The laser head is newly developed and is available in Types 1 and 2 as the workpiece requires.

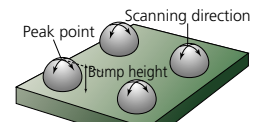
SPECIFICATION: Quick Vision Type

Model No.		QVH Apex 302	QVH Apex 404	QVH Apex 606
Range / vision	X-axis	300mm	400mm	600mm
	Y-axis	200mm	400mm	650mm
Range / laser (type 1 / type 2)	X-axis	176 / 162mm	276 / 262mm	476 / 462
	Y-axis	200 / 195mm	400 / 395mm	650 / 645mm
Range	Z-axis	200mm	250mm	250mm
Accuracy / vision* (20°C±0.2°C)	E1XY	(1.5+3L/1000)μm	(1.5+3L/1000)μm	(1.5+3L/1000)μm
	E1Z	(3.0+4L/1000)μm	(3.0+4L/1000)μm	(3.0+4L/1000)μm
	E2XY	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(2.5+4L/1000)μm
	E2ZY	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(2.5+4L/1000)μm

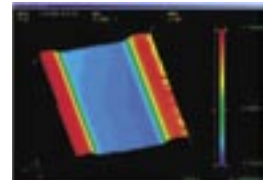
*The measuring accuracy is defined at the following conditions, Programmable power turret: 1X, Objective set: 5X, L = Dimension between two arbitrary points (mm)

Applications

- Measurement of BGA/CSP bump height and coplanarity of IC packages



- Flatness measurement



- Surface feature analysis



SPECIFICATION: Hyper Quick Vision Type

Model No.		Hyper QVH 302	Hyper QVH 404	Hyper QVH 606
Range / vision	X-axis	300mm	400mm	600mm
	Y-axis	200mm	400mm	650mm
Range / laser (type 1 / type 2)	X-axis	176 / 162mm	276 / 262mm	476 / 462mm
	Y-axis	200 / 195mm	400 / 395mm	650 / 645mm
Range	Z-axis	200mm	250mm	250mm
Accuracy / vision* (20°C±0.2°C)	E1XY	(0.8+2L/1000)μm	(0.8+2L/1000)μm	(0.8+2L/1000)μm
	E1Z	(3.0+2L/1000)μm	(3.0+2L/1000)μm	(3.0+2L/1000)μm
	E2XY	(1.4+3L/1000)μm	(1.4+3L/1000)μm	(1.4+3L/1000)μm
	E2ZY	(2.5+2L/1000)μm	(2.5+2L/1000)μm	(2.5+2L/1000)μm

*The measuring accuracy is defined at the following conditions, Programmable power turret: 1X, Objective set: 5X, L = Dimension between two arbitrary points (mm)

SPECIFICATION: Quick Vision ACCEL Type

Model No.		QVH ACCEL 404	QVH ACCEL 606	QVH ACCEL 808	QVH ACCEL 1212	QVH ACCEL 1517
Range / vision	X-axis	400mm	600mm	800mm	1250mm	1500mm
	Y-axis	400mm	650mm	800mm	1250mm	1750mm
Range / laser (type 1 / type 2)	X-axis	276 / 262mm	480 / 462mm	680 / 662mm	1130 / 1112mm	1380 / 1362mm
	Y-axis	400 / 395mm	650 / 645mm	800 / 795mm	1250 / 1245mm	1750 / 1745mm
Range	Z-axis	150mm	150mm	150mm	100mm	100mm
Accuracy / vision* (20°C±0.2°C)	E1XY	(1.5+3L/1000)μm	(1.5+3L/1000)μm	(1.5+3L/1000)μm	(2.2+3L/1000)μm	(2.2+3L/1000)μm
	E1Z	(3.0+4L/1000)μm	(3.0+4L/1000)μm	(3.0+4L/1000)μm	(4.0+5L/1000)μm	(4.0+5L/1000)μm
	E2XY	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(3.5+4L/1000)μm	(3.5+4L/1000)μm
	E2ZY	(2.5+4L/1000)μm	(2.5+4L/1000)μm	(3.5+5L/1000)μm	(3.5+5L/1000)μm	(3.5+5L/1000)μm

*The measuring accuracy is defined at the following conditions, Programmable power turret: 1X, Objective set: 5X, L = Dimension between two arbitrary points (mm)

Quick Vision ELF

SERIES 359 — CNC Vision Measuring System

FEATURES

- Controller-integrated compact size design
This series is appropriate for installation at a small site office because of its light weight and space saving.
- Small body packed full of functions
This series offers various types of machines equipped with the PRL illuminator and power turret. Also, the laser auto-focus unit and touch signal probe can be installed.
- The highest performance/cost ratio of the series



SPECIFICATION

Model No. and Type		QVE200			QVE250		
		RF machine	PT machine	PRO machine	RF machine	PT machine	PRO machine
Range	X-axis	200mm			200mm		
	Y-axis	200mm			250mm		
	Z-axis	100mm			100mm		
Resolution		0.1μm			0.1μm		
High-sensitivity CCD camera		B&W			B&W		
Accuracy* (20°C±0.2°C)	E1xy	(2.0+3L/1000)μm			(2.0+3L/1000)μm		
	E1z	(4.0+5L/1000)μm			(4.0+5L/1000)μm		
Max. drive speed (X/Y/Z-axis)		100mm/s			100mm/s		
Illumination (PRL: Programmable Ring Light)	Surface	Halogen	Halogen	Halogen	Halogen	Halogen	Halogen
	Contour	Halogen	Halogen	Halogen	Halogen	Halogen	Halogen
	Ring light	Ring fiber	Ring fiber	PRL	Ring fiber	Ring fiber	PRL
Magnification change system**		Fixed	Turret	Turret	Fixed	Turret	Turret
Stage glass size		269 x 261mmmm			269 x 311mm		
Max workpiece load		10kg			10kg		
Optional accessory		Touch signal probe (user option), laser auto-focus (factory installed option)					

* The measuring accuracy is defined at the following conditions
Programmable power turret: 1X Objective set: 5X L = Dimension between two arbitrary points (mm)

**Fixed: Optical system with fixed magnification, Turret: Programmable Power Turret



Refer to the QUICK VISION leaflet (E4125) for more details.

Accessory for Quick Vision

Objective

Objective	Turret lens mag.	Monitor mag.	View Field (mm)	WD (mm)
QV-1X	1X	32X	6.27 x 4.70	34
	2X	64X	3.13 x 2.35	
	6X	192X	1.04 x 0.78	
QV-2.5X	1X	80X	2.50 x 1.88	34
	2X	160X	1.25 x 0.94	
	6X	480X	0.41 x 0.31	
QV-5X	1X	160X	1.25 x 0.94	33.5
	2X	320X	0.62 x 0.47	
	6X	960X	0.20 x 0.15	
QV-SL1X	1X	32X	6.27 x 4.70	52.5
	2X	64X	3.13 x 2.35	
	6X	192X	1.04 x 0.78	

Objective	Turret lens mag.	Monitor mag.	View Field (mm)	WD (mm)
QV-SL2.5X	1X	80X	2.50 x 1.88	60
	2X	160X	1.25 x 0.94	
	6X	480X	0.41 x 0.31	
QV-10X	1X	320X	0.627 x 0.470	30.5
	2X	640X	0.313 x 0.235	
	6X	1920X	0.104 x 0.078	
QV-25X	1X	800v	0.250 x 0.188	13
	2X	1600X	0.125 x 0.094	
	6X	4800X	0.041 x 0.031	

The monitor magnification and field of view values are for the PRO machine.
QV-10x, QV-25x: Depending on a workpiece of illumination may be insufficient at a turret lens magnification of 2X and 6X.
QV-25x: The PRL illumination is restricted in its usable position.



Accessory for Quick Vision

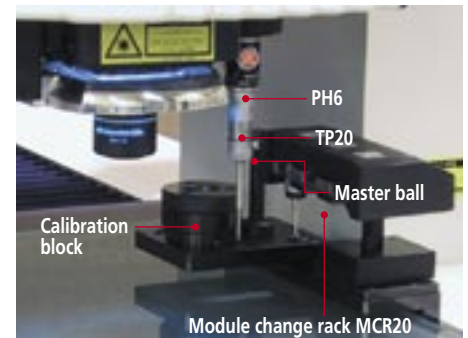
Touch Signal Probe Unit (User Option)

• 3D workpiece measurement

The touch signal probe enables 3D measurement of a workpiece which cannot be measured using image processing alone.

• Non-contact and contact measurements with a single system

With the QV touch signal probe unit added in, the system can perform contact measurement with this probe in addition to the non-contact vision measurements.



Module Change Rack Available

Vision measurement and touch signal probe measurement can be interchanged during a series of automatic measurements using the module change rack.

QV-INDEX



Max. workpiece diameter	140mm
Max. workpiece mass	2kg
Min. rotation angle	0.1°
Positioning accuracy	±0.5°
Max. rotation speed	10rpm

System Specifications after Installation of the Touch Signal Probe

Model		QV Apex 202 [HYPER QV 202]	QV Apex 302 [HYPER QV 302]	QV Apex 404 [HYPER QV 404]	QV Apex 606 [HYPER QV 606]
Measuring range (TP: touch signal probe)	Vision	200 x 200 x 200mm	300 x 200 x 200mm	400 x 400 x 250mm	600 x 650 x 250mm
	TP	134 x 200 x 200mm	234 x 200 x 200mm	334 x 400 x 250mm	534 x 650 x 250mm
Measuring accuracy (vision measurement)	E _{1XY}	(1.5+3L/1000)μm [(0.8+2L/1000)μm]			
	E _{1Z}	(3.0+4L/1000)μm [(3.0+2L/1000)μm]			
	E _{2XY}	(2.5+4L/1000)μm [(1.4+3L/1000)μm]			
Measuring accuracy (using touch signal probe)	E _{1XY}	(1.8+3L/1000)μm [(1.7+3L/1000)μm]			
	E _{1Z}	(1.8+3L/1000)μm [(1.7+3L/1000)μm]			
Workpiece maximum height		200mm		250mm	

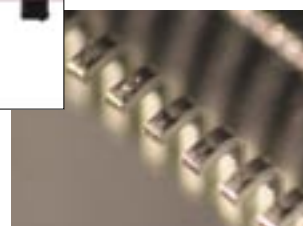
- If the module change rack and the master ball are used, the measuring range will be reduced below the dimensions in the table. For detailed information, contact Mitutoyo.
- Other specifications are the same as those of the QV series.

Laser Auto Focus (Factory-installed option)

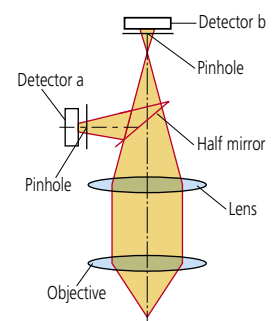
The system can be equipped with the Laser Auto Focus unit that allows a stable, high-speed height measurement during high-speed travel. This unit provides stable measurement results with minimum dependence on surface inclination since the double pinhole method is adopted in the detection system.



Objective	QV2.5X
Measurement principle	Double pinhole method
Laser spot diameter	3μm
Repeatability	σ = 0.4μm



Example: Height of leads from a QFP package



Safety Precautions against Laser Beam

This system uses a low-power visible laser beam which corresponds to a CLASS 1 (visible light) of IEC 60825 for measurement. The CLASS 1 laser warning label as shown right is attached to the main unit.

CLASS 1 LASER PRODUCT
クラス1 レーザ製品

Quick Scope

SERIES 359 — CNC / Manual Vision Measuring System



QS200Z

SPECIFICATION

Model		QS200	QS250	QS200Z	QS250Z
Range	X-axis	200mm	200mm	200mm	200mm
	Y-axis	200mm	250mm	200mm	250mm
	Z-axis	100mm	100mm	100mm	100mm
Resolution		0.5μm			
Length standard		Reflective linear encoder			
Measuring accuracy (at 20°C)*		XY: (2.5+6L/1000)μm, Z: (5+6L/1000)μm			
Magnification	Objective	2.5X, 1X, 5X	2.5X, 1X, 5X	0.5X - 3.5X zoom	0.5X - 3.5X zoom
	On monitor	105X (at 2.5X)	105X (at 2.5X)	21X - 147X	21X - 147X
Image detecting unit		High-resolution 1/3" color CCD camera			
Illuminations		Surface: co-axial light, fiber-optic ring light Contour: stage light			
Table glass size		269 x 261mm	269 x 311mm	269 x 261mm	269 x 311mm
Max. workpiece height		110mm	110mm	110mm	110mm
Max. workpiece weight		10kg	10kg	10kg	10kg
Dimensions (W x D x H), Mass		465 x 815 x 663mm, 76kg			

*When using 2.5X objective or the zoom lens in 2.5X magnification (Magnification on monitor: 105X), L = Measuring length (mm)

FEATURES: CNC model

- Surface, contour and fiber-optic ring light illumination options allow users to configure the QS lighting to meet a variety of measurement needs.
- Powerful, Windows® based QSPAK software is easy to use and offers a wide spectrum of measuring and analysis capabilities.
- Functions include zoom, auto-focus, measurement playback, one-click edge detection, graphic display, 48 different macros, and a pattern matching function for several common part features.
- X,Y stage can be controlled by mouse or through the optional multi-function control box.

FEATURES: Manual model

- Excellent surface observation model for a wide variety of workpieces.
- 0.1μm resolution and 150mm Z-axis range.
- Power zoom allows for easy and fast magnification change.
(QS-L1020/AF is a fixed-magnification type)
- Fine illumination capability allows for lighting changes to match workpiece requirements.
- The quick release system in the stage allows instant switching between a coarse movement and a fine movement.
- Quick Navigation function allows the user to do repeat measurements quickly.
- An auto-focus function is available for QS-L1020/AF and QS-L1020Z/AF.



QS-L1020Z/AF

SPECIFICATION

Model		QS-L1020/AF	QS-L1020Z/AF	QS-L1020Z	QS-E1020
Range (X-axis / Y-axis / Z-axis)		200 x 100 x 150mm			
Resolution		0.1μm			
Length standard		Reflective linear encoder			
Measuring accuracy (at 20°C)*		XY: (3+20L/1000)μm, Z: (5+6L/1000)μm			
Magnification	Objective	2.5X, 1X, 5X	0.5X - 3.5X zoom	0.5X - 3.5X zoom	2.5X, 1X, 5X
	On monitor	105X (at 2.5X)	21X - 147X	21X - 147X	105X (at 2.5X)
Image detecting unit		High-resolution 1/3" color CCD camera			
Illuminations		Surface: co-axial light, fiber-optic ring light Contour: stage light			
Table glass size		269 x 261mm	269 x 311mm	269 x 261mm	269 x 311mm
Max. workpiece height		150mm	150mm	150mm	150mm
Max. workpiece weight		10kg	10kg	10kg	10kg
Dimensions (W x D x H), Mass		618 x 700 x 676mm, 56kg (618 x 752 x 682mm, 57kg: QS-E1020)			

*When using 2.5X objective or the zoom lens in 2.5X magnification (Magnification on monitor: 105X), L = Measuring length (mm)



Refer to the QUICK SCOPE leaflet (E4142) for more details.

Quick Image

SERIES 361 — Non-contact 2-D Vision Measuring System



Refer to the QUICK IMAGE leaflet (E4242) for more details.

Quick Image is a new concept in 2-D vision measuring instruments. It provides very unique features to improve measurement efficiency.

FEATURES

- Long focal depth and wide field of view
- Telecentric optical system
- Mega-pixel color CCD camera
- Large quadrant LED ring light



QI-1010RL



QI-RL



QI-3017RL

SPECIFICATION

Model	QI (QI-RL)	QI-505 (QI-505RL)	QI-1010 (QI-1010RL)	QI-2010 (QI-2010RL)	QI-1017 (QI-1017RL)	QI-3017 (QI-3017RL)
Stage size	Fixed stage	50 x 50mm	100 x 100mm	200 x 100mm	200 x 170mm	300 x 170mm
Travelling range	X, Y-axis	—	50 x 50mm	100 x 100mm	200 x 100mm	200 x 170mm
	Z-axis	25mm	25mm	100mm	100mm	100mm
Measuring mode	High-resolution mode and Normal mode					
Accuracy (on monitor)	±5μm (high-resolution mode), ±8μm (normal mode)					
Repeatability (±2σ)	±1μm (high-resolution mode), ±2μm (normal mode)					
Measuring accuracy (U _{1xy})	±(5+0.08L)μm L = measuring length (mm)					
Detectable min. distance	0.17mm					
CCD camera	1.3 megapixels 1/2 inch color CCD camera					
Optical system	Magnification	0.2X, double telecentric system				
	WD*	111mm	90mm	111mm	90mm	111mm
	DOF**	±0.6mm (high-resolution mode), ±11mm (normal mode)				
Illumination	Contour	✓	✓	✓	✓	✓
	Surface	✓	✓	✓	✓	✓
	4-quadrant LED	✓ (QI-RL)	✓ (QI-505RL)	✓ (QI-1010RL)	✓ (QI-2010RL)	✓ (QI-1017RL)
Stage glass size	86 x 82mm	86 x 82mm	170 x 170mm	242 x 140mm	260 x 230mm	360 x 230mm
Max. loading	5kg	5kg	5kg	10kg	20kg	20kg
Mass	18kg	20kg	60kg	64kg	135kg	143kg

*WD: Working distance, **DOF: Depth of focus

UMAP Vision System

SERIES 361 - Detailed Shape Measuring System

UMAP
Vision System



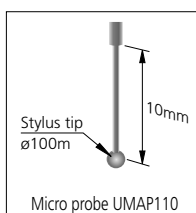
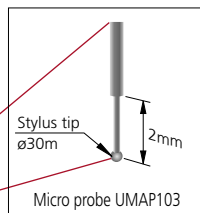
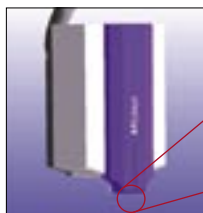
UMAP Vision System Hyper 302 (CMM base)

FEATURES: Type 1 with UMAP103

- Detailed shapes are contact-measured using an extra-small stylus with a tip ball diameter of 30μm and shaft length of 2mm.
- A vision probe enables the user to zoom in on a desired fine section or perform normal vision measurement.
- Compatible with the TP200 touch-signal probe for CMM.
- The extra-small stylus can be removed/installed and replaced by the user.
- Contour measurement by touch-trigger scanning can also be performed.

UMAP Probe

The newly developed UMAP103 micro-probe has a micro stylus with an extremely small ball tip of 30μm diameter, shank length of 2mm, and aspect ratio of 66.7, which can make contact measurements on very small and, relatively, deep holes.



SPECIFICATIONS: Type 1 with UMAP103

Model		UMAP Vision System Hyper 302	UMAP Vision System Ultra 350
Measuring range	Vision system	300 x 200 x 200mm	350 x 350 x 150mm
	Vision system + UMAP103	245 x 200 x 200mm	295 x 350 x 125mm
UMAP103 probe	Tip diameter	30μm	30μm
	Stylus length	2mm	2mm
	Aspect ratio	66.7	66.7
Accuracy (20°C±0.2°C)	Vision system	U1 (X, Y-axis)	(0.8+2L/1000)μm
		U1 (Z-axis)	(3.0+2L/1000)μm
	Touch probe*	E3	(2.0+3L/1000)μm
		UMAP103	(1.2+3L/1000)μm
Measuring speed	Touch probe	Repeatability	σ = less than 0.1μm
		UMAP103	σ = less than 0.1μm
Measuring speed	Touch probe	3mm/sec	3mm/sec
		UMAP103	Less than 10μm/sec
Resolution		0.01μm, reflective linear encoder	0.01μm, reflective linear encoder
Vision system	Illumination system	Coaxial and ring light (white LED)	Coaxial and ring light (white LED)
Measuring table size (W x D)		399 x 271mm	438 x 509mm
Maximum workpiece load		15kg	25kg
Mass (including machine stand)		383kg	1320kg

*using TP200 touch signal probe

Specification of UMAP110

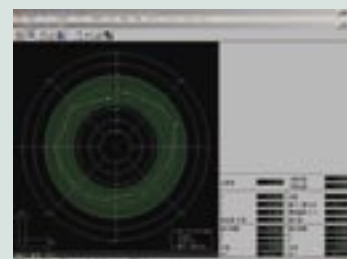
Tip shape	Diameter: 100 to 110μm, stylus length: 10mm, aspect ratio: 100
Accuracy	Repeatability σ = 0.15μm

* Other specifications are the same as those of UMAP103.

Measurement example

- Measurement of a very small hole (measuring sample: wire-cut part)

This system can not only measure various minuscule forms, but also create the error-developed view for a geometric feature at each measurement point. (Straightness, roundness, and flatness.)



UMAP Vision System 302 Type 2 (Quick Vision base)

NANOCORD

Minute Form Measuring System

Technical Data

Measuring range

X-axis: 300mm

Y-axis: 200mm

Z-axis: 100mm

Accuracy: $(0.3+L/1000)\mu\text{m}$
L = measured length (mm)

Construction

X and Y-axis: XY surface guide

Z-axis: Moving carriage and fixed spindle

Guiding method: Hydrostatic bearing

Driving method: Friction drive

Length standard: Laser holoscale

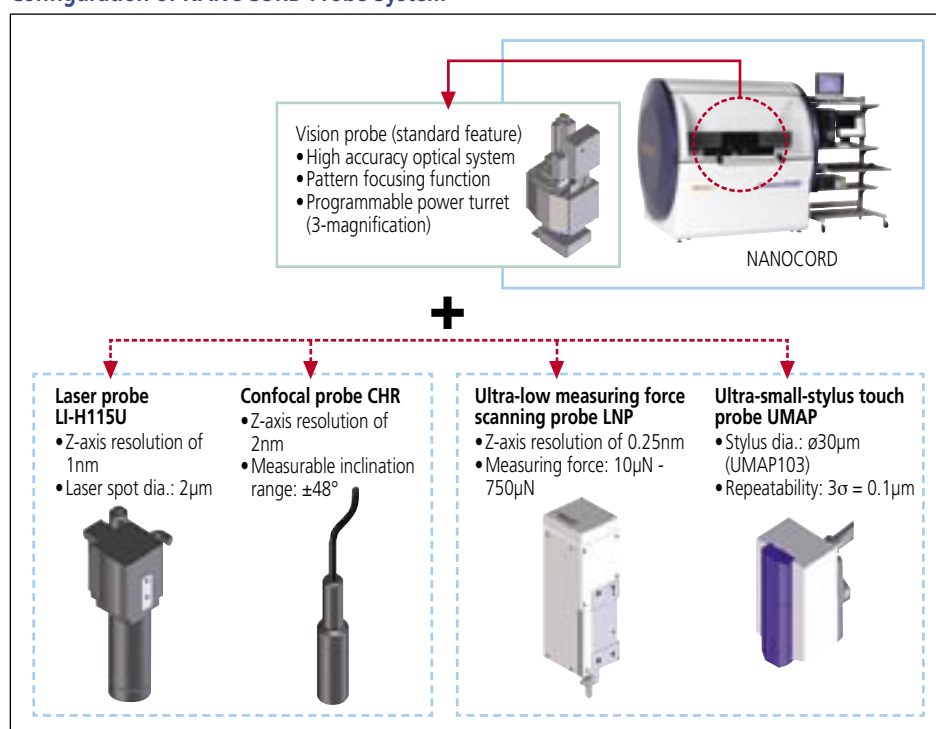
Illumination system: Surface illumination
Programmable ring light

FEATURES

- Able to accurately measure minute forms such as MEMS products, electro-devices, precise dies and molds, and aspherical lenses.
- Every model of the NANOCORD Series has a newly developed ultra-high-accuracy main unit.
- Every model of the NANOCORD Series has a vision probe as a standard accessory.
- The system including the LI-HU (laser probe) is especially suitable for non-contact, high-speed measurement of minute forms.
- The system including the CHR Probe (confocal probe) is especially suitable for measuring transparent workpieces and highly inclined workpieces.
- The system including the Minute Form Probe (ultra-low-measuring-force, contact-type probe) is especially suitable for nondestructive measurement of soft workpieces.
- The system including the UMAP 100 (touch signal probe with a micro stylus) is especially suitable for measuring micro holes.



Configuration of NANOCORD Probe System



Neo-Derm / Digi-Derm

SERIES 179 — Electronic Coating Thickness Gage

FEATURES

- Battery powered for portable use and can also operate on AC power with an optional adapter.
- Measurements are displayed on the clear LCD screen and can be output for SPC data analysis. (Digi-Derm)
- A set of calibration films and a metallic base is provided for each unit.
- Measures the thickness of nonmagnetic coating on magnetic substrata or a layer of nonconductive material on nonmagnetic substrata.
- Special probe for measuring the coating thickness on the inside wall of bores is optional (732135).



SPECIFICATIONS

Metric						
Order No.	179-700	179-701	179-702	179-745	179-721	179-755
Display	Analog meter	Analog meter	Analog meter	Digital, LCD	Analog meter	Digital, LCD
Range	0 - 50µm	H: 0 - 100µm L: 50 - 500µm	H: 0 - 600µm L: 0.5 - 2mm	0 - 1.5mm	H: 0 - 100µm L: 0 - 500µm	0 - 1.0mm
Resolution	—	—	—	0.001mm	—	0.001mm

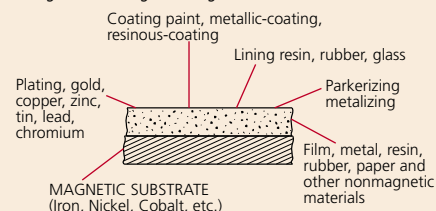
Inch						
Order No.	—	179-711	179-712	179-746	—	179-756
Display	—	Analog meter	Analog meter	Digital, LCD	—	Digital, LCD
Range	—	H: 0 - .004" 0 - 100µm L: .002" - .02" 50 - 500µm	H: 0 - .025" 0 - 600µm L: .02" - .08" 0.5 - 2mm	0 - .059" 0 - 1.5mm	—	0 - .039" 0 - 1.0mm
Resolution	—	—	—	.00005" 0.001mm	—	.00005" 0.001mm
Min. coating area	ø5mm	ø5mm	ø5mm	ø5mm	ø8mm	ø8mm
Min. radius of curvature	Convex Concave	3mm 25mm	3mm 25mm	3mm 25mm	7mm 25mm	7mm 25mm
Min. thickness of substrata	0.3mm	0.3mm	0.3mm	0.3mm	0.3mm	0.3mm
Application	Nonmagnetic coatings on magnetic substrate				Non-conductive coatings on nonmagnetic substrate*	
Dimensions (W x D x H)	106 x 62 x 163mm			100 x 44 x 180mm	106 x 62 x 163mm	100 x 44 x 180mm
Mass	600g			500g	600g	500g

*Measurement is impossible if the substrate is an austenitic stainless steel.

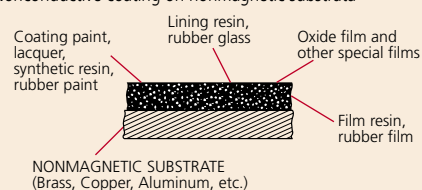


Application

Nonmagnetic coatings on magnetic substrata

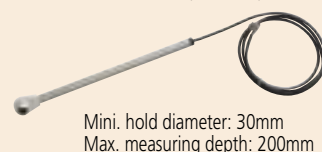


Nonconductive coating on nonmagnetic substrata



Optional Accessory

0732135*: Special probe for inside wall of bore
*not available for 179-721, 179-755, 179-756.



Mini. hold diameter: 30mm
Max. measuring depth: 200mm

526688: AC adapter for Neo-Derm (100V AC)
526688A: AC adapter for Neo-Derm (120V AC)
526688D: AC adapter for Neo-Derm (220V AC)
526688E: AC adapter for Neo-Derm (220/240V AC)
528041: AC adapter for Digi-Derm (100V AC)
528041A: AC adapter for Digi-Derm (120V AC)
528041D: AC adapter for Digi-Derm (220V AC)
528041E: AC adapter for Digi-Derm (220/240V AC)
936937: SPC cable for Digi-Derm (1m)
965014: SPC cable for Digi-Derm (2m)

Consumables

527599: Calibration film (25µm, 1 pc.)
527600: Calibration film (50µm, 1 pc.)
527601: Calibration film (100µm, 1 pc.)
527602: Calibration film (250µm, 1 pc.)
527603: Calibration film (0.5mm, 1 pc.)
527604: Calibration film (1.0mm, 1 pc.)
527605: Calibration film (2.0mm, 1 pc.)
685013: Calibration film (1.5mm, 1 pc.)
933038: Metallic base for calibration film (magnetic)
937305: Metallic base for calibration film (nonmagnetic)
937287: Calibration film set (25µm, 50µm)
937288: Calibration film set (25µm, 50µm, 100µm, 250µm)
937289: Calibration film set (100µm, 250µm, 0.5mm, 1.0mm, 2.0mm)
945014: Calibration film set (25µm, 50µm, 100µm, 250µm, 0.5mm, 1.0mm, 1.5mm)
945049: Calibration film set (25µm, 50µm, 100µm, 250µm, 0.5mm, 1.0mm)