CNC Form Measuring Machines with VISION PROBE

Catalog No. E4384

New CNC form measuring machines deliver increased productivity using a precision imaging probe system

Mitutoyo

CNC Form Measuring Machines with VISION PROBE

CNC form measuring machines that use imaging probes can accurately locate and identify measurement positions and measure features visible in the image

The lineup consists of Formtracer and Surftest models

Formtracer model simultaneously measures form and surface roughness

CS-H5000CNC + VISION PROBE

Surftest model measures surface roughness

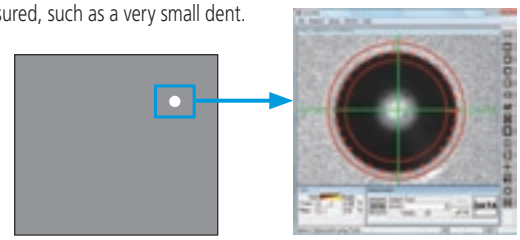
SV-3000CNC + VISION PROBE

Enhanced support for improved measurement throughput

Incorporation of a vision probe makes it easy to identify target measurement positions on surfaces, previously a difficult task.

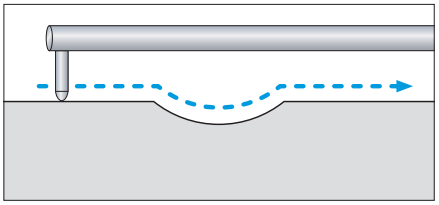
[Small feature shape measurement] (Patent pending in Japan.)

The vision probe is used to accurately locate the position of the feature to be measured, such as a very small dent.



Dent located and centered in the vision probe's image

The detector is swung into its operating position directly under the vision probe.

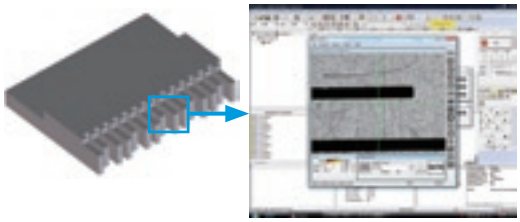


Dent shape traced by the detector's stylus

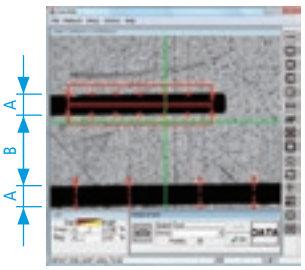
Features can also be measured directly from the vision probe image.

[Combined dimension and roughness measurement] (Patent pending in Japan.)

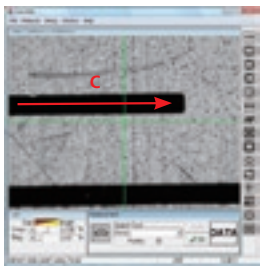
First, the vision probe is used to accurately locate the feature of interest, such as the small finger-type structure shown in these images.



Next, feature dimensions of interest are measured in the image.



Finally, the roughness is automatically measured by switching to the detector (a contact probe).



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VISION PROBE QVPII

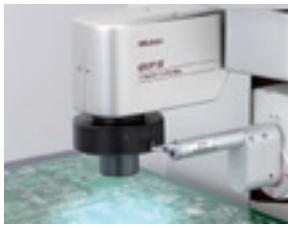
VISION PROBE QVPII

The vision probe has been specially designed for use with CNC form measuring machines and incorporates the knowledge gained through many years of experience with coordinate measuring machines and image measuring machines.

The ring light and ML 10× objective lens shown mounted are optional items.

CCD size		1/3 inch (B/W)
Optical tube magnification		0.375X
Illuminating function	Co-axial	White light LED source
	Ring (Option)	

A bright, long-life white LED is standard equipment

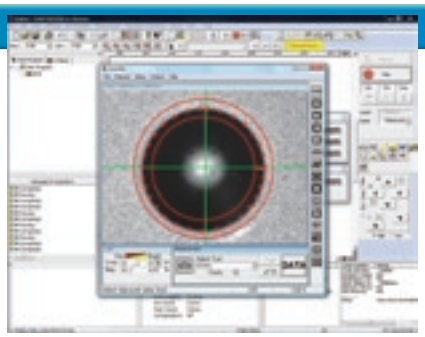


The standard QVPII is equipped with co-axial illumination directed down through the lens, and a ring light is available as an option. The illumination brightness is adjustable.

The ring light and ML 10× objective lens shown mounted are optional items.

Automatic edge detection

The VISIONPAK software package processes the QVPII probe images to automatically detect the edges of features, and the general-purpose contour FORMTRACEPAK package is used to perform the necessary calculations (such as determining dimensions and geometrical deviation).
VISIONPAK runs in combination with FORMTRACEPACK, and the image window is automatically displayed when QVPII is switched on.



Aligning the detector with the QVPII

The detector's stylus tip* location can be conveniently aligned with the QVPII crosshairs on the monitor image by simply using a offset value Acquisition kit.
In addition, because it is possible to program switches between QVPII and the detector*, automatic measurement that includes both contact-based and non-contact-based measurement is possible.

* Depends on the stylus

Built-in safety mechanism

The Z-axis detector and QVPII include a safety device that prevents damage by automatically turning off the equipment if the detector is in danger of colliding with a workpiece or jig.

Powerful image processing tools

VISIONPAK's range of image processing tools makes it possible to quickly detect simple or complex edges visible within the image.

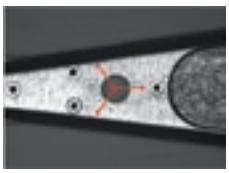
Outlier removal

When measuring very small shapes, removing burrs and dust on the measured object is difficult, and such imperfections can cause measurement errors. VISIONPAK can recognize these imperfections as outliers to prevent such errors.

VISIONPAK Image Processing Tools

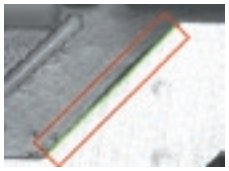
Simple tool

Detects a single point on the edge pointed to by the arrow.



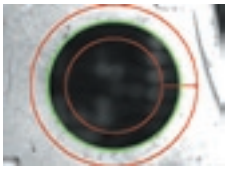
Box tool

Detects a straight edge enclosed by a rectangular box and creates multiple points along that edge.



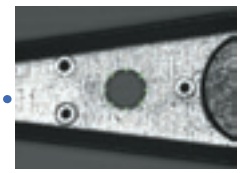
Circle tool

Detects a circular edge enclosed within concentric circles and creates multiple points along that edge. As with the box tool, it can collect data that is free from the effect of burrs and dust.



Manual tool

Detects an arbitrary edge pointed to (clicked on) by the mouse.

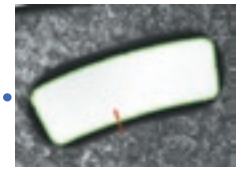


Centroid tool

Detects the center of area of an arbitrary form.

Edge self-tracing tool

By simply specifying the start point and measurement interval, the target edge can be detected while automatically tracing an unknown geometry.



Specifications

Model				CS-H5000CNC + VISION	SV-3000CNC + VISION
X1-axis	Measuring range			200mm	
	Resolution			0.00625μm	0.05μm
	Scale type			Laser Holoscale	Reflection-type linear encoder
	Drive speed	At CNC measurement		40mm/s maximum	200mm/s maximum
		At joystick control		0～40mm/s	0～50mm/s
	Contact measurement	Measuring speed	Roughness measurement	0.02～0.2mm/s	0.02～2mm/s
			Contour measurement	0.02～2mm/s	—
		Measuring direction		Both pulling and pushing	Pulling
		Straightness		(0.1＋0.0015L)μm *1、*2	0.5μm/200mm
		Accuracy (at 20℃)		±(0.16＋0.001L1)μm *2	—
	Vision measurement	Accuracy (at 20℃) *3 E1X		±(2＋3L1/1000)μm *4	
Z1-axis Detector	Measuring range			24mm	800μm/80μm/8μm
	Resolution			0.002μm	0.01μm (800μm), 0.001μm (80μm), 0.0001μm (8μm)
	Stylus motion			Swinging arc	
	Scale type			Laser Holoscale	Differential inductance
	Accuracy (at 20℃)			±(0.07＋|0.02H|)μm *5	—
	Measuring force			0.75mN (0.075gf)	0.75mN or 4mN
	Tracing angle			Ascent 60°, descent 60° (depending on surface condition)	—
	Measuring face direction			Downward	
Z2-axis Column	Measuring range			350mm (from the Y-axis table)	
	Resolution			0.05μm	
	Scale type			Reflection-type linear encoder	
	Drive speed	Under CNC control		200mm/s maximum	
		Under joystick control		0～50mm/s	
Y-axis Table	Measuring range			200mm	
	Resolution			0.05μm	
	Scale type			Reflection-type linear encoder	
	Drive speed	Under CNC control		200mm/s maximum	
		Under joystick control		0～50mm/s	
	Maximum loading			20kg (center of mass is to be within 100mm of the table center.)	
	Contact measurement	Straightness		0.5μm/200mm	
		Accuracy (at 20℃)		±(2＋2L1/100)μm ※4	
	Vision measurement	Accuracy (at 20℃) *3 E1Y		±(2＋3L1/1000)μm ※4	
	Table size			200×200mm	

*1: According to Mitutoyo inspection method *2: L=Measurement length (mm) *3: Guaranteed accuracy condition: A master gage is measured at 150mm height above the Y-axis table with a 10X objective lens. *4: L1=Dimension (mm) between 2 arbitrarily-selected points *5: H=Height measured from the horizontal (mm)

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Mitutoyo Corporation
20-1, Sakado 1-chome,
Takatsu-ku, Kawasaki-shi,
Kanagawa 213-8533, Japan
T +81 (0) 44 813-8230
F +81 (0) 44 813-8231
http://www.mitutoyo.co.jp

Mitutoyo

080 1006 1 B (CH) HS, Printed in Japan