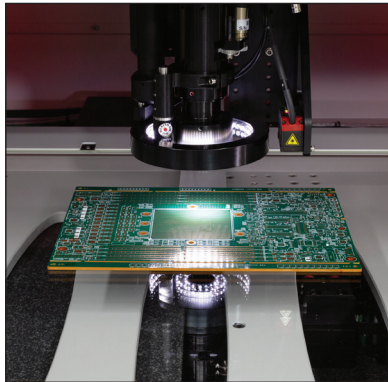


Multiple Lighting Options Available



PCBA Measurement



VSA713
Video Measurement System
711 mm x 610 mm x 200 mm Range
Shown with Adjustable Quadrant Light

Rapid, Multisensor Video Measurement Machines

Thorlabs' VideoMic[®] Video Measuring Systems provide high-speed, non-contact 3-axis coordinate measurement with industry-leading accuracy. These multisensor measuring machines can easily verify critical dimensions on first articles, production samples, or entire runs. Automated inspection protocols utilize the system's large field of view and high-resolution sensors to easily inspect large volumes of components sequentially or simultaneously. The system's tolerance reports and export utilities allow for setting thresholds, enabling timely corrections to the production process or, when necessary, interruption of production to minimize scrap. Images are collected on a high-resolution CCD camera and analyzed with sub-pixel algorithms enabling sub-micron measurements. Once measured, the feature coordinates and statistics can be stored, analyzed, and exported for additional analysis and reporting.

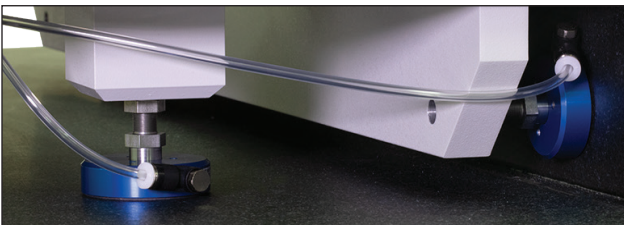
With a significant worldwide install base and modularity to tackle a wide variety of applications, the VideoMic[®] line of measurement systems has a proven track record of reliability. It is guaranteed to meet the quality assurance requirements of your production facility.

System Options

Six base systems are available, each utilizing a granite, split-axis base and gantry design. These measurement systems are offered in two product lines with air bearings and mechanical bearings, respectively. The VSA product line utilizes balanced linear motors with air bearings to position each axis of travel, while the VSM product line utilizes servo-driven ground ball screws to position each axis of travel. Each of the three motor axes and associated encoders is bonded directly to the granite, creating a system that is extremely accurate, stable, and resistant to environmental factors. The powerful M3 metrology software enables all the measurement, dimensioning, and reporting capabilities needed for the qualification of materials.

Key Features

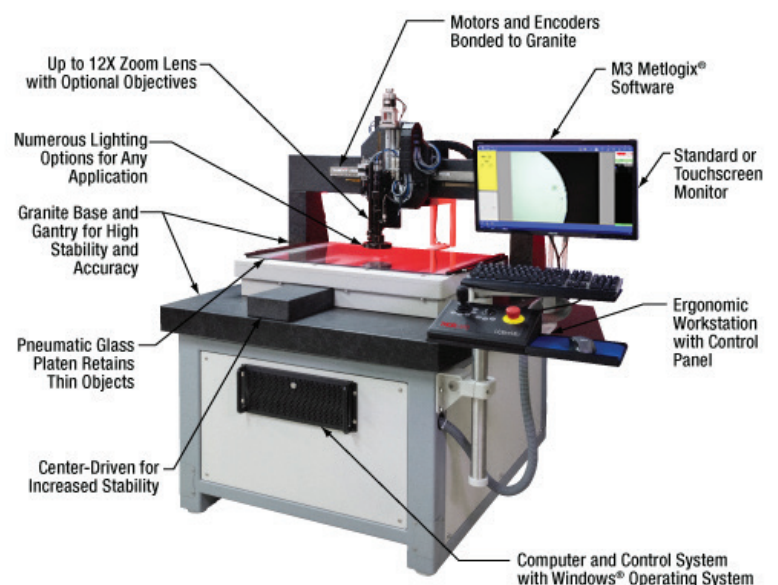
- ◆ Advanced Metrology Software with a High Degree of Flexibility for Programming
- ◆ Enhanced Video Edge Detection (VED) for Selective Feature Measurement
- ◆ Simultaneous Measurement of Multiple Features within the Field of View for Quick Program Execution
- ◆ 3D Measurement Capabilities in Video, Laser, and Touch Modalities
- ◆ Program Creation from Automatic CAD Data Import
- ◆ Easy-to-Use Interactive Feature Creation for Manual Program Recording
- ◆ Report Generation with Drawing Markups and Customizable Output Table Information
- ◆ Data Compatibility with Advanced PCB Analysis Software
- ◆ Extremely Flat Granite Bases Provide an Ideal Plane for Stage Motion
- ◆ High-Speed Air Bearing Stage Positioning Permits Rapid Feature Detection and Program Execution
- ◆ High-Resolution CCD Cameras for Optimal Image Quality
- ◆ Variety of Lighting Options for Enhancing Features for Processing
- ◆ Customizable Zoom Lenses Enable Large Field of View or High Resolution
- ◆ Auxiliary Sensor Options for Laser and Touch Probes Compliment Video Measurements
- ◆ Includes Compact Control Panel and Standard Keyboard to Maximize Operator Performance



VSA Series systems include frictionless air bearings that do not wear or require lubrication.



VSA Series' Non-Contact Magnetic Track Shown Above the Gold 0.10 µm Encoder



A VSA713 Video Coordinate Measurement System with the Hood Removed

Applications



Our video systems can be customized to meet the specific needs of your application. Below we list several application spaces and examples for which our measurement systems offer industry-leading accuracy in inspection.

Electronics

- ◆ PCB (Printed Circuit Board) and PCBA (PCB Assembly)
- ◆ FPC (Flexible Printed Circuit)
- ◆ Connectors (Pin Dimensioning, Pin Alignment)
- ◆ Batteries
- ◆ Solar Panels

Mechanical Components

- ◆ Machined Parts
- ◆ Stamped Parts
- ◆ Hardware (Screws, Fasteners, Inserts, and Gears)
- ◆ Medical Devices

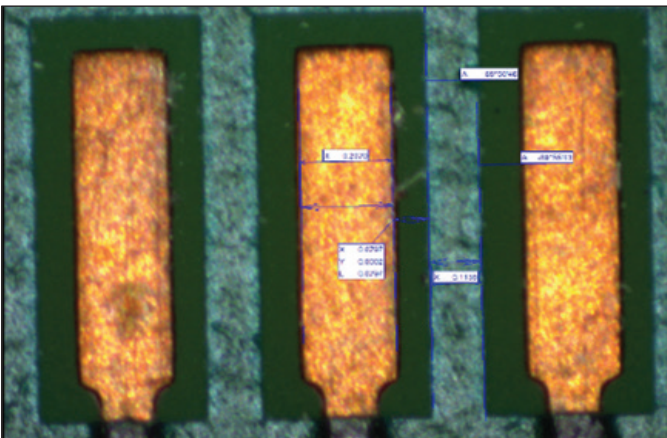
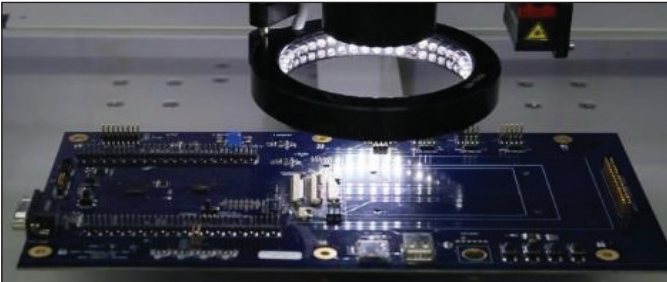
Plastics, Glasses, and Polymers

- ◆ Molded Components
- ◆ Films

Top: A machined component is positioned for inspection.

Middle: PCBA Inspection Using the On-Axis LED Illuminator and LED Ring Light

Bottom: Trace Measurement of a PCB



Camera Options

Thorlabs offers a 1.3 MP and a 5 MP CCD color camera for use in our video coordinate measurement (CMM) systems. The 1.3 MP option offers a high-quality ICX424AQ sensor with a 1/3" optical format and speeds up to 40 fps. It is ideal for quickly imaging a large number of products fixed on the video stage. The 5 MP option offers a high 2536 x 2068 pixel resolution ICX625AQ sensor with a 2/3" optical format, making it ideal for detailed inspections of small items. The 5 MP camera will operate at a slower, 15 fps speed and will have an increased FOV, comparatively.



1.3 MP Camera with 1/3" Optical Format

Specifications

	1.3 MP	5 MP
Sensor Type	Interline SXGA Progressive Color CCD: ICX424AQ	Interline QSXGA Progressive Color CCD: ICX625AQ
Pixels (H x V)	1348 x 976	2536 x 2068
Active Pixels (H x V)	1280 x 966	2448 x 2058
Imaging Area (H x V)	4.8 mm x 3.6 mm	8.4 mm x 7.1 mm
Pixel Size	3.75 μ m x 3.75 μ m	3.45 μ m x 3.45 μ m
Optical Format	1/3"	2/3"
Frame Rate	40 fps	15 fps
Filter	IR Cut-On Filter	

Accessories

Touch Probe

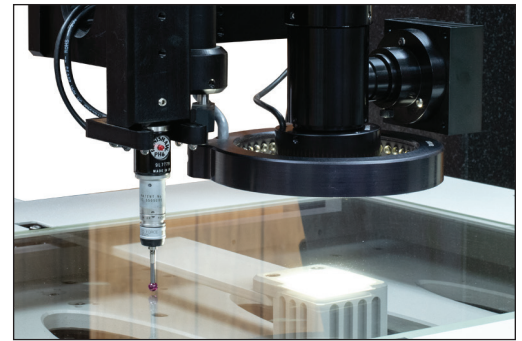
Thorlabs' video measuring systems are compatible with most Renishaw TP20 and TP200 series 3-axis touch-trigger probes, as well as SP600 series 3-axis scanning probes. These are sold as kits that are preconfigured for the video system. Each kit includes a probe body, probe module, stylus, and an optional manual or motorized module-changing rack.



A Selection of LF, SF, and MF Probe Modules and M2 Styli with Varying Tip Styles

Laser Probe

The Triangulation Displacement Laser option determines the target's Z position by measuring the reflected light from the target's surface using an internal CCD detector. The light collection is not colinear; there is a fixed angle between the beam output and the collection optic. This design allows for a significant standoff from the sample. The laser probe is useful for characterizing surface flatness and Z-dimensions of features that allow the angled beam to enter and exit properly.



A Mounted Touch Probe

Confocal Probe

The confocal probe performs a colinear measurement of the Z position, obtained by measuring the spectral response of a white light signal reflected from the sample. The confocal probe enables the highest performance in Z measurements with sub-micron resolution.

Fixturing Options

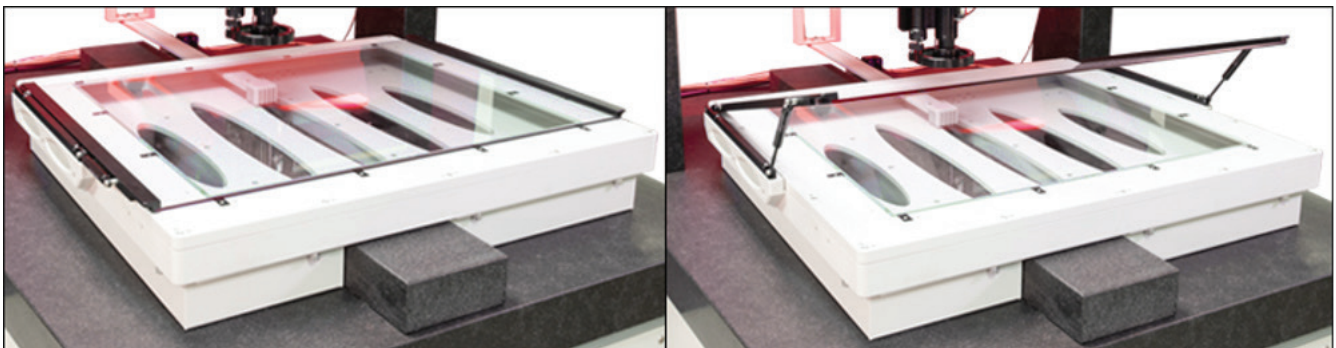
Thorlabs offers numerous options for fixing an object in place during inspection with our video coordinate measuring machines (CMMs). Fixturing is the process of securing an object prior to scanning with a CMM. Doing so allows for repeatable, accurate, and fast measurement scans of a large number of items from a production run. Accommodations for custom mounting hole locations and interconnects can be discussed at the time of purchase.



Laser Probe Being Used to Measure Surface Flatness

Hinged Glass Platen

A pneumatic, hinged, glass platen can be added to any stage to secure smaller objects or circuit boards up to 0.20" (5.1 mm) thick. The system is programmed to ensure the detection path column is raised when the platen is opened preventing unwanted collisions.



The hinged glass platen is shown in its raised (right) and closed (left) positions. The platen can be configured to automatically open as part of a software routine or by manually lifting the glass panel.

Calibration Grid

To confirm the accuracy of a measurement system, a NIST-traceable calibration grid is used. The array of grid targets provides ideal features for measuring the CNC position at the feature sites. The measured feature values can be easily compared to the provided certification, and a resultant report can be generated for quality compliance.

Large-Field-of-View Bi-Telecentric Lenses and High-Magnification Objectives

Depending on the application, the system may require a specialized lens. Large-field-of-view bi-telecentric lenses offer up to an 83 mm field of view and a 30 mm depth of field. Bi-telecentric lenses increase measurement speed by allowing more features to be captured within a single image, in addition to requiring fewer Z-axis adjustments due to the significant increase in depth of field. To obtain the highest levels of feature detail, a variety of machine vision objective lenses are also available.



TL1X-SAP1X
1X Super Apochromatic
Microscope Objective



MVBT2313
0.128X Bi-Telecentric Lens

Objectives

Item # ^a	Wavelength Range	M	WD
LMUL-10X-UVB	240 - 360 nm	10X	20.0 mm
LMUL-20X-UVB		20X	15.3 mm
LMUL-50X-UVB		50X	12.0 mm
TL1X-SAP	420 - 700 nm	1X	8.0 mm
MY5X-802	436 - 656 nm	5X	34.0 mm
MY10X-803		10X	34.0 mm
MY20X-804		20X	20.0 mm
MY50X-805		50X	12.0 mm

a. Compatible 12X and 6.5X zoom lens systems are also available, with 0.25X, 0.5X, and 0.75X auxiliary lenses.

Bi-Telecentric Lenses

Item #	M	WD ^a	Depth of Field ^b
MVBT2313	0.128X	179.0 mm	±15 mm
MVBT2324	0.243X	97.9 mm	±11 mm
MVBT2353	0.528X	44.5 mm	±1 mm
MVBT2310	1.000X	44.0 mm	±0.9 mm

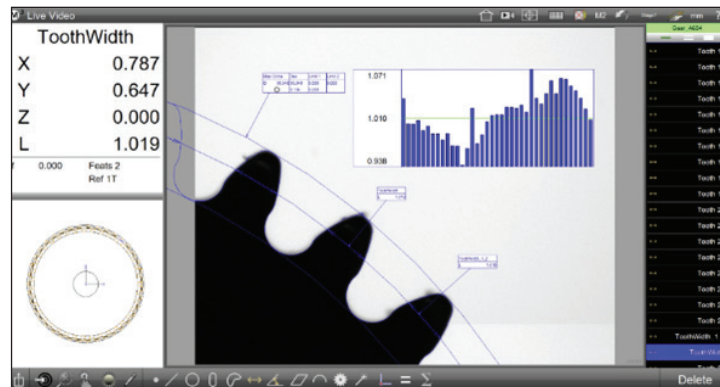
a. Working distance is specified from the center of the depth of field to the first mechanical surface of the lens housing.
b. Specified at 70 lp/mm and 50% MTF.

Software Options

Additional M3 software features can be purchased and enabled for thread measurements, gear measurements, profiling geometries, and digital comparator capabilities. Upgrades to the included LCD monitor and software are offered, as are import and export software utilities, and statistical process control (SPC) software packages.



M3 Profiling Add-On



M3 Gear Inspection Add-On

Specifications

VideoMic® Video Measurement System Specifications

Base System Item # ^a		VSM463	VSM713
XYZ Control			
Stage Bearings		Mechanical	
Stage Motors		Servo	
Measurement (Travel) Range	X-Y	460 mm x 305 mm (18" x 12")	711 mm x 610 mm (28" x 24")
	Z	200 mm (8")	
Accuracy ^b	X-Y (E2)	(2.5 + 5L/1000) µm	
	Z (E1)	(1.5 + 5L/1000) µm	
Velocity	X-Y	≤760 mm/s	
	Z	150 mm/s	
Repeatability	Z	±3 µm (±0.00012") at High Magnification	
Granite	Flatness	≤0.005 mm (Over Any 700 mm Area)	
	Roughness	Ra0.4 (Equivalent to RMS16)	
	Waviness	≤0.001 mm / 100 mm x 100 mm	
Unit Dimensions			
Footprint	Width	1020 mm (40")	1270 mm (50")
	Depth	1020 mm (40")	1630 mm (64")
Total Height		1730 mm (68")	1730 mm (68")
Approximate System Weight (Crated / Uncrated)		1043 kg (2300 lbs) / 726 kg (1600 lbs)	1630 kg (3600 lbs) / 1225 kg (2700 lbs)
Approximate Footprint Overhang ^c	Control	Up to 635 mm (25")	
	Station		
Top Clearance		Allow for Approximately 1220 mm (48") for Servicing	
Rear Clearance		Allow for Approximately 610 mm (24" for Servicing	
General			
Operating Temperature	Range	20 ± 0.5 °C (67 to 69 °F)	
	Rate	0.25 °C/hr (0.5 °F/hr)	
Relative Humidity (Non-Condensing)		30% - 80%	
Line Voltage		115 / 230 VAC, 50 / 60 Hz, Single Phase, 1.0 kW	

- a. The base item number indicates the unit size, measurement range, and bearing/motor type of the chosen system. The magnification optics, camera, and lighting options can then be customized to suit a specific application. Contact TMS-Sales@thorlabs.com for help in selecting system options and specifications.
- b. L is the point-to-point travel distance, or diagonal travel distance. This applies to a thermally stable system at 20 °C using a certified artifact, pixel value of 2 µm or less, evenly distributed load, and a standard measuring plane.
- c. The control station includes the monitor, keyboard, mouse, and control pad; it is mounted at the front of the unit. The printer tray is an optional accessory that is mounted at the rear of the unit.

VideoMic® Video Measurement System Specifications

Base System Item # ^a		VSA463	VSA713	VSA963	VSA1273
XYZ Control					
Stage Bearings		Air			
Stage Motors		Linear			
Measurement (Travel) Range	X-Y	460 mm x 305 mm (18" x 12")	711 mm x 610 mm (28" x 24")	965 mm x 760 mm (38" x 30")	1270 mm x 915 mm (50" x 36")
	Z	200 mm (8")			
Accuracy ^b	X-Y (E2)	(1.5 + 5L/1000) µm			
	Z (E1)	(1.5 + 5L/1000) µm			
Velocity	X-Y	≤760 mm/s			
	Z	150 mm/s			
Repeatability	Z	±3 µm (±0.00012") at High Magnification			
Granite	Flatness	≤0.005 mm (Over Any 700 mm Area)			
	Roughness	Ra0.4 (Equivalent to RMS16)			
	Waviness	≤0.001 mm / 100 mm x 100 mm			
Unit Dimensions					
Footprint	Width	1020 mm (40")	1270 mm (50")	1520 mm (60")	2140 mm (85")
	Depth	1020 mm (40")	1630 mm (64")	1880 mm (74")	2350 mm (93")
Total Height		1730 mm (68")		1860 mm (73)	1800 mm (71")
Approximate System Weight (Crated / Uncrated)		1043 kg (2300 lbs) / 726 kg (1600 lbs)	1630 kg (3600 lbs) / 1225 kg (2700 lbs)	2041 kg (4500 lbs) / 1588 kg (3500 lbs)	2994 kg (6600 lbs) / 2450 kg (5400 lbs)
Approximate Footprint Overhang ^c	Control	Up to 635 mm (25")			
	Station				
Top Clearance		Allow for Approximately 1220 mm (48") for Servicing			
Rear Clearance		Allow for Approximately 610 mm (24") for Servicing			
General					
Operating Temperature	Range	20 ± 0.5 °C (67 to 69 °F)			
	Rate	0.25 °C/hr (0.5 °F/hr)			
Relative Humidity (Non-Condensing)		30% - 80%			
Line Voltage		115 / 230 VAC, 50 / 60 Hz, Single Phase, 1.0 kW			
Air Supply	Velocity	85 L/m (3 CFM) Dry Air			
	Pressure	7 - 8.25 Bar (100 - 120 PSI)			

- a. The base item number indicates the unit size, measurement range, and bearing/motor type of the chosen system. The magnification optics, camera, and lighting options can then be customized to suit a specific application. Contact TMS-Sales@thorlabs.com for help in selecting system options and specifications.
- b. L is the point-to-point travel distance, or diagonal travel distance. This applies to a thermally stable system at 20 °C using a certified artifact, pixel value of 2 µm or less, evenly distributed load, and a standard measuring plane.
- c. The control station includes the monitor, keyboard, mouse, and control pad; it is mounted at the front of the unit. The printer tray is an optional accessory that is mounted at the rear of the unit.

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