

COMPLETE SUPPORT TO ALL YOUR NEEDS

NEXIV
VMR

The perfect answer to all your measurement needs

The NEXIV VMR series

With an expanded lineup that includes small to ultra-wide measurement platforms as well as versatility in optical head selection, the NEXIV VMR series provides complete support for all your measurement needs.

Type	Ultra High Precision	Small Parts	Ultra Wide	Ultra Wide
XY stroke (mm)	300x300	150x150	1000x800	1200x720
Optical Head for Type 1, 2, 3	VMR-H3030	VMR-1515	VMR-10080	VMR-12072
	Master Instruments for measurement room Molds	Packages Substrates Pressed parts Small parts (connectors, etc.) Watch components Car metal parts	Printing mask for substrates LCD parts	Large flat panel display parts
Maximum Magnification Module (VMR-Z120X)	VMR-H3030 Z120X	VMR-1515 Z120X	VMR-10080 Z120X	VMR-12072 Z120X
	WL-CSPs WL-Bump height WL-SIPs Rerouted masks MEMS masks	Small high-density substrates Small high-precision molds Packages (2D + height) MEMS parts	LCD glass substrates (pattern measurement) Organic EL glass substrates (pattern measurement)	LCD glass substrates (pattern measurement) Organic EL glass substrates (pattern measurement)
LU Head (LU Model)		VMR-1515 LU	VMR-10080 LU	VMR-12072 LU
		Small LCDs Semiconductor wafers (smaller than 150 mm)	Large LCDs Color filters	Large LCDs Color filters

Ultra High Precision Measurement Platform
NEXIV VMR-H3030



With ultra-high precision and versatility, this model can serve as the master instrument in your laboratory. NEXIV VMR-H3030 achieves sub-micrometer level uncertainty thanks to optimum layout of the ultra-precise low-thermal expansion glass scales and robust hardware designs.

- Ultrahigh precision appropriate for the Master Instrument
- Wide illumination choices ensure accurate detection of edges in dies and molds
- Long working distance (50mm) permits measurement of parts with large height variance
- 15X zoom provides wide field of view for rapid search and high magnification for accurate measurement. Accurate calibration at all magnifications allows rapid field of view measurements of multiple parameters.

Small Part Measurement Platform
NEXIV VMR-1515



The VMR-1515 series has a smaller travel (X, Y, Z) 150 x 150 x 150. It is suitable for metrology automation of small size parts.

- A long 50mm working distance sufficiently supports measurements of 3D workpieces
- 5X zoom provides wide field of view for rapid search and high magnification for accurate measurement. Accurate calibration at all magnifications allows rapid field of view measurements of multiple parameters.
- High-speed TTL Laser AF ensures high-precision AF independent of surface shape.

Ultra Wide Measurement Platform
NEXIV VMR-10080

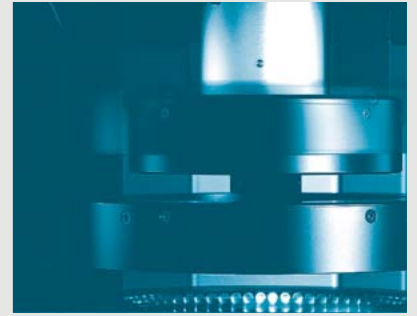


Long 1000 x 800 mm stage stroke performs brilliantly in the measurement of large-size workpieces.

- Long stage stroke enables measurements of LCD substrates/modules and large-size PCBs
- Laser AF also enables measurements of height variance and warping in workpieces
- Search function facilitates measurements of lands and holes of PCBs
- Variety of illumination choices facilitate accurate edge detection even for vague geometries
- High-speed stage and high-speed image processing provide high throughput

Optical Head for Type 1, 2, 3

Ensure measurements with high accuracy and at high speeds.

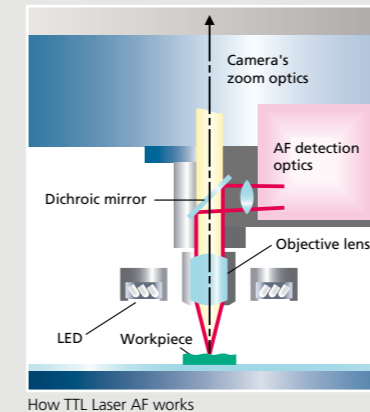


Widefield, high N.A. objective lens

The highly corrected objective lens is equivalent to those found in Nikon's top-end microscopes. They have a high N.A. of 0.35 with a long 50mm working distance at all magnifications.

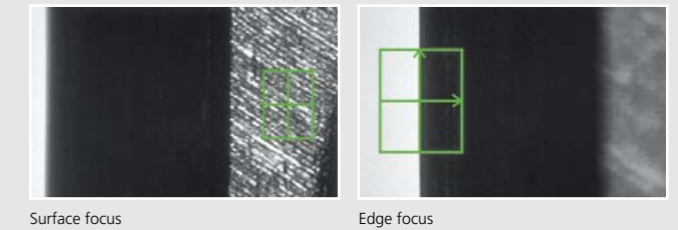
Upgraded TTL Laser AF

TTL Laser AF provides high resolution, long working distances, and fast operating speed for perfect focusing on narrow spaces at low magnifications. High-speed scanning measurement is possible at a rate of 1000 points per second max., enabling ultra-precise Z-axis measurements in a variety of applications.



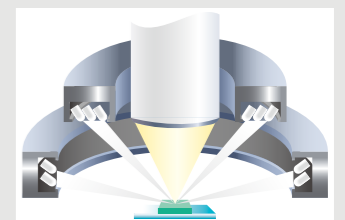
High-speed, high-precision Vision AF

Thanks to the adoption of a new algorithm and a progressive scan CCD camera, Vision AF now provides greater speeds and accuracy closer to TTL Laser AF. Vision AF is convenient for applications where TTL Laser AF cannot be used, for example, when focusing on chamfered or round edges. The Multiple-Vision AF enables the simultaneous measurement of multiple points with different heights within the field of view.



8-sector LED ring illumination

An illumination system consisting of inner and outer ring illuminators has been specially developed for the VMR series. The system makes possible observations of extremely low-contrast edges which are usually invisible under episcopic illumination by arbitrarily combining illuminations from eight directions. Best for edge enhancement of the contours of bosses, pins, ceramic packages, and similar workpieces.



How the 8-sector LED ring illuminator works

Standard head with 15X high-speed zoom

The standard head features 5-step, 15X high-speed zoom, providing greater flexibility in choosing magnifications according to the size of the measuring area.

Magnification vs field of view (mm)

Zoom position	1	2	3	4	5
Type 1					
Optical magnification	0.5x	1x	2x	4x	7.5x
Total magnification	18x	36x	72x	144x	270x
Field of view (mm)	9.33x7	4.67x3.5	2.33x1.75	1.165x0.875	0.622x0.467
Type 2					
Optical magnification	1x	2x	4x	8x	15x
Total magnification	36x	72x	144x	288x	540x
Field of view (mm)	4.67x3.5	2.33x1.75	1.165x0.875	0.582x0.437	0.311x0.233
Type 3					
Optical magnification	2x	4x	8x	16x	30x
Total magnification	72x	144x	288x	576x	1080x
Field of view (mm)	2.33x1.75	1.165x0.875	0.582x0.437	0.291x0.218	0.155x0.117

Total magnifications listed above represent those on the monitor screen when a 24" monitor is set to the UXGA (1600 x 1200 pixels) mode.

Inner ring illuminator (37° from the optical axis)

This type can be universally used whenever strong illumination from various directions is needed. This illumination also provides a full 50mm working distance.



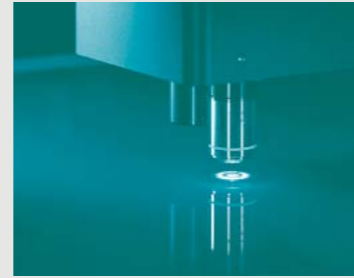
Outer ring illuminator (75° from the optical axis)

This type enables the observation of workpieces that are impossible with lighting at a shallow angle. When not in use, the illuminator retracts, creating more space over the workpiece. When in use, the working distance will be 10mm.



Maximum Magnification Module VMR-Z120X

With variable magnifications up to 120x, these models address applications that demand higher precision and density.



Newly developed maximum magnification module VMR-Z120X

The new module achieves a 1x to 120X magnification range by using two objectives and changing the optical path. An 8-step zoom gives this system the capability to do rapid field of view measurements of hundreds of parameters and do critical measurements of line widths down to 1µm.

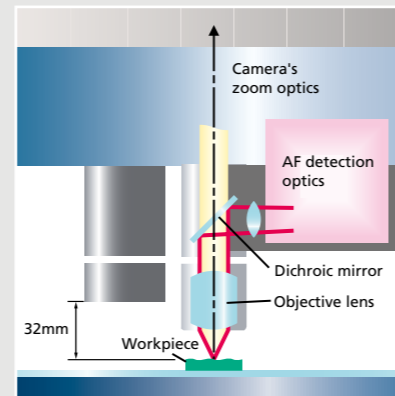
Magnification vs field of view (mm)

Optical magnification	1x	2x	4x	7.5x
Total magnification	36x	72x	144x	270x
Field of view (mm)	4.67 x 3.5	2.33 x 1.75	1.165 x 0.875	0.622 x 0.467
Optical magnification	16x	32x	64x	120x
Total magnification	576x	1146x	2292x	4320x
Field of view (mm)	0.291 x 0.218	0.146 x 0.109	0.073 x 0.055	0.039 x 0.029

Total magnifications listed above represent those on the monitor screen when a 20" monitor is set to the UXGA (1600 x 1200 pixels) mode.

High-resolution TTL Laser AF with ultra tiny laser spot

The module comes with a high-resolution TTL Laser AF that incorporates high N.A. objectives and achieves ultra tiny laser spots. It significantly improves performance in focusing on and scanning over thin, transparent/semitransparent (e.g. resists) surfaces or irregular reflection surfaces. High-speed scanning measurement is possible at a rate of 1000 points per second max., enabling ultra-precise Z-axis measurements in a variety of applications.



How TTL Laser AF works

LU Head (LU Model)

Universal epi-illuminator/motorized nosepiece type

Nikon's industry-acclaimed CFI60-2 optics supports high-precision, strain-free measurements.



CFI60-2 optical system

CFI60-2 optics, the culmination of Nikon's optical technologies, achieves brilliant, high-contrast images, making the system most suitable for the observation of large LCD substrates and color filters. This system can perform both dimensional measurements of a workpiece via image processing and observation in a single unit. By using a high-contrast DIC slider, enhanced DIC imaging is also possible.

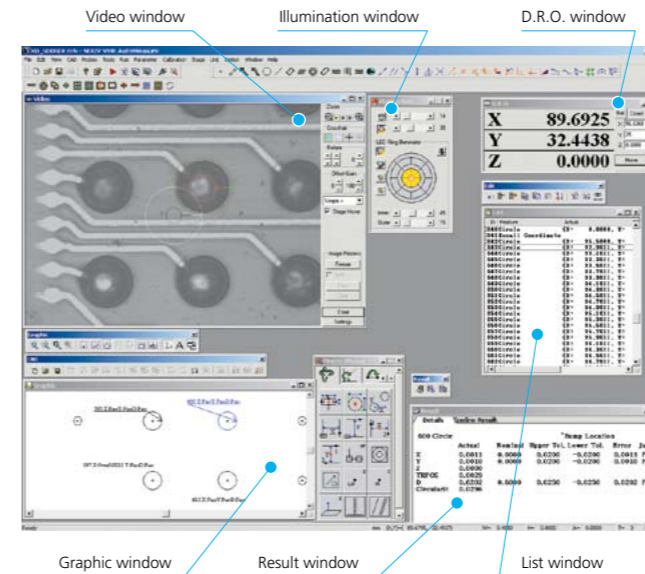


CFI60-2 objective lenses	Magnification	NA	W.D. (mm)	CFI60-2 objective lenses	Magnification	NA	W.D. (mm)
TU Plan Fluor BD	5x	0.15	18.00	TU Plan EPI ELWD*	20x	0.40	19.00
	10x	0.30	15.00		50x	0.60	11.00
	20x	0.45	4.50		100x	0.80	4.50
	50x	0.80	1.00	T Plan	10x	0.20	37.0
TU Plan BD ELWD	100x	0.90	1.00	EPI SLWD*	20x	0.30	30.0
	20x	0.40	19.00		50x	0.40	22.0
	50x	0.60	11.00		100x	0.60	10.0
CFI L Plan EPI*	100x	0.80	4.50	TU Plan Apo EPI*	50x	0.80	2.00
	2.5x	0.075	8.8		100x	0.90	2.00
T Plan EPI*	1x	0.03	4.0		150x	0.90	1.50
	2.5x	0.075	6.5	TU Plan Apo BD	50x	0.80	2.00
TU Plan Fluor EPI*	5x	0.15	23.50		100x	0.90	2.00
	10x	0.30	17.50		150x	0.90	1.50
	20x	0.45	4.50				
	50x	0.80	1.00				
	100x	0.90	1.00				

*An LU objective adapter is necessary when using the EPI series of objective lenses.

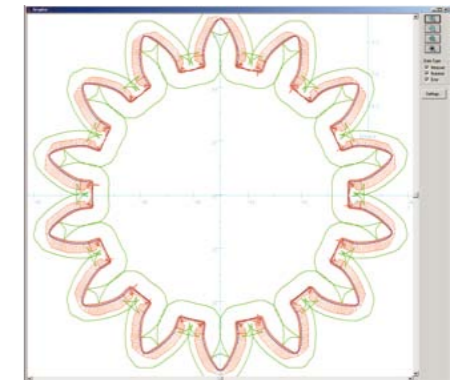
Standard Software

Main program



Two-dimensional profile shape analysis program: NEXIV Profiler/CAD Reader

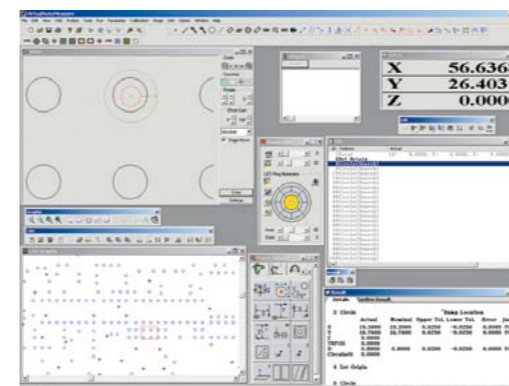
NEXIV Profiler makes it possible to measure and tolerance 2-dimensional profile shapes in a workpiece that cannot be measured in the normal geometric mode. Now more accurate quantitative measurements can be taken than with the chart comparison method using profile projectors and/or conventional measuring microscopes. With the NEXIV CAD Reader nominal shape data can be created from CAD data in the DXF/IGES file format.



CAD interface off-line teaching support program: NEXIV Virtual AutoMeasure

This program enables CAD data to be read into the Virtual Video Window on a separate computer, allowing the operator to use NEXIV's teaching program with the same operational procedures as on the online computer. This eliminates the necessity of using the actual workpiece during teaching sessions and lets the NEXIV system concentrate on automatic measurement for increased productivity.

- Supports IGES, DXF, DMIS, NC files, Gerber, and Excellon.
- The Virtual Video Window enables the operator to confirm the current field of view based on CAD data.
- Same operational procedures as the NEXIV AutoMeasure.
- Manual or one-click automated programming.
- Possible to combine programs with Macro steps, such as Line Width Measure and Multi Pattern Search.



Options

Surface analysis software MountainsMap X

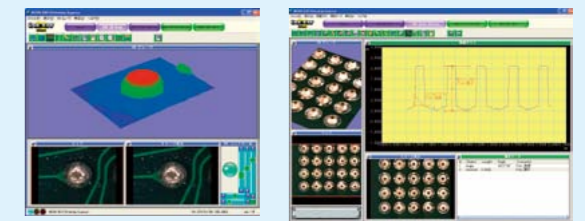
Industry standard ISO/ASME/JIS compliant surface analysis software

The MountainsMap X is powerful software for surface metrology analysis. It provides the rich functionality of 3D visualization, cross-sectional view, 2D and 3D roughness, and other parameters based on the latest ISO standards.



EDF/Stitching Express

This optional software makes EDF - Extended Depth of Field - images by extracting focused pixel information from multiple captured images in Z-axis direction. Also, it generates stitching images from different FOV images captured with CNC XY stage motion, making a wide FOV observation possible. Both functions contribute to image documentation.



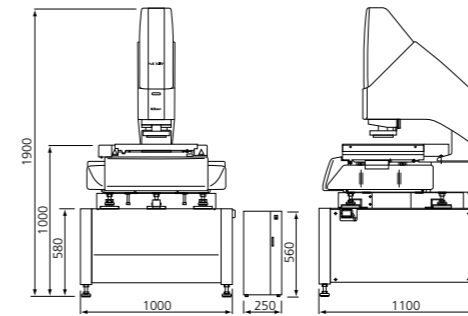
Specifications

		Main Unit			
Model		VMR-H3030/Z120X	VMR-1515/Z120X/LU	VMR-10080/Z120X/LU	VMR-12072/Z120X/LU
Stroke	Optical Head for Type 1, 2, 3 LU model	300 x 300 x 150 mm (11.8 x 11.8 x 5.9 in.)	150 x 150 x 150 mm (5.9 x 5.9 x 5.9 in.)	1000 x 800 x 150 mm (39.4 x 31.5 x 5.9 in.)	1000 x 800 x 150 mm (47.2 x 28.3 x 5.9 in.)
	With max. magnification module (high mag. lens)	300 x 300 x 150 mm (11.8 x 11.8 x 5.9 in.)	150 x 150 x 150 mm (5.9 x 5.9 x 5.9 in.)	1000 x 800 x 150 mm (39.4 x 31.5 x 5.9 in.)	1200 x 720 x 150 mm (47.2 x 28.3 x 5.9 in.)
	With max. magnification module (low mag. lens)	250 x 300 x 150 mm (9.8 x 11.8 x 5.9 in.)	100 x 150 x 150 mm (3.9 x 5.9 x 5.9 in.)	950 x 800 x 150 mm (37.4 x 31.5 x 5.9 in.)	1150 x 720 x 150 mm (45.3 x 28.3 x 5.9 in.)
Minimum readout		0.01 μm		0.1 μm	
Maximum workpiece weight		30kg (66.1 lb)	20kg (44.0 lb)	40kg (88.2 lb)	40kg (88.2 lb)
Measuring uncertainty	U _{1x} , U _{1y}	0.6 + 2L/1000 μm (workpiece max. 10kg)	1.5 + 4L/1000 μm (workpiece max. 5kg)	2 + 4L/1000 μm (workpiece max. 40kg)	2.2 + 4L/1000 μm (workpiece max. 40kg)
	U _{2xy}	0.9 + 3L/1000 μm (workpiece max. 10kg)	2.5 + 4L/1000 μm (workpiece max. 5kg)	3 + 4L/1000 μm (workpiece max. 40kg)	3.2 + 4L/1000 μm (workpiece max. 40kg)
Z-axis (L: Length in mm < W.D.)		0.9 + L/150 μm	1.5 + L/150 μm Note: Z-axis accuracy is guaranteed by Laser AF.		
Camera		B&W 1/3-in. CCD (progressive scan), color 1/3-in. CCD			
Working distance	Optical Head for Type 1, 2, 3	50mm			
	With max. magnification module	High mag. objective lens: 9.8mm Low mag. objective lens: 32mm			
	LU model	Varies depending on objective lens in use			
Magnification vs field of view	Optical Head for Type 1	0.5 – 7.5X / 9.33 x 7 – 0.622 x 0.467 mm			
	Optical Head for Type 2	1 – 15X / 4.67 x 3.5 – 0.311 x 0.233 mm			
	Optical Head for Type 3	2 – 30X / 2.33 x 1.75 – 0.155 x 0.117 mm			
	With max. magnification module	1 – 120X / 4.67 x 3.5 – 0.039 x 0.029 mm			
LU model	Varies depending on objective lens in use				
Auto focus		TTI Laser AF and Vision AF. LU model: Vision AF only			
Illumination	Optical Head for Type 1, 2, 3	Diascopic, episcopic, 8-segment LED ring illumination (inner ring / outer ring)			
	With max. magnification module	Episcopic, diascopic (with high mag. head only), darkfield illumination			
	LU model	Diascopic, Episcopacy & Darkfield illumination			
Power source		AC100-240V ±10%, 50/60Hz			
Power consumption		Max. 11A (Standard type), 13A (Z120X type)		Max. 13A (Standard type), 15A (Z120X type)	
Dimensions & weight	Main unit only	915 x 1060 x 1300 mm, approx. 450kg (36.0 x 41.7 x 51.2 in., 992.1 lb.)	512 x 703 x 1200 mm, approx. 180kg (20.2 x 27.7 x 47.2 in., 396.8 lb.)	—	—
	Main unit & table	1000 x 1100 x 1900 mm, approx. 570kg (39.4 x 43.3 x 74.8 in., 1256.6 lb.)	512 x 703 x 1200 mm, approx. 180kg (20.2 x 27.7 x 47.2 in., 396.8 lb.)	1530 x 2200 x 1750 mm, approx. 1500kg (60.2 x 86.6 x 68.9 in., 3306.9 lb.)	1734 x 2200 x 1750 mm, approx. 1600kg (68.3 x 86.6 x 68.9 in., 3527.4 lb.)
	Controller	250 x 550 x 500 mm, approx. 31kg (9.8 x 21.7 x 19.7 in., 68.3 lb.)			
Footprint		2400 (W) x 1400 (D) mm (94.5 x 55.1 in.)	2100 (W) x 1100 (D) mm (82.7 x 43.3 in.)	2800 (W) x 2500 (D) mm (110.2 x 98.4 in.)	3000 (W) x 2500 (D) mm (118.1 x 98.4 in.)

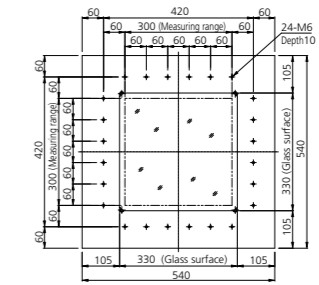
The "Z120X" type is equivalent to the "TZ" type in Japan.

Dimensional diagrams

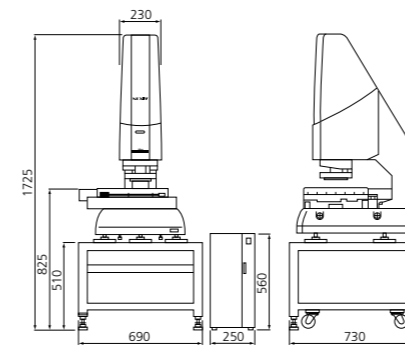
VMR-H3030/Z120X



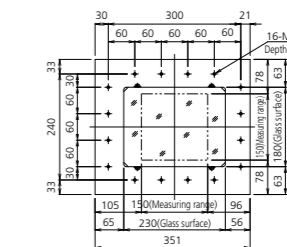
(Position of tapped holes for custom fixtures)



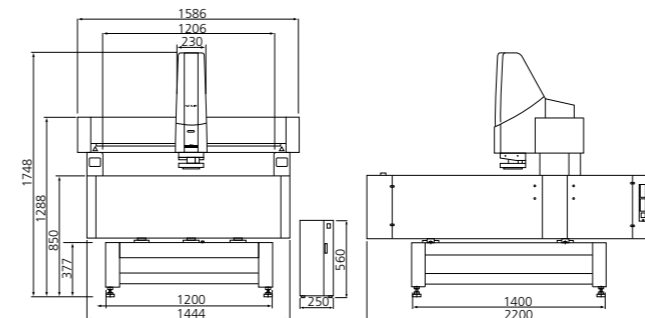
VMR-1515/Z120X/LU



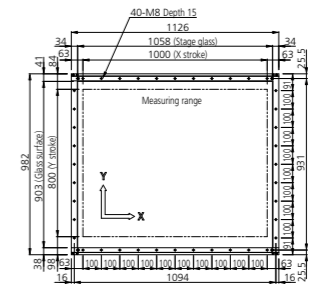
(Position of tapped holes for custom fixtures)



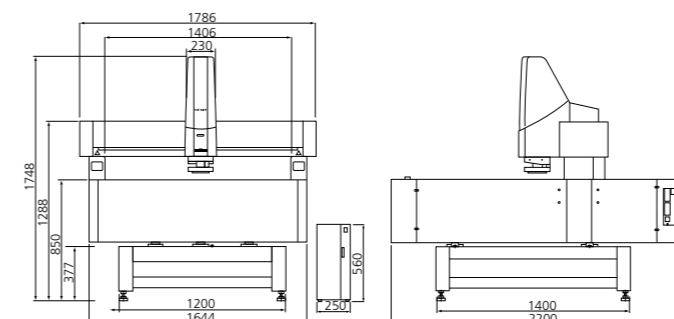
VMR-10080/Z120X/LU



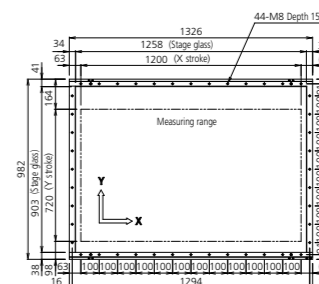
(Position of tapped holes for custom fixtures)



VMR-12072/Z120X/LU



(Position of tapped holes for custom fixtures)



ISO/IEC 17025 Certified

Nikon Corporation Instruments Company has been certified as an ISO/IEC 17025 accredited calibration laboratory for CNC Video measuring systems by the Japan Accreditation Board for Conformity Assessment.
(ISO/IEC 17025: International standard, which specifies the general requirements to ensure that a laboratory is competent to carry out specific tests and/or calibrations)

Date of accreditation: November 22, 2010
 Accredited section: Accredited section: Industrial Instruments CS 1st Engineering Section, Quality Assurance Department, Instruments Company
 Calibration site: Customer's laboratory (field service)
 Type of measuring instruments: Coordinate measuring machine

Scope of calibration	Maximum measuring abilities (K=2) [L=measurement length (mm)]	
Interval distance measurement	L ≤ 420mm	0.34μm
	420 ≤ L ≤ 1000mm	(0.45 + 0.54 x L/1000)μm



Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. March 2014 ©2014 NIKON CORPORATION

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