



Digital Microscope

NEW VHX-X1 Series



The most comprehensive microscope
solution for imaging and analysis

VHX
DIGITAL MICROSCOPE

One versatile tool for any application **ALL IN ONE**



Ultra-high-definition observation

4K CMOS image sensor with
highest-in-class resolution

—————> P. 04

SEM-like surface analysis

NEW Dynamic Optical Shadow
Effect Mode

—————> P. 06

Easy operation for all users

Full-control console

—————> P. 08

Expandable to
suit your needs

MICROSCOPE



Automatically
reproduce settings

NEW Quick replay

—————> P. 12

9 times greater
analysis range

NEW Large 300 mm 11.81" stage

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Replace Metallurgical
Microscopes

NEW High-resolution revolver lens

—————> P. 16

All-in-one device for any application

Ultra-high-definition observation

4K CMOS image sensor with highest-in-class resolution and 4K-compatible lens

KEYENCE's 4K CMOS image sensor and telecentric HR lenses provide a large depth of field while enabling high-resolution observation.

With a wide variety of built-in lighting and a motorized lens turret, the VHX-X1 Series allows for seamless magnification change from 5x to 6000x without having to replace the lens.





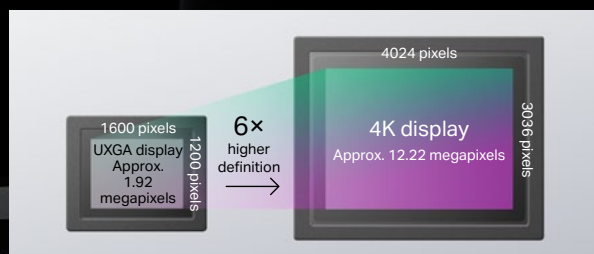
Digital Microscope

NEW VHX-X1 Series

Highest-in-class resolution

4K CMOS image sensor

The 4K CMOS image sensor ensures high resolution and low noise. This utilizes the full image-capture power of the 4K monitor and high-resolution lens for high-resolution observation.



High-resolution lenses

Telecentric HR lenses*

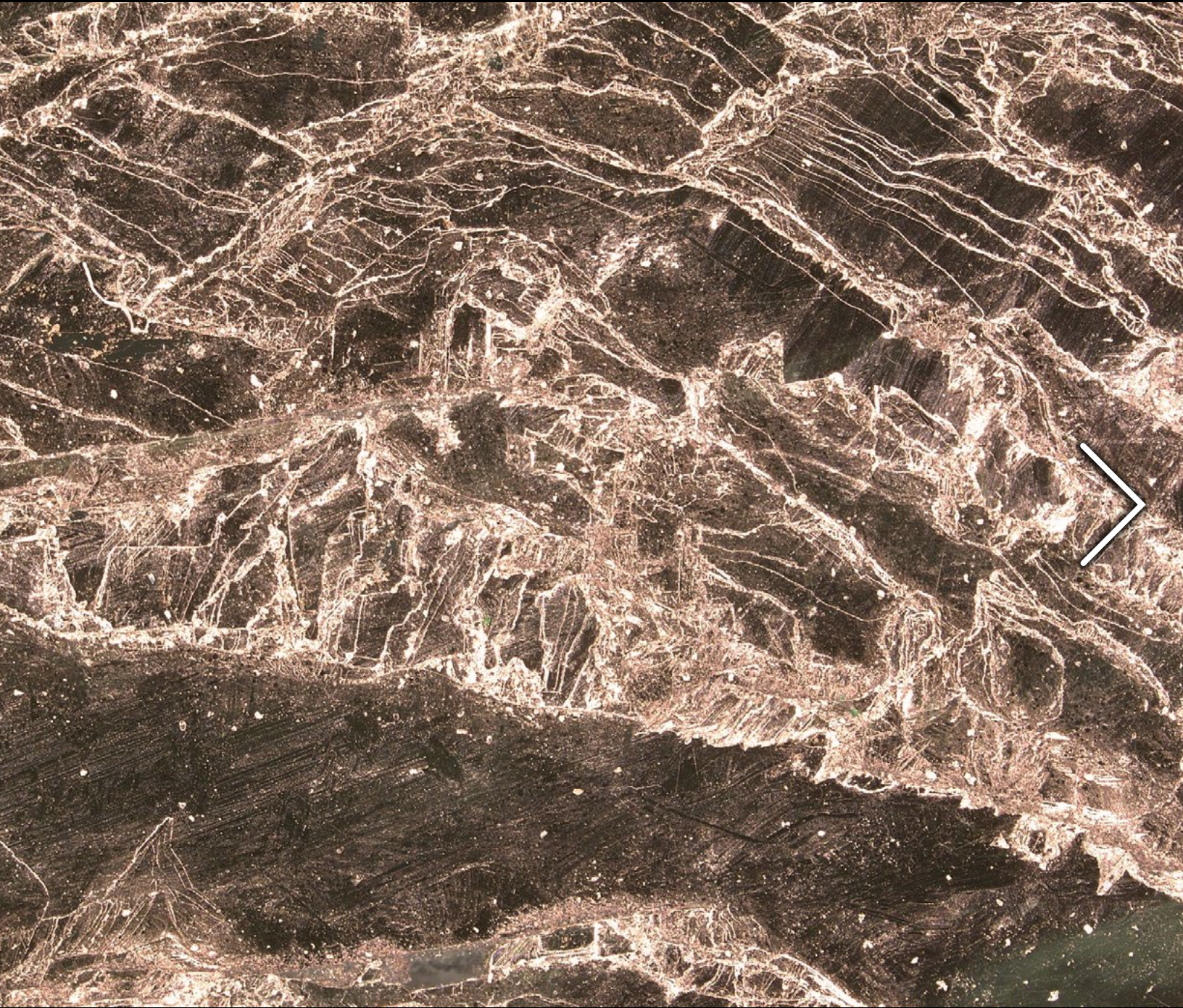
Combining resolution high enough to support 4K image quality with a large depth of field, these new dedicated lenses for the VHX-X1 Series push the envelope of optical performance. *Excluding the VHX-E00



SEM-like Surface Analysis

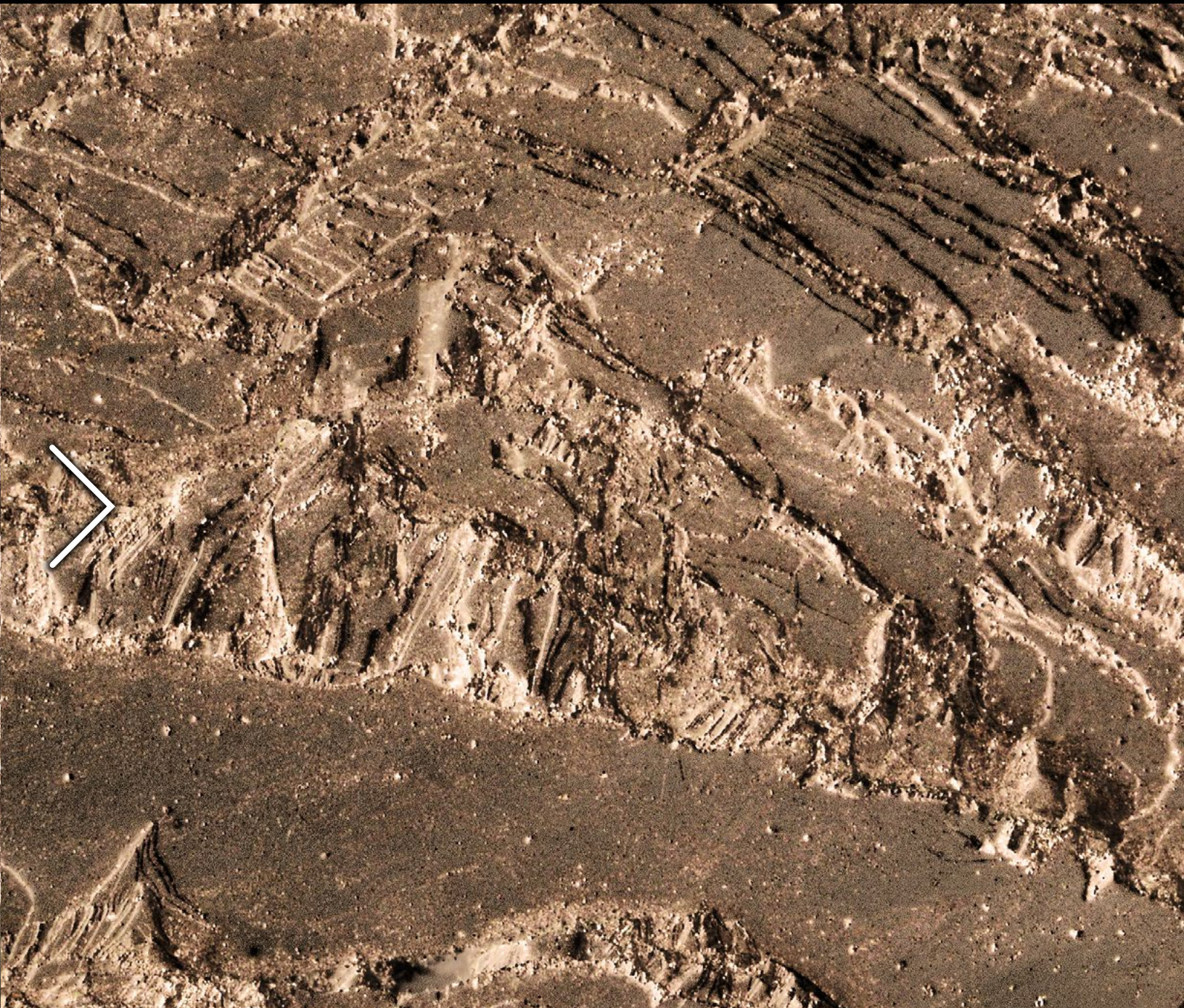
NEW Dynamic Optical Shadow Effect Mode

▮ Conventional Microscopes



Easily visualize surface conditions at low magnification
and dynamically change lighting

Dynamic Optical Shadow Effect Mode

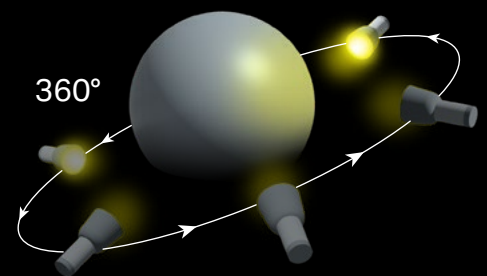


SEM-like surface analysis at the push of a button

Detailed multi-angled illumination enables clear 3D visualization of surface conditions at low magnification that traditionally required an SEM.

Post-imaging lighting adjustment

The lighting direction can be changed as desired across 360 degrees, even after imaging, allowing easy visualization of hard-to-see surface conditions.



Easy operation for all users

Full-control console

Simply by placing the target on the stage, users can control alignment, focus adjustment, magnification, and various other settings right from the user console.

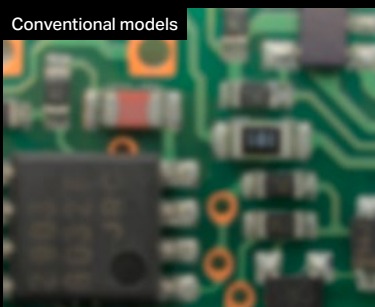
This allows even novice users the ability to capture high resolution images in seconds.

Focus

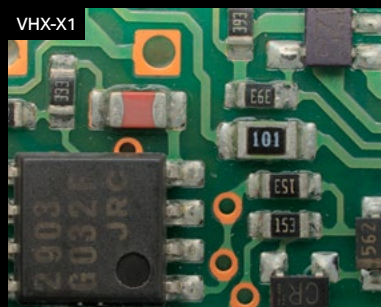
Easily adjust focus while simultaneously viewing the lens and target



Conventional models



VHX-X1



PCB (50x)

Lighting

Wide variety of lighting options and ability to adjust brightness for clear observation



FPC (80x)

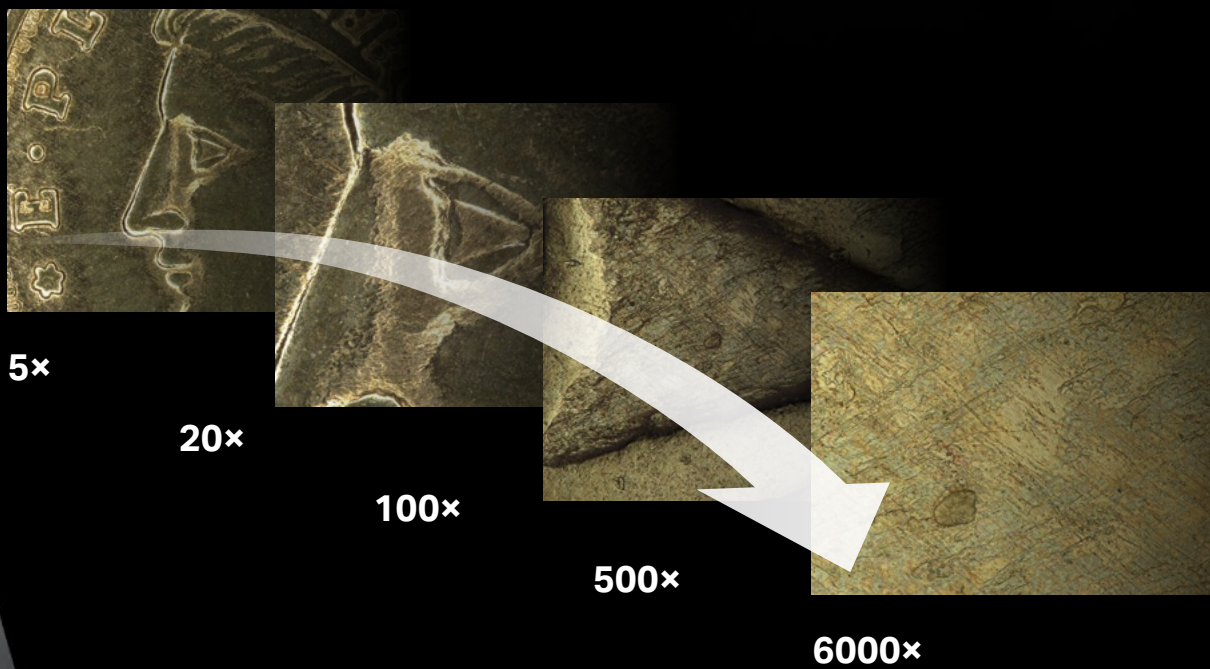


XY motorized stage

Automatically move to the desired observation location

Magnification change

Seamless observation from low to high magnification



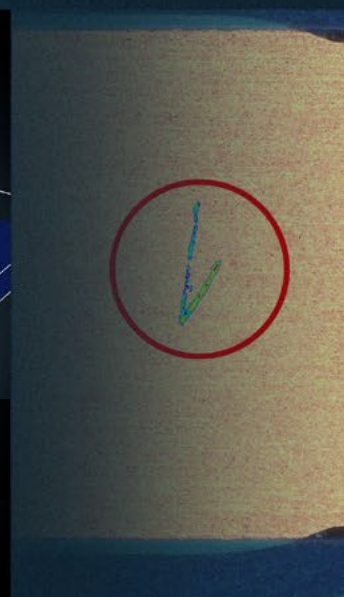
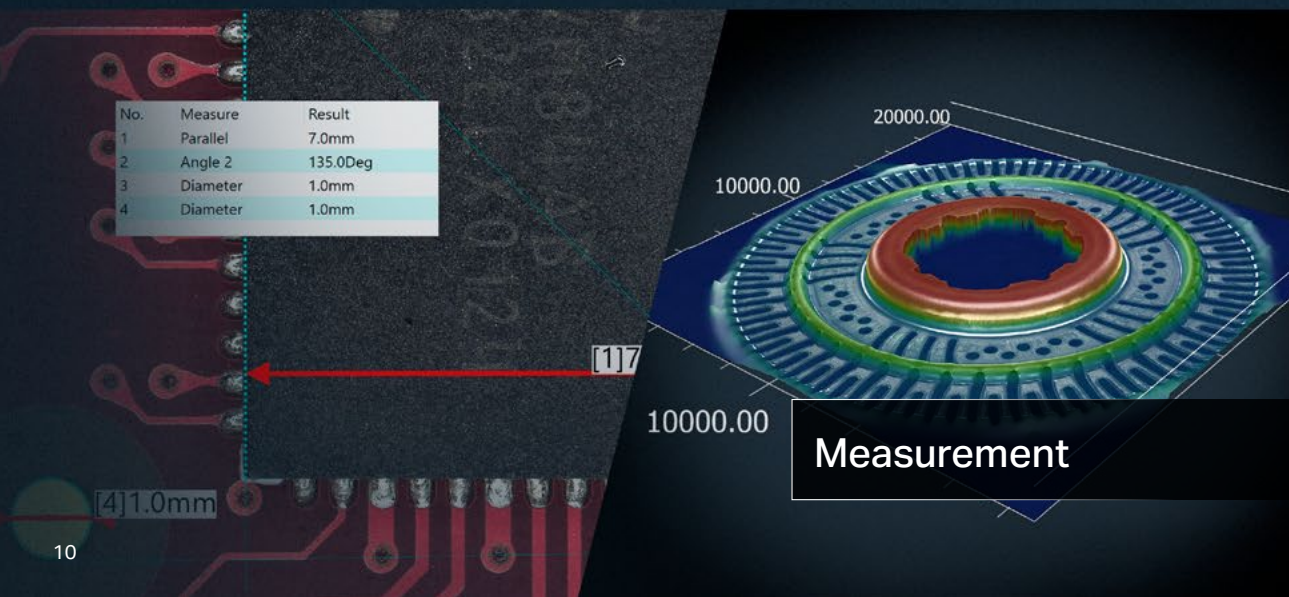


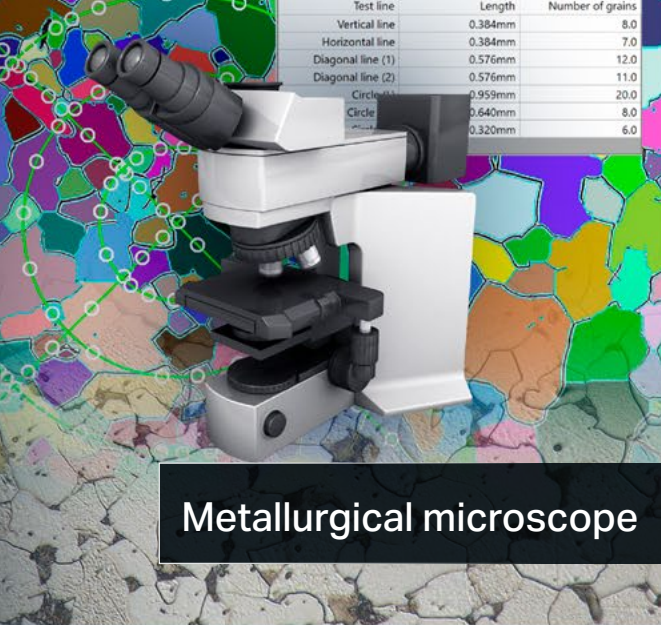
Stereoscopic microscope



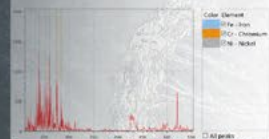
VHX-X1 Series

Customizable to suit your needs





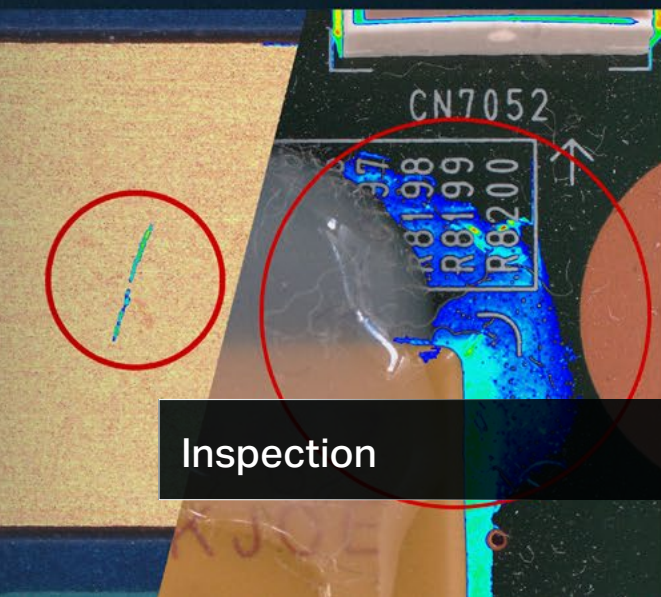
Metallurgical microscope



300 Series



Elemental analysis



Inspection



Special-purpose stages*

*The special-purpose stages shown are not KEYENCE products.

Automatically reproduce settings at the click of a button

NEW Quick replay

Simply select a saved file...



Gear (20×)



Quick replay

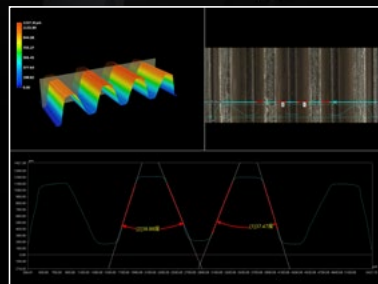


Significantly reduce
processing time
at the click of a button

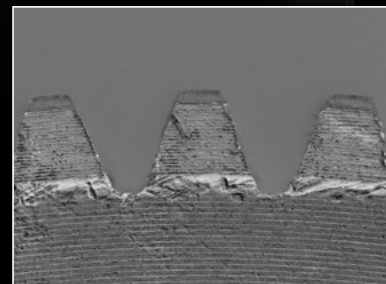
2D measurement



3D measurement



Advanced Optical Shadow Effect Mode

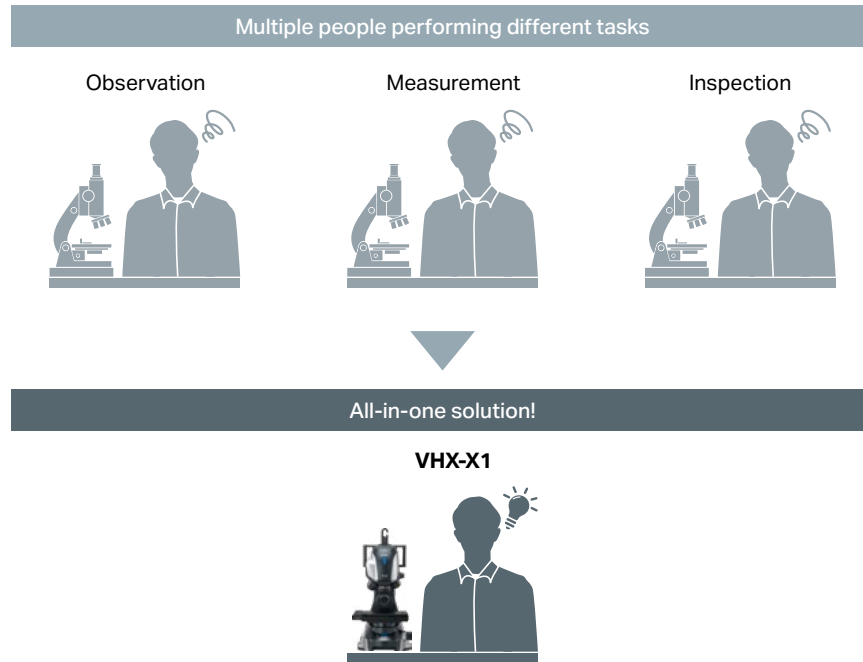


All-in-one design for improved efficiency

With conventional systems, inspection and analysis are performed using multiple pieces of equipment with several microscope specialists.

With an emphasis on usability, the all-in-one VHX-X1 Series allows even first-time users to easily capture high resolution images and perform a wide range of analysis.

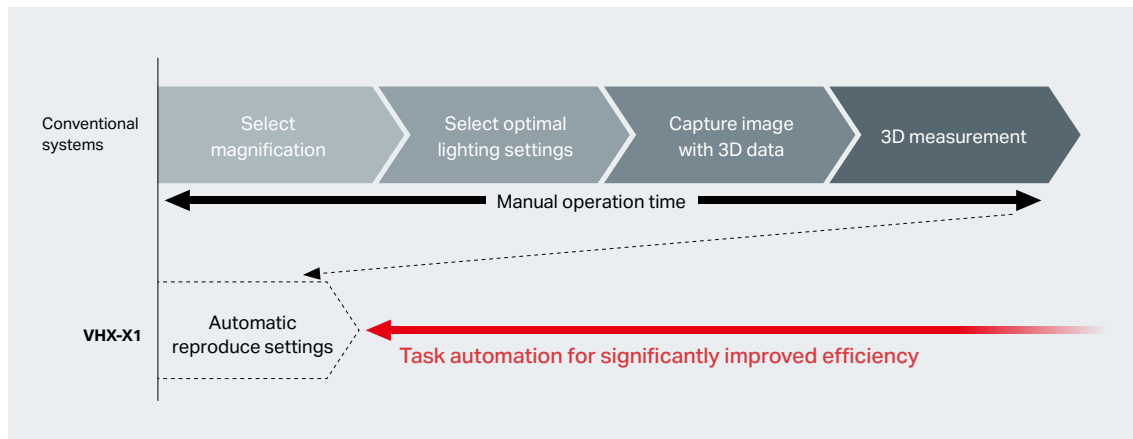
The versatility of the VHX-X1 Series means that inspection and analysis that previously took several microscope specialists and conventional systems to accomplish now only require one device.



Improved analysis efficiency

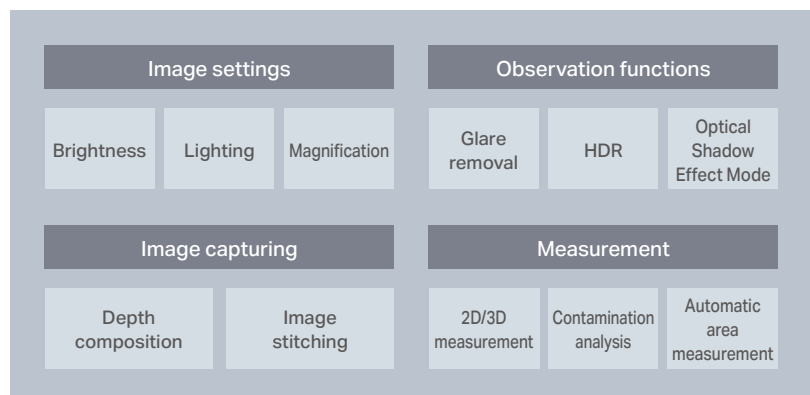
The VHX-X1 Series automatically performs tasks needing to be done by the operator with conventional systems, including determining the observation coordinates and the conditions for analysis and measurement.

This eliminates errors and reduces the time needed for setting up the system.



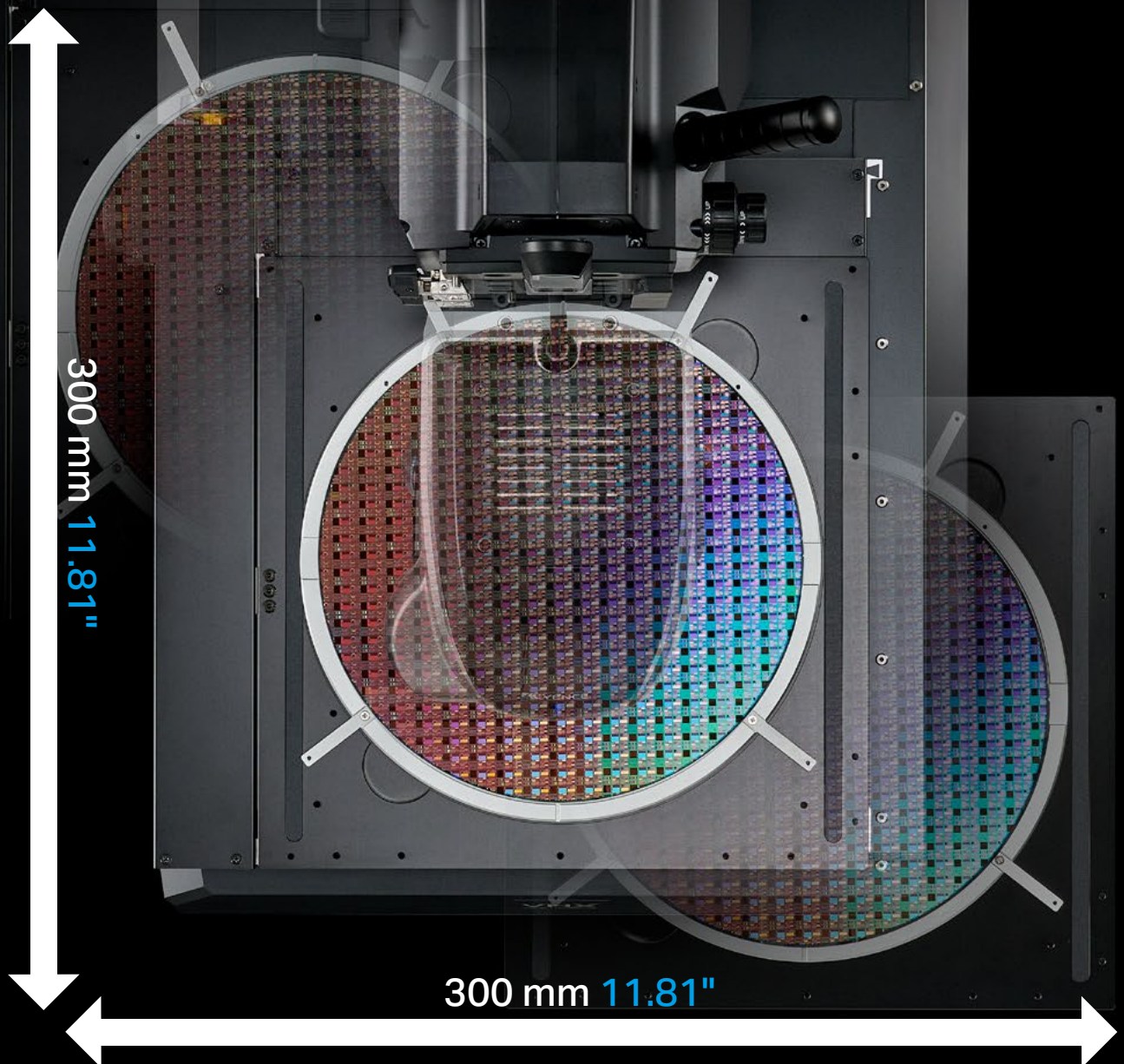
Support for a wide range of observation and measurement applications

The VHX-X1 Series supports a variety of functions including image settings, observation, measurement, and image-capturing functions.



9 times greater analysis range than conventional models

NEW Large 300 mm 11.81" stage



Movable range of XY stage
300 mm × 300 mm 11.81" × 11.81"

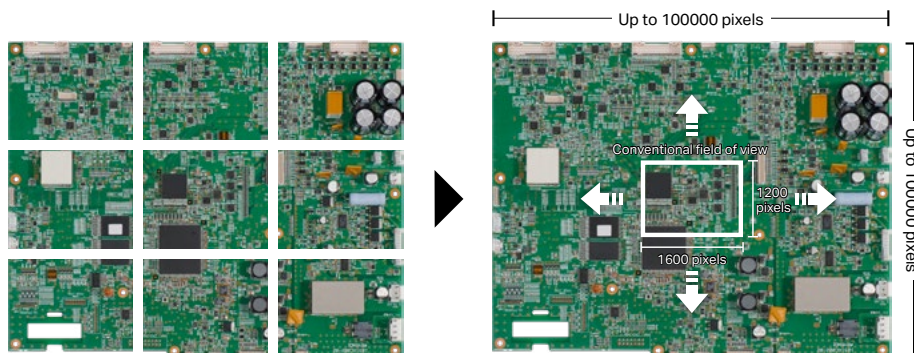
Observation of previously impossible targets

By combining the free-angle observation system and a 300 mm × 300 mm 11.81" × 11.81" stage, the VHX-X1 Series enables users to capture images and measurements over a wide area, while the Z-axis movement allows for clear observation of tall targets.



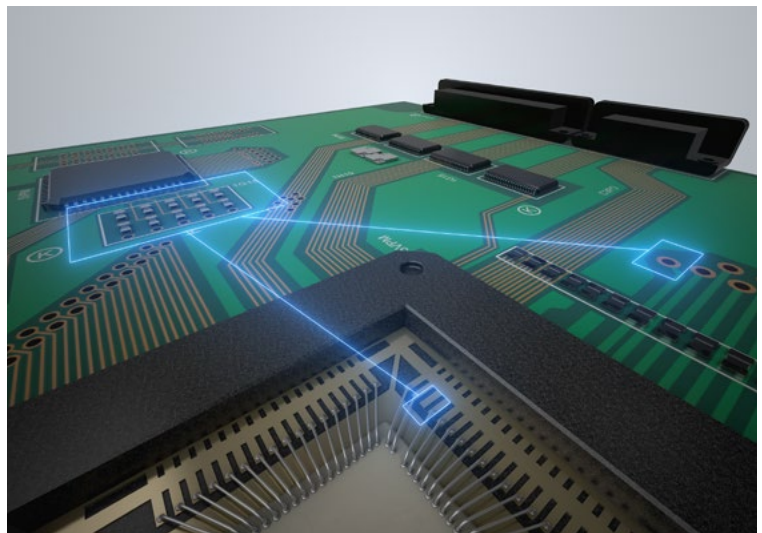
300 mm × 300 mm 11.81" × 11.81" observation in a single image

Automatic image stitching is possible thanks to ultra-high speed and precise movements. While observation with conventional models is possible only within a limited field of view, the VHX-X1 Series enables observation over a wide area with no misalignment of images.



Automatically capture images and measurements

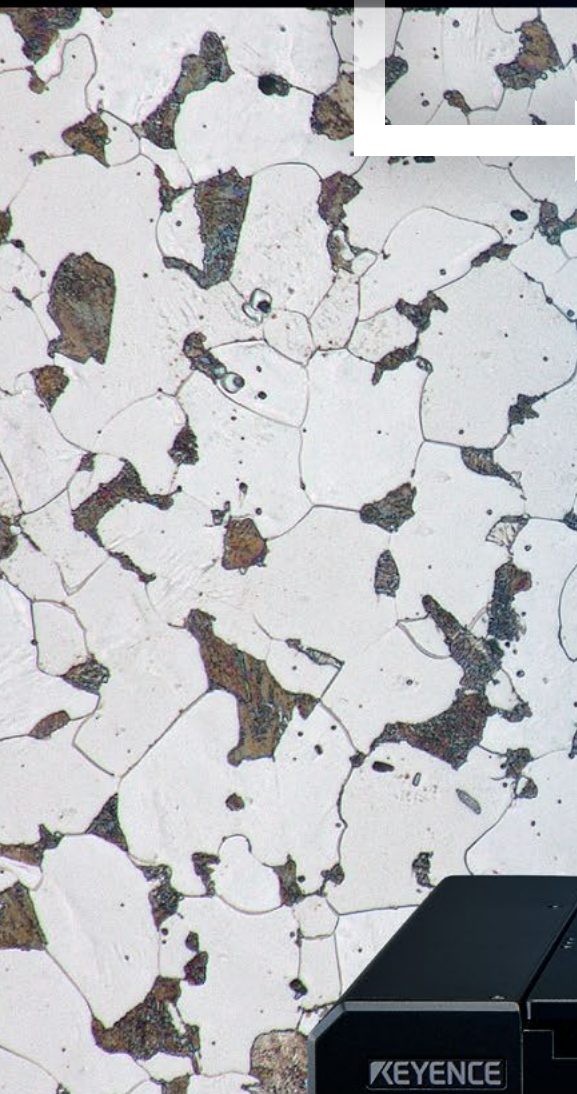
Using the Auto-Measurement Teaching function, repeated measurements can be performed automatically on identically shaped samples. Automatic reproduction is possible for not only XYZ coordinates but also magnification and lighting settings.



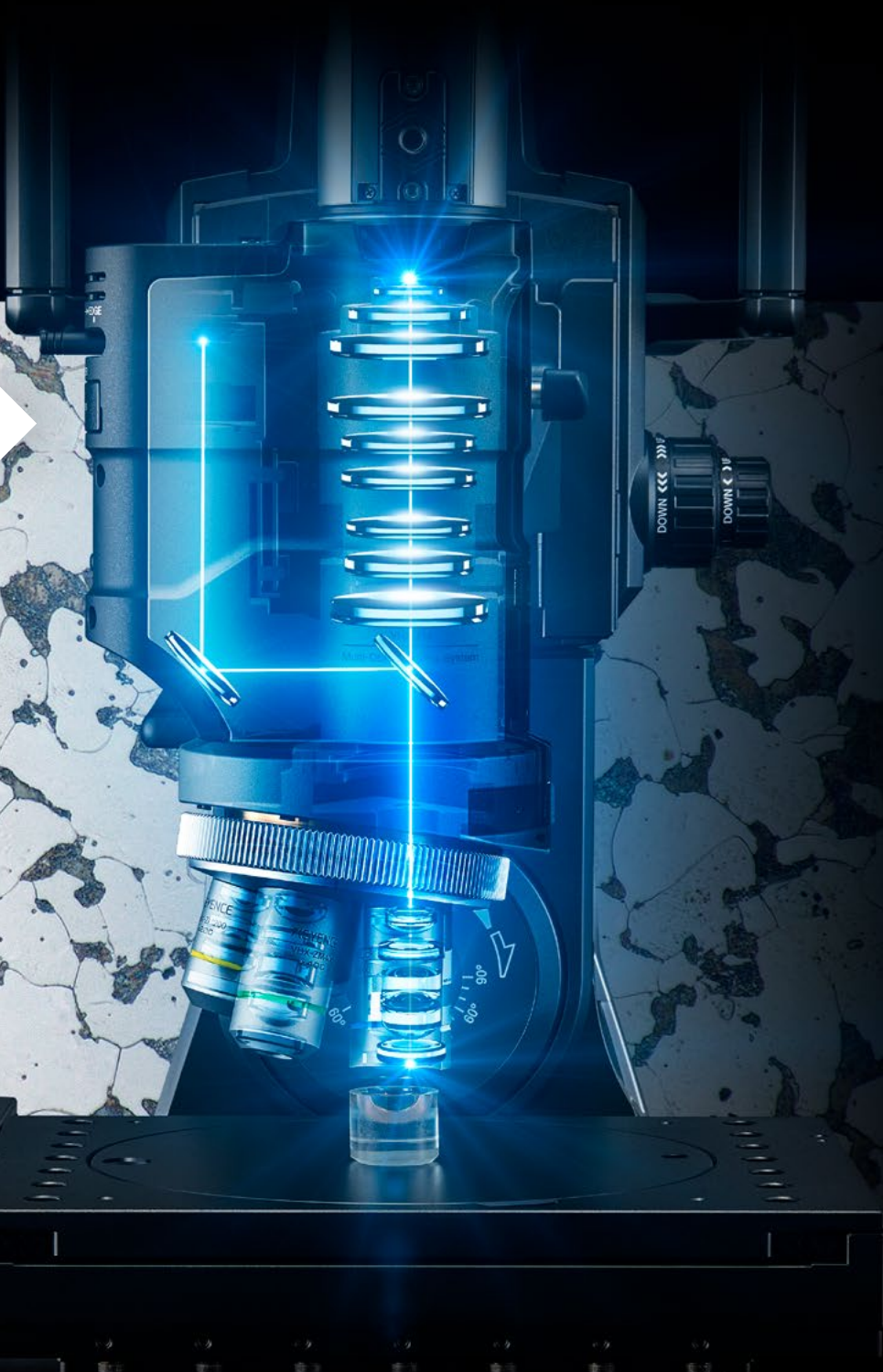
Replace Metallurgical Microscopes

NEW High-resolution revolver lens

Conventional
models



Metal structure (1000×)



Metallurgical microscope capabilities

The VHX-X1 Series offers unparalleled ease of use with the new High-resolution revolver lens without sacrificing metallurgical image capturing capabilities.

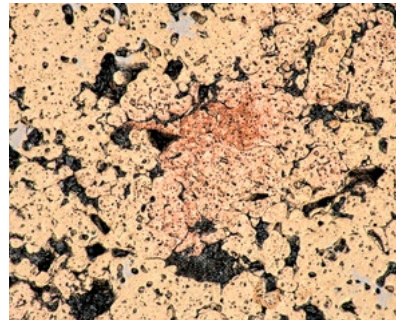
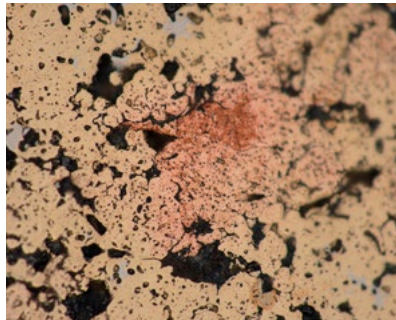
With conventional metallurgical microscopes, focusing, observation positioning, and other adjustments are difficult to perform but the VHX-X1 Series allows for these tasks to be automated.



Higher resolution lenses

The lenses have been redesigned from scratch with special features for metallurgical applications, ensuring unparalleled resolution. Clear, high-definition observation is possible even for difficult-to-observe metallic grain boundaries.

The depth composition function—not available with conventional metallurgical microscope systems—also allows for fully focused images even of samples with different heights.



Metal structure (1000×)

NEW

Cast Iron Analysis

The VHX-X1 Series automatically captures analysis of graphite cast iron and non-metallic inclusions compliant with multiple standards, important for analyzing metal structures.

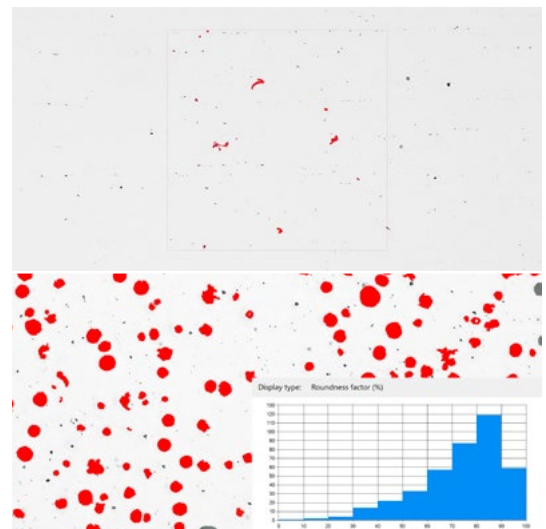
This means analysis can be performed automatically during microscope observation.

Graphite cast iron

JIS G5502
JIS G5505
ISO 945-1
ISO 945-2
ISO 945-4
ISO 16112
ASTM A247
ASTM E2567
GB/T 9441

Non-metallic inclusions

JIS G0555
ISO 4967
GB/T 10561
ASTM E45
DIN 50602



History of the VHX Series (Est. 1990)

Adopted by over 20,000 companies worldwide

KEYENCE's VHX Series Digital Microscope makes observation simple and easy. KEYENCE develops each new model to meet the growing needs of a wide variety of customers and industries. With the goal of developing the ideal digital microscope, we remain dedicated to pursuing the advancement of microscope technology.



VH-6000



VH-6300



VH-7000



VH-8000

1st Generation New design eliminates eye pieces



VHX-500



VHX-600



VHX-900



VHX-1000



VHX-2000

3rd Generation Introduction of high dynamic range (16-bit color gradation)

6th Generation

Introduction of
expandable microscopes

VHX-X1

VHX
DIGITAL MICROSCOPE



VHX-100



VHX-200

2nd Generation

Introduction of 3D observation and measurement



VHX-5000



VHX-6000



VHX-7000



VHX-7000N

4th Generation

Introduction of advanced focus and
lighting techniques

5th Generation

Introduction of 4K ultra-high-accuracy observation

ALL IN ONE

View, capture, and measure with just one system

The VHX-X1 Series offers observation that exceeds conventional imaging tools. With advanced measurement capabilities, this system enables a variety of analyses. Expanded memory capacity also allows for storage of millions of images. The easy-to-use interface allows both expert and novice users to effectively use the system. The VHX-X1 Series is equipped with all of the features needed to enhance your analysis.

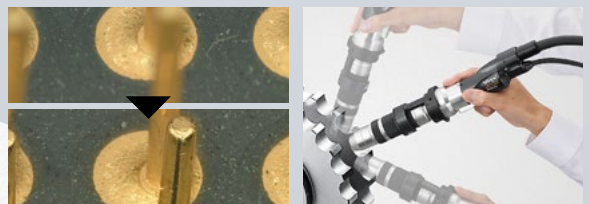


View



Observation with an optimal balance of brightness and clarity

The VHX-X1 Series has a depth of field that is 20 times greater than conventional optical microscopes. KEYENCE designs the lenses, cameras and graphic engine in-house, enabling observation with an optimal balance of depth and brightness. Even novice users can capture high resolution images with ease from any magnification or angle.



Large depth of field

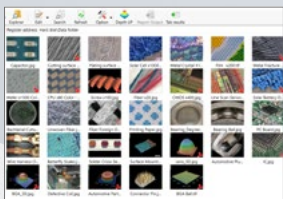
Hand-held observation

Capture

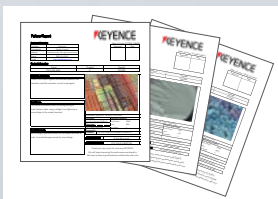


Images can be saved and shared easily

With a 1 TB hard drive, images are easily saved locally. Images can be shared over LAN or a USB drive. Reports can also be automatically created and shared.



Easily save and recall images



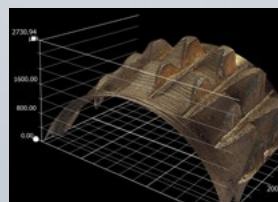
Automatically generate reports

Measure

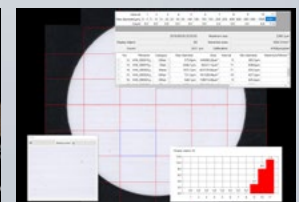


Perform a wide variety of measurements and analyses with just one device

Easily perform 2D and 3D measurements and roughness, contamination, grain sizing, and other analyses with one tool.



3D measurement



Contamination analysis

Fully-integrated head

Motorized lens turret with highest quality lenses

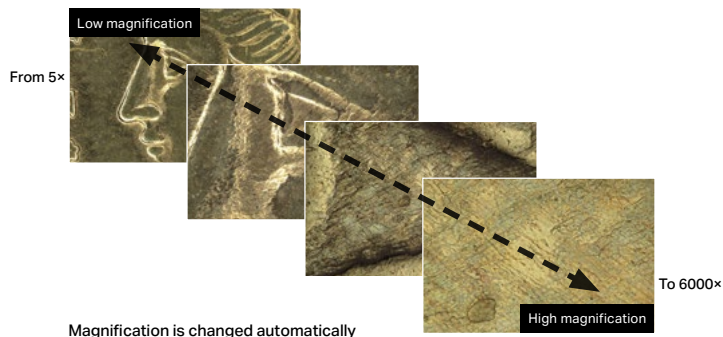
Thanks to a 4K CMOS image sensor and a newly developed optical system, the VHX-X1 Series combines a large depth of field with high resolution. A wide range of observation modes—including brightfield, darkfield, polarization, and Differential Interference Contrast (DIC)—are possible, allowing the system to be used a variety of applications.



Telecentric HR lens with high NA and high resolution*

Combining resolution high enough to support 4K image quality with a large depth of field, these new dedicated lenses for the Fully-integrated head push the envelope of optical performance.

*Excluding the VHX-E00



Automatic magnification change from 5× to 6000×

Observation can be carried out automatically from 5× to 6000× magnification. Magnification-switching can also be carried out quickly using either the mouse or the handheld controller.

High performance camera

Lenses founded on 30 years of history

The diverse lineup of lightweight camera lenses make observation easy for a wide range of targets. All lenses were developed using 30 years of research history and are guaranteed to offer high resolution.



Wide lineup of zoom lenses

A wide variety of zoom lenses with different magnifications and lighting methods are available for observation of virtually any target. All previously manufactured lenses are also supported.



Easy, intuitive operation

With a wide variety of zoom lenses and adapters to choose from, observation is possible regardless of target size or shape, from handheld observation to endoscope- and fiberscope-based observation.

Lighting and Observation Functions

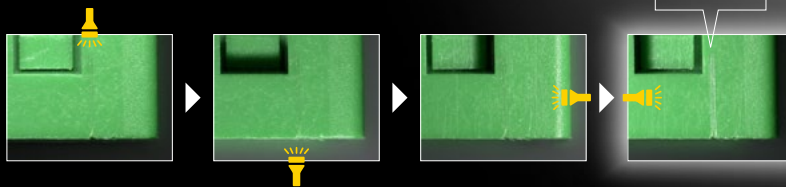
Automatic capturing of optimal lighting settings

Clear visualization of irregularities

NEW Search lighting

Automatic optimization of lighting conditions for easier and faster observation of shapes and flaws with no risk of overlooking even small abnormalities.

Quickly identify abnormalities



Continuous real-time lighting adjustments

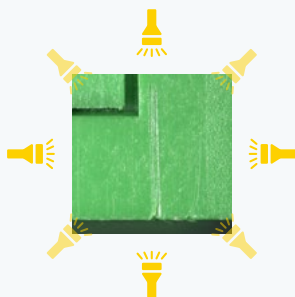
The dynamic lighting capability allows observation with continuous real-time adjustments, ensuring the visibility of microscopic features.

Automatic lighting optimization just by selecting the desired area

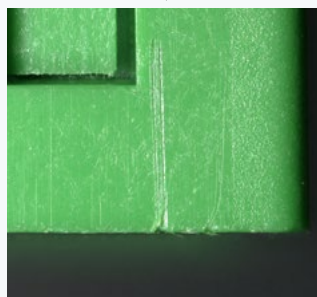
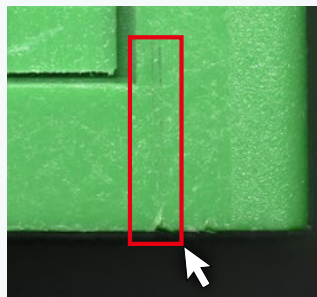
Simply select the area to analyze, and the proprietary Contrast Detect algorithm will instantly set the optimal lighting settings.

Contrast Detect Algorithm

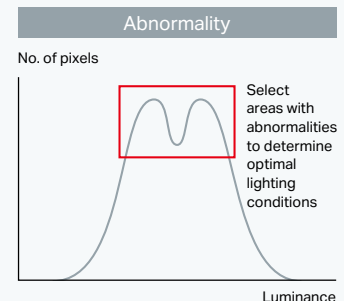
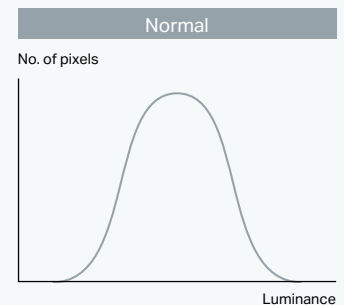
By continuously capturing the luminance changes for each pixel, the VHX-X1 Series can identify abnormal conditions and automatically select the optimal lighting conditions in real-time.



Lighting direction can be changed in real time.



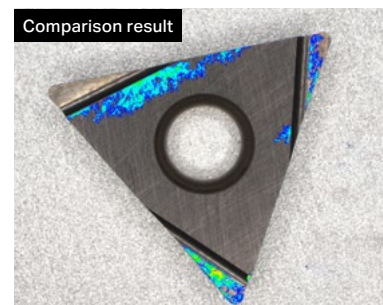
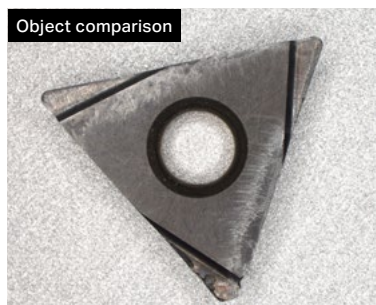
Connector terminal (20×)



Instantaneous, automatic comparison

NEW Highlight Difference

Differentiation based on image brightness and hue is performed by comparing the captured image against registered acceptable product images, with the degree of difference displayable in color. This allows for instantaneous visualization of even minute differences often missed with visual and conventional microscope inspections.

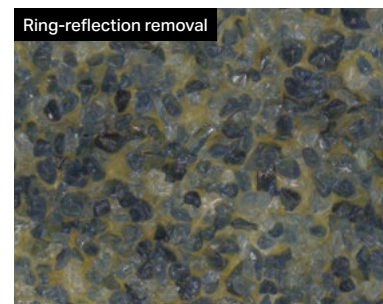
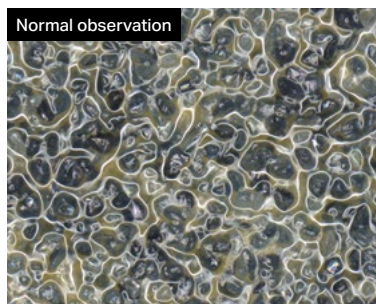


Cutting tool (15×)

Eliminating glare

Ring-reflection removal

By capturing multiple images with different lighting, an image free of glare can be obtained. With conventional systems, removing reflections on a target can be difficult; but the VHX-X1 Series can remove glare at the click of a button.

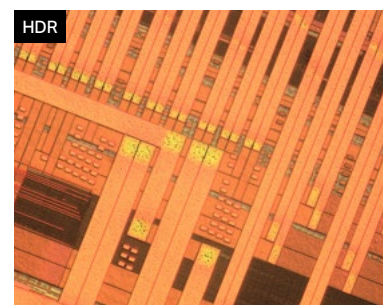
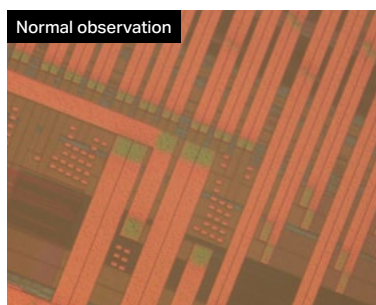


Sandpaper (100×)

Enhanced color and contrast

HDR

The High Dynamic Range (HDR) imaging function captures multiple images at varying shutter speeds to obtain an image with high color gradation. This enables observation at previously unattainable levels of accuracy and contrast.



IC pattern (500×)

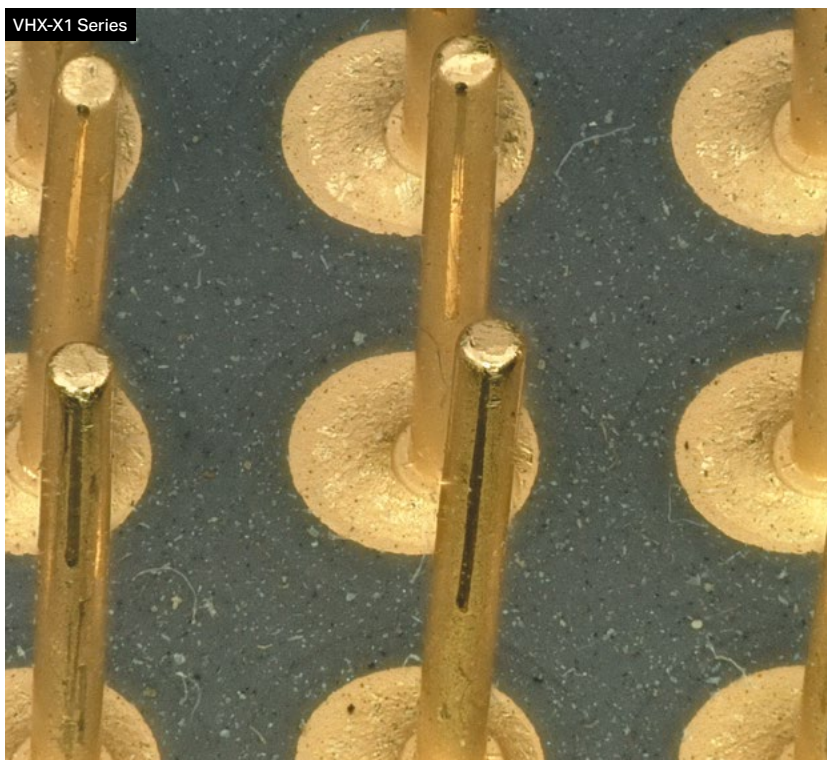
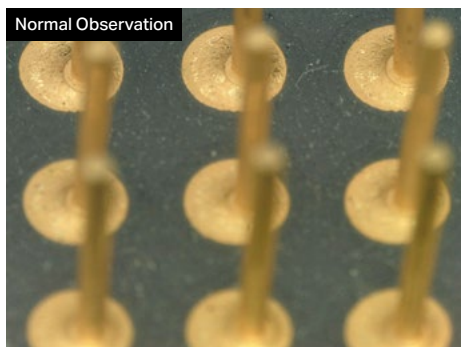
Depth Composition and Image Stitching

Fully focused observation of targets

Impressive depth of field

Take advantage of a depth of field that is 20 times greater than conventional optical microscopes. Depth of field is one of the fundamental features of a microscope that can greatly influence image quality and ease of operation.

KEYENCE designed the lenses, camera, and graphics engine of the VHX-X1 Series for observation with an optimal balance of depth of field and brightness.



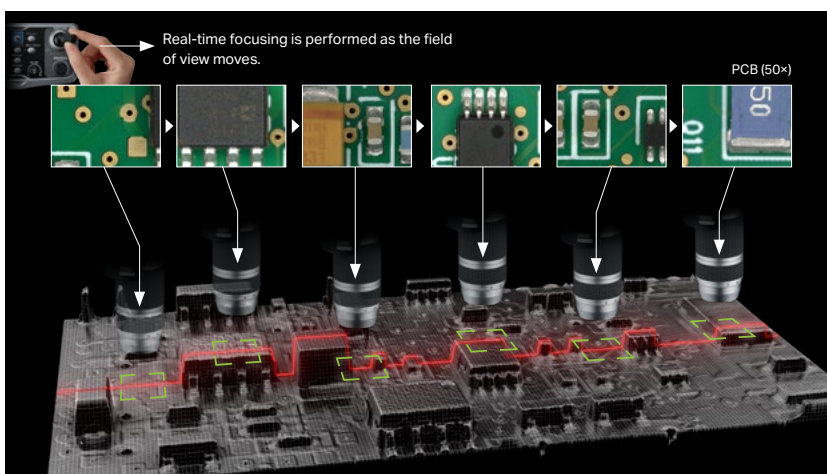
Real-time in-focus imaging

NEW Focus tracking

The lens automatically adjusts focus in real-time according to the uneven surface of the target, eliminating the need for manual focus adjustment which can be difficult with conventional systems.

Focus tracking algorithm

The VHX-X1 Series uses the movement of the XY stage and the 3D shape of the target to predict the observation point and its height, while KEYENCE's ultra-high-speed auto focus system keeps the target in focus.



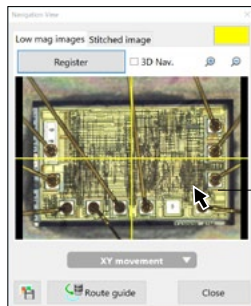
Fully focused imaging anywhere

Depth composition (2× faster than previous models)

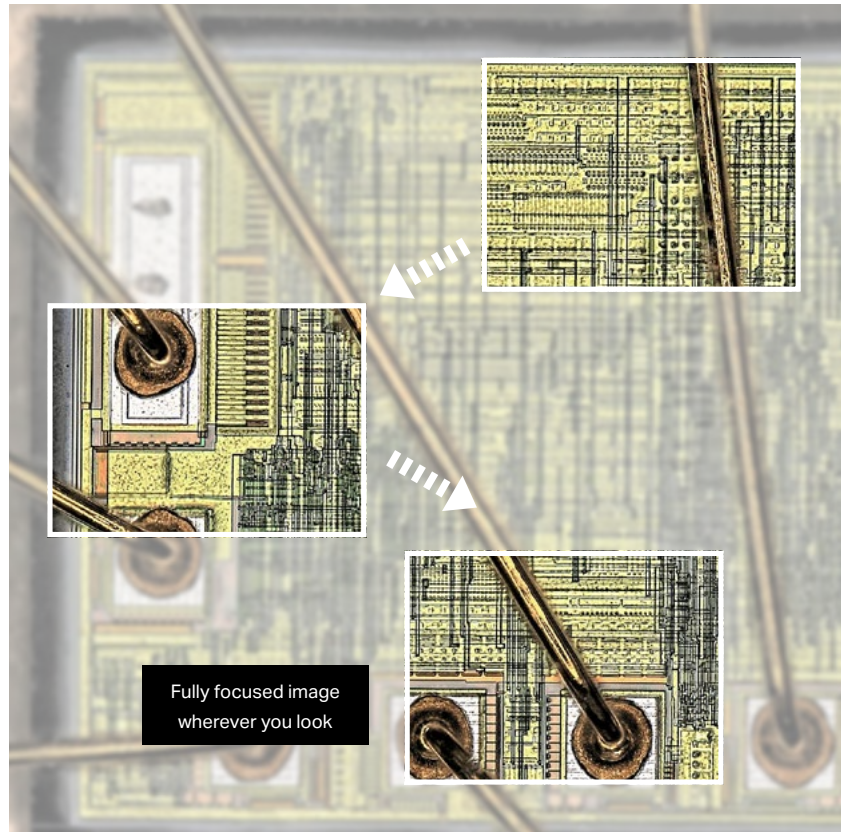
The VHX-X1 Series uses Fast Accurate D.F.D. to capture fully-focused images at any magnification and at 2 times the speed of conventional systems, even at 4K resolutions.

Real-time composition interface

Simply click the desired area on a navigation image of the target, and the stage will automatically move to the selected location and perform depth composition until the area is in focus, drastically reducing the time and effort required for observation.



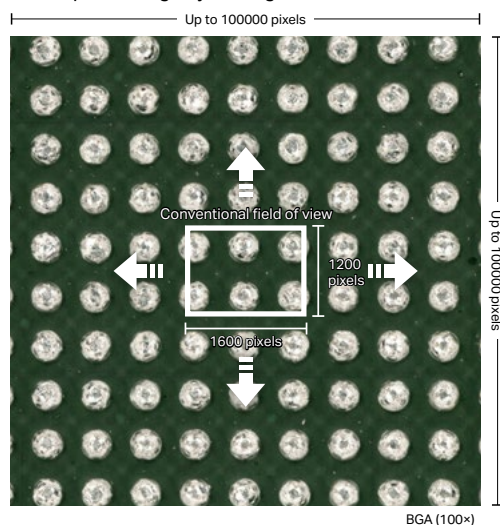
In the Navigation window (wide field, low magnification), click on the area to view.



Wider observation area even at high magnification

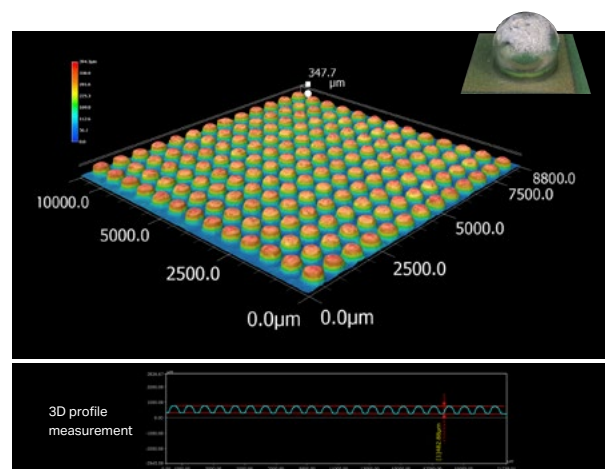
Ultra-high-speed image stitching

When you press the Image Stitching button, the image is automatically stitched together, providing an overall view of the target while preventing any misalignment.



3D image stitching

By capturing multiple images while the stage is moving, 3D data capture and stitching can be performed simultaneously. This makes it possible to view and analyze the overall contours of the target.



Measurement Functions

Easy and accurate measurement of targets

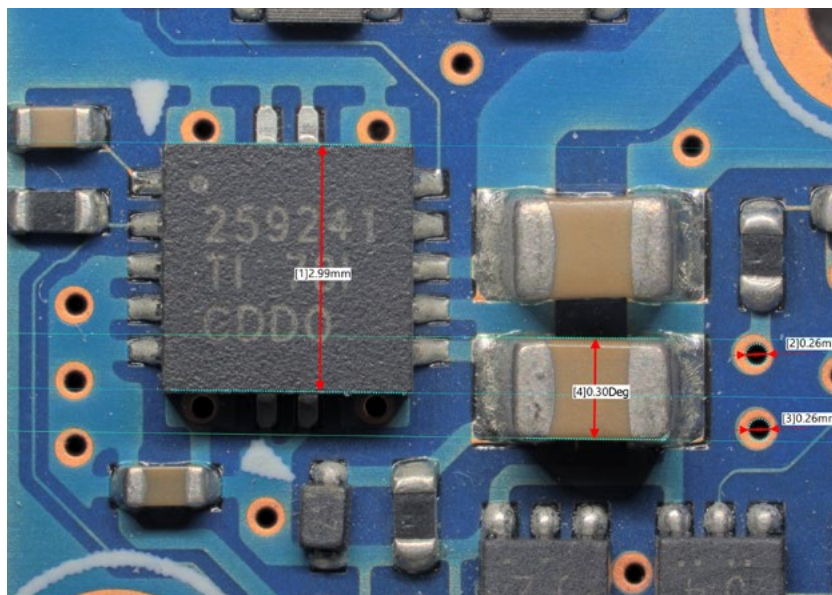
A variety of easy-to-use, accurate measurement functions

2D measurement

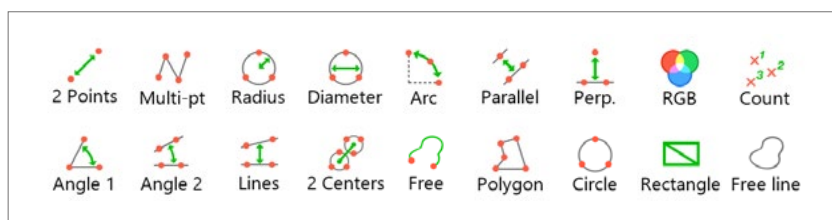
Using simple mouse operations, a wide range of measurements—including distance between 2 points, angle, diameter, parallel lines, and area—can be performed on the screen in real time. Once the image has been saved, additional features can be measured at a later time. With the free remote analysis software, anyone can use the 2D measurement functions with ease on their own PC.

Wide variety of measurement tools

The VHX-X1 Series includes 18 basic measurement tools plus 11 advanced measurement tools.



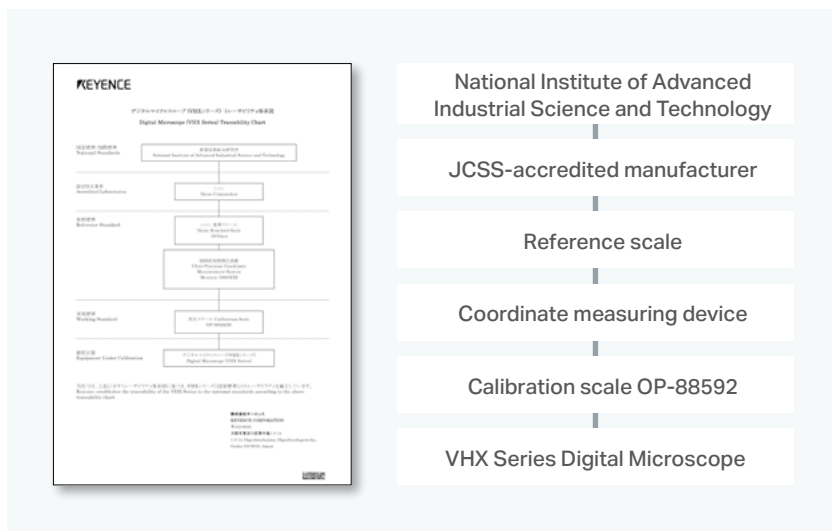
PCB (20x)



A traceability system compliant with national standards

Guaranteed measurement accuracy

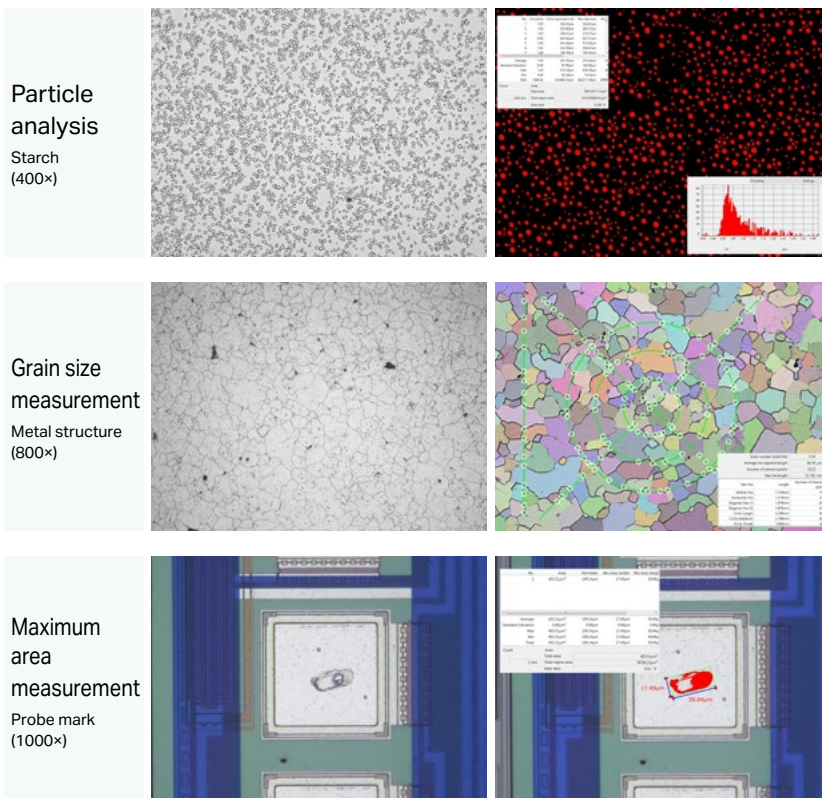
The VHX-X1 Series traceability system diagram conforms to national standards for guaranteed measurement accuracy from low to high magnification.



Fully automatic advanced image analysis

Automatic measurement/ count

Area measurements and counts can be carried out easily within a specified range on the target. Targets that are not required can even be excluded, and overlapping targets can also be separated. Even when performed by novice users, the operation will still yield highly accurate analysis results.



Automatic calibration

One-push calibration

Simply installing a dedicated scale and performing a one-click operation automatically calibrates each lens. The simplicity of the operation means accurate calibration can be carried out correctly even by novice users.



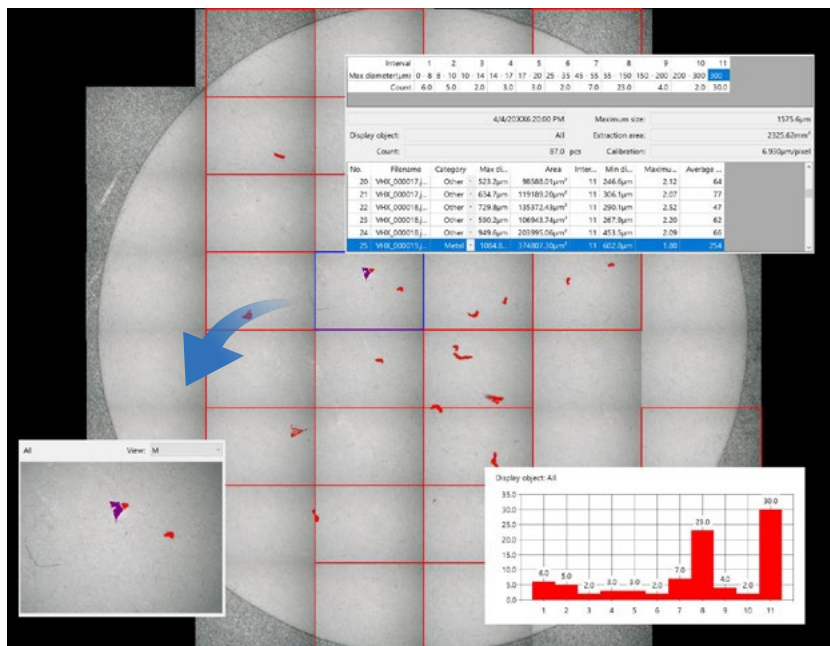
Measurement Functions

Automatically capture accurate results with complex measurements for all users

Contamination analysis compliant with ISO 16232 and VDA 19

Contamination analysis

The VHX-X1 Series is capable of contamination analysis compliant with ISO 16232 and VDA 19 cleanliness inspection standards covering the automotive industry. The large depth-of-field images captured at high resolution can be analyzed for accurate measurement even for targets with an uneven surface. The analysis algorithm has also been revised for even faster processing speeds.



Membrane filter (50x)

Detailed Analysis mode

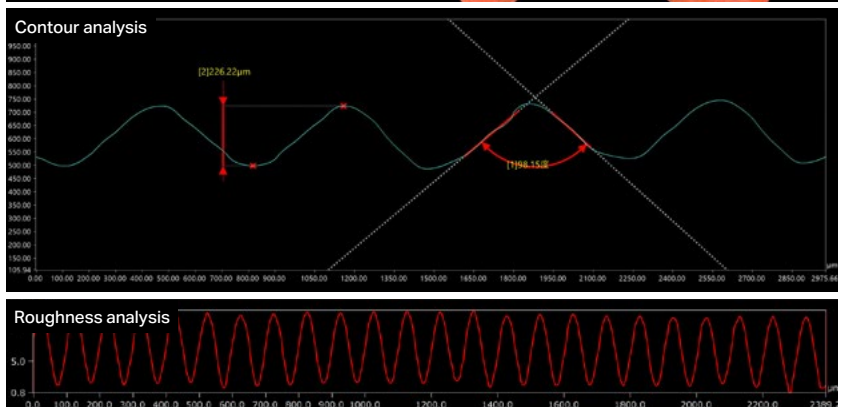
When a particular contamination area is selected on an image of the whole filter, the stage automatically moves to that area. The magnification can be increased instantly to allow detailed observation, simplifying the process of identifying foreign particles and making the operation more efficient. This mode can also be used for depth composition and 3D height measurement.



Easy measurement of everything from 3D contours to surface roughness

3D measurement

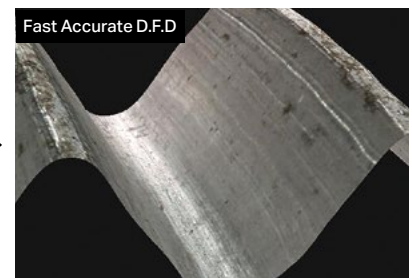
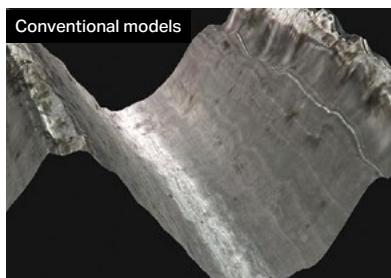
Even when the target has an uneven surface, a fully-focused image is obtained instantly, composed from multiple images with varying focus positions. Additionally, the 3D display can be used to observe surface contours and roughness.



Screw threads (100×)

High-accuracy 3D conversions using KEYENCE's Fast Accurate D.F.D. method

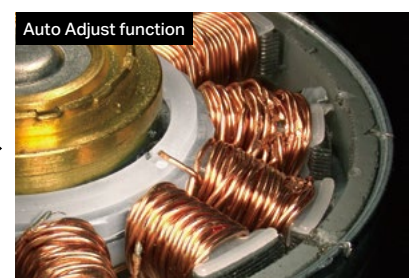
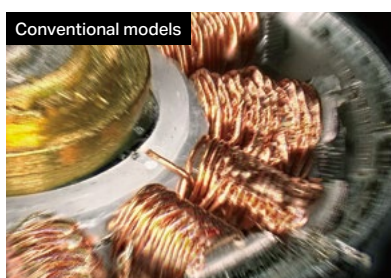
KEYENCE's Fast Accurate D.F.D. method estimates height based on subtle variations in texture to create a 3D image, with areas of poor texture being treated as noise, allowing for even higher accuracy imaging.



Threads (100×)

Auto Adjust function for depth composition even when imaging at an angle

When images are captured, the Auto Adjust function automatically compensates for the edge displacement and vibration that can occur during image capture. The system then goes on to construct a highly comprehensive, fully focused image. This composition can even include images captured at an angle.



Coil (20×)

Recording Functions

Captured parameters saved with the image

Data can be recorded at the touch of a button and shared instantly

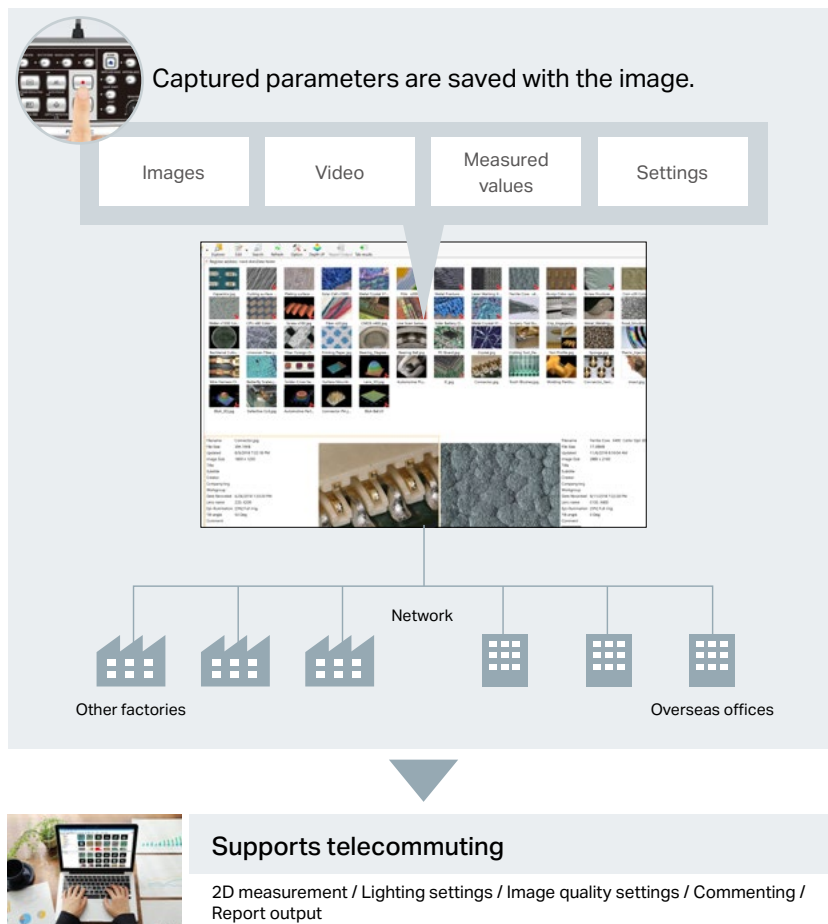
Saving data

Images, measurement results, observation conditions, and other data are saved whenever the Capture button is pressed during observation. Also, by connecting the VHX to a network, you can share data throughout your company, making the system even more useful.

Remote and local operations

Remote analysis software

The remote analysis software makes it possible to analyze and edit data captured at a remote location. The software is also license-free and can be used on multiple PCs.



Automatic capturing of lighting data from every direction

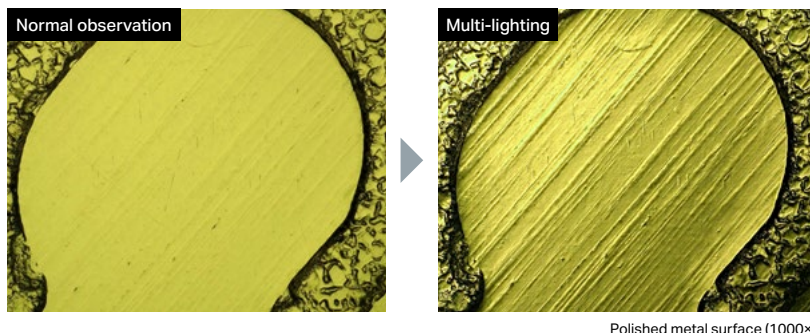
Multi-lighting

With the Multi-lighting function, omnidirectional lighting data is captured at the click of a button. The image most suitable for observation can then be selected from this data. This eliminates the need to endlessly adjust the lighting settings to obtain a clear image.

Flexible lighting changes even after recording

Because lighting data is retained with the saved image, the lighting can be changed by using the mouse to move the lighting icon.

Lighting can be changed even after data is saved to a PC.



Polished metal surface (1000X)

Simplified report creation

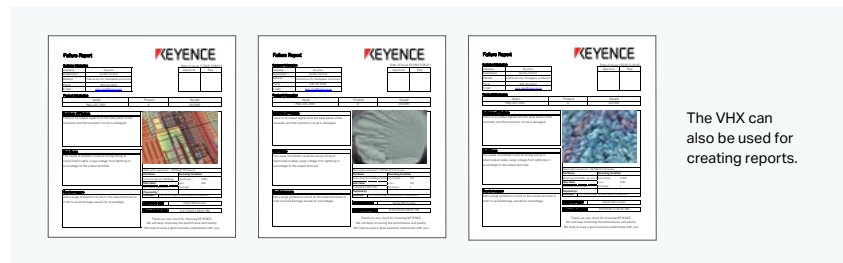
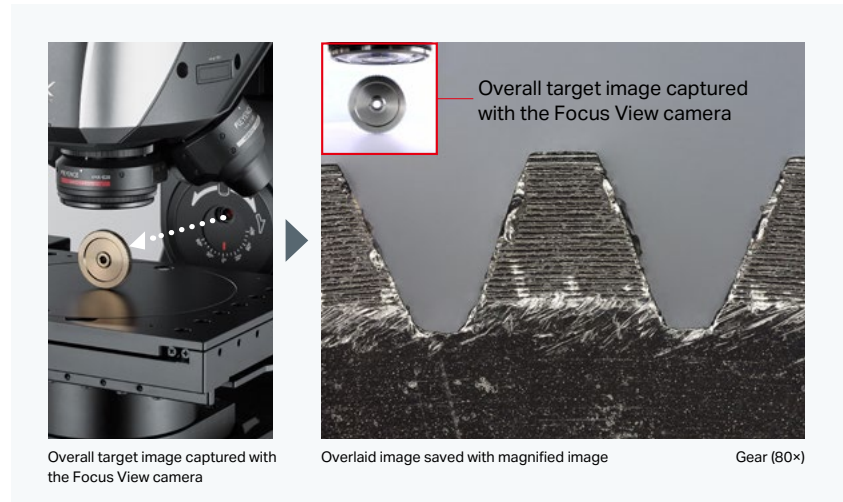
Overlay image capturing

Images from the Focus View camera and navigation screen can be overlaid on the observation image. This makes it possible to view both the overall image of the target and the magnified observation image in a single data set.

Report function

Excel and Word* applications can be installed on the VHX, just as with a PC, for easy report creation. The report function can be used to output up to 100 files, including images, capture time and lens magnification data, and measurement results.

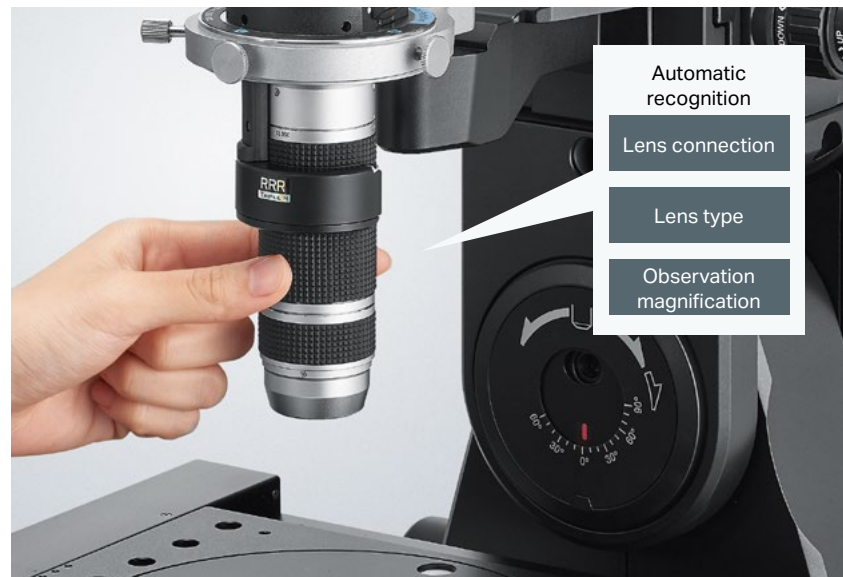
*Excel and Word are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.



Automatic recording of measurement magnification data

Automatic magnification recognition

Magnification must be accounted for when making measurements, so the magnification needs to be selected correctly for observation. To eliminate errors, the VHX recognizes the magnification automatically. It also identifies the connected lens and increases measurement accuracy by compensating accordingly.

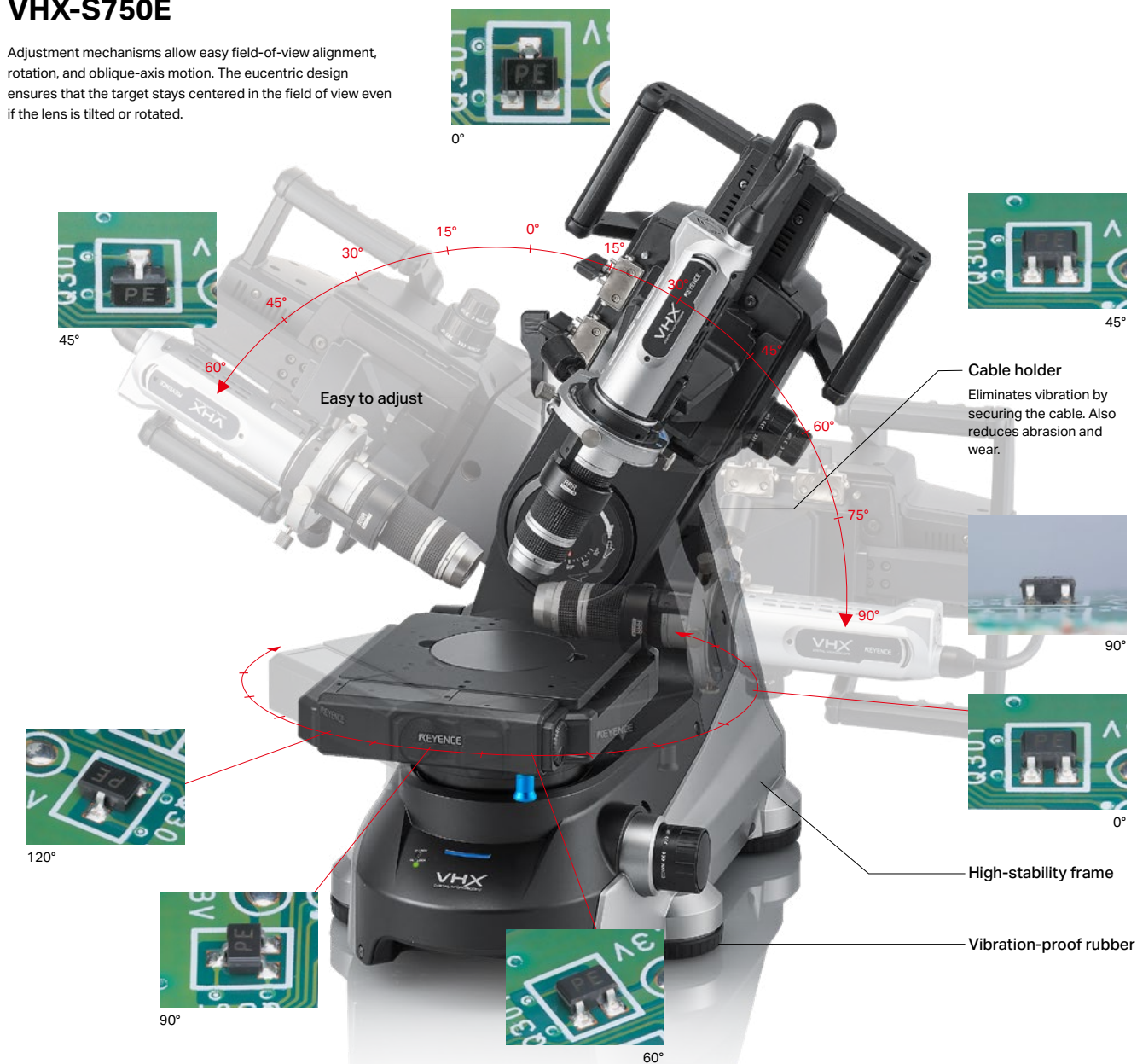


Stage

Versatile stage system accommodates a wide range of targets

Free-Angle Observation System with High-Accuracy XYZ Motorized Stage VHX-S750E

Adjustment mechanisms allow easy field-of-view alignment, rotation, and oblique-axis motion. The eucentric design ensures that the target stays centered in the field of view even if the lens is tilted or rotated.



LED transmitted illumination

LED-transmitted illumination is provided as standard, enabling clear observation from low to high magnification.



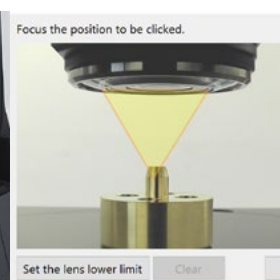
Rotation sensor

The built-in rotation sensor identifies the rotation position from the stage, so that even when rotated, the stage moves in the direction shown on the screen.



Focus view

The Focus View function enables simultaneous observation of the lens and target. Thanks to the intuitive software interface, focusing can be carried out easily with just a click.



300 × 300 mm 11.81" × 11.81"
Ultra-large XYZ Stage

VHX-SL1F/SL1B NEW

This ultra-large 300 × 300 mm 11.81" × 11.81" motorized stage was designed to meet the need for larger observation and measurement ranges, and to accommodate large samples.



100 × 100 mm 3.94" × 3.94"
Large XYZ Motorized Stage

VHX-S770E

Take advantage of KEYENCE's 100 × 100 mm 3.94" × 3.94" XYZ motorized large-scale stage for free-angle observation.



Special-purpose stages*

In response to customer requests, the VHX-X1 Series is compatible with various special stages. Image stitching and stage position identification are still possible even with special-purpose stages, allowing for use with an even wider variety of targets.

Flexible arm/large-scale stage



Inspection stages for large PCBs, solar batteries, glass, etc.



Automatic inspection system with robotic arm



Large Cylindrical Measuring Stage



*The special-purpose stages shown are not KEYENCE products.

Lens

Continuously evolving lineup of KEYENCE optical lenses

VHX-7100



Fully-integrated head and lens for the highest image quality at magnifications between 5× to 6000×

Fully-Integrated Head VHX-7100

With five dedicated objective lenses and built-in lighting (motorized aperture), this unit combines high (NA 0.9) resolution with a large depth of field and is designed for even more outstanding operability.

High-Resolution (HR) Lenses

High-Resolution, Ultra-Low-Magnification Objective Lens

5 ▶ 20

VHX-E00 NEW

Model		VHX-E00				
Magnification		5×	7×	10×	15×	20×
Field of View (mm/inch)	Horizontal	61.00 2.40"	42.80 1.69"	30.50 1.20"	20.00 0.79"	15.24 0.60"
	Vertical	45.50 1.79"	32.10 1.26"	22.80 0.90"	15.00 0.59"	11.40 0.45"
	Diagonal	76.20 3.00"	53.50 2.11"	38.10 1.50"	25.00 0.98"	19.05 0.75"
Working distance (mm/inch)		56.5 2.22"				

High-Resolution, Medium-Magnification Objective Lens

100 ▶ 500

VHX-E100

Telecentric lens

Model		VHX-E100					
Magnification		100×	150×	200×	300×	400×	500×
Field of view (mm inch)	Horizontal	3.05 0.12"	2.03 0.080"	1.52 0.06"	1.02 0.040"	0.76 0.03"	0.61 0.024"
	Vertical	2.28 0.09"	1.52 0.06"	1.14 0.045"	0.76 0.03"	0.57 0.022"	0.46 0.018"
	Diagonal	3.81 0.15"	2.54 0.10"	1.91 0.075"	1.27 0.05"	0.95 0.037"	0.76 0.03"
Working distance (mm inch)		24 0.94"					

High-Resolution, Maximum-Magnification Objective Lens

2500 ▶ 6000

VHX-E2500

Telecentric lens

Model		VHX-E2500			
Magnification		2500×	4000×	5000×	6000×
Field of view (mm inch)	Horizontal	0.12 0.005"	0.08 0.003"	0.06 0.0024"	0.05 0.0020"
	Vertical	0.09 0.0035"	0.06 0.0024"	0.05 0.0020"	0.04 0.0016"
	Diagonal	0.15 0.006"	0.1 0.0039"	0.08 0.003"	0.06 0.0024"
Working distance (mm inch)		1 0.04"			

High-Resolution, Low-Magnification Objective Lens

20 ▶ 100

VHX-E20

Telecentric lens

Model		VHX-E20					
Magnification		20×	30×	40×	50×	80×	100×
Field of view (mm inch)	Horizontal	15.24 ^{0.60}	10.16 ^{0.40}	7.62 ^{0.30}	6.10 ^{0.24}	3.81 ^{0.15}	3.05 ^{0.12}
	Vertical	11.40 ^{0.45}	7.60 ^{0.30}	5.70 ^{0.22}	4.56 ^{0.18}	2.85 ^{0.11}	2.28 ^{0.09}
	Diagonal	19.05 ^{0.75}	12.70 ^{0.50}	9.53 ^{0.38}	7.62 ^{0.30}	4.76 ^{0.19}	3.81 ^{0.15}
Working distance (mm inch)		30 1.18" (22.9 0.90 ^{mm})					

*1 When OP-88323 is mounted

High-Resolution, High-Magnification Objective Lens

500 ▶ 2500

VHX-E500

Telecentric lens

Model		VHX-E500					
Magnification		500×	700×	1000×	1500×	2000×	2500×
Field of view (mm inch)	Horizontal	0.61 0.024"	0.44 0.017"	0.31 0.012"	0.20 0.008"	0.15 0.006"	0.12 0.005"
	Vertical	0.46 0.018"	0.33 0.013"	0.23 0.009"	0.15 0.006"	0.11 0.0043"	0.09 0.0035"
	Diagonal	0.76 0.03"	0.54 0.021"	0.38 0.015"	0.25 0.010"	0.19 0.007"	0.15 0.006"
Working distance (mm inch)		6.3 0.25"					

VHX-E00 NEW



VHX-E20



VHX-E100



VHX-E500



VHX-E2500



High-Resolution Revolver Lens VHX-ZMT NEW

100 ▶ 2000

Specialty lens for metallurgical applications

With four objective lenses available, high-resolution observation is possible at magnifications of 100×, 200×, 400×, and 1000×. Magnifications of 2000× are also possible when using a high-magnification lens, the VHX-ZM2000.

Model	VHX-ZMT					VHX-ZM2000
Magnification*	100×	200×	400×	1000×		2000×
Field of view (mm inch)	Horizontal	3.05 0.12"	1.52 0.06"	0.76 0.03"	0.31 0.012"	0.15 0.006"
	Vertical	2.28 0.09"	1.14 0.05"	0.57 0.02"	0.23 0.009"	0.11 0.004"
	Diagonal	3.81 0.15"	1.91 0.08"	0.95 0.037"	0.38 0.015"	0.19 0.007"
Working distance (mm inch)	20 0.79"	11 0.43"	3 0.12"	1 0.039"	0.94 0.037"	

* Magnification on a 15-inch monitor with a 1/2-inch CCD camera.

Dual-Objective zoom lens VH-ZST

20 ▶ 2000

Allows observation at magnifications from 20× to 2000× without changing lenses

Take advantage of a wide magnification range without the need to change lenses. Observation can be tailored to the target using mixed lighting with main-unit control, or versatile lighting using various optical adapters.*2

Model	VH-ZST						
Magnification*1	20×	100×	200×	500×	1000×	2000×	
Field of view (mm inch)	Horizontal	15.24 <i>0.60"</i>	3.05 <i>0.12"</i>	1.52 <i>0.06"</i>	0.61 <i>0.024"</i>	0.30 <i>0.012"</i>	0.15 <i>0.006"</i>
	Vertical	11.4 <i>0.45"</i>	2.28 <i>0.09"</i>	1.14 <i>0.04"</i>	0.46 <i>0.018"</i>	0.23 <i>0.009"</i>	0.11 <i>0.004"</i>
	Diagonal	19.05 <i>0.75"</i>	3.81 <i>0.15"</i>	1.91 <i>0.08"</i>	0.76 <i>0.03"</i>	0.38 <i>0.015"</i>	0.19 <i>0.007"</i>
Working distance (mm inch)	15 <i>0.59"</i>						

*1 Magnification on a 15-inch monitor with a 1/2-inch CCD camera.

*2 Because of the flared shape, coaxial illumination undergoes circular polarization.



VHX-ZM2000





Long-Working-Distance, High-Performance Zoom Lens VH-Z50T

50 ▶ 500

Long-range lens with an observation distance of 85 mm **3.35"**

Perform observation at high magnification farther away from the target. KEYENCE's long-range lens enables observation on areas that were previously inaccessible.

Model	VH-Z50T					
Magnification*	50×	100×	200×	300×	400×	500×
Field of view (mm inch)	Horizontal	6.10 0.24"	3.05 0.12"	1.52 0.06"	1.02 0.040"	0.76 0.03"
	Vertical	4.56 0.18"	2.28 0.09"	1.14 0.045"	0.76 0.03"	0.57 0.022"
	Diagonal	7.62 0.30"	3.81 0.15"	1.91 0.08"	1.27 0.050"	0.95 0.037"
Working distance (mm inch)	85 3.35"					

* Magnification on a 15-inch monitor with a 1/2-inch CCD camera.



High-Performance, Low-Range Zoom Lens VH-Z00R/Z00T

0.1 ▶ 50

Handles everything from entire-target images to enlarged detail

With a magnification range from 0.1× to 50×, this lens allows observation of anything from an entire-target image to enlarged detail. Featuring click-style magnification adjustment, an aperture mechanism, and an observation distance upwards of 95 mm **3.74"**, this macro lens delivers high performance and excellent operability.

Model	VH-Z00R/Z00T						
Magnification*	0.1×	0.5×	1×	5×	10×	30×	50×
Field of view (mm inch)	Horizontal	3200 125.98"	640 25.20"	320 12.60"	61 2.40"	30.5 1.20"	10.2 0.40"
	Vertical	2400 94.49"	480 18.90"	240 9.45"	45.5 1.79"	22.8 0.90"	7.6 0.30"
	Diagonal	4000 157.48"	800 31.50"	400 15.75"	76.2 3.00"	38.1 1.50"	12.7 0.50"
Working distance (mm inch)	Approx. 7700	Approx. 1500	Approx. 720	95 3.74"			
	303.15"	59.06"	28.35"				

* Magnification on a 15-inch monitor with a 1/2-inch CCD camera.



Ultra-Small, High-Performance Zoom Lens VH-Z20R/Z20T

20 ▶ 200

Delivers high resolution in a compact package

The VH-Z20R/Z20T utilizes an improved depth of field to deliver high-resolution observation at magnifications of 20× to 200×, making it ideal for general-purpose use.

Model	VH-Z20R/Z20T					
Magnification*1	20×	30×	50×	100×	150×	200×
Field of view (mm inch)	Horizontal	15.24 0.60"	10.16 0.40"	6.10 0.24"	3.05 0.12"	2.03 0.080"
	Vertical	11.40 0.45"	7.60 0.30"	4.56 0.18"	2.28 0.09"	1.52 0.060"
	Diagonal	19.05 0.75"	12.70 0.50"	7.62 0.30"	3.81 0.15"	2.54 0.10"
Depth of field (mm inch)*2	34 1.34"	15.5 0.61"	6.0 0.24"	1.6 0.063"	0.74 0.03"	0.44 0.02"
Working distance (mm inch)	25.5 1.00"					

*1 Magnification on a 15-inch monitor with a 1/2-inch CCD camera.

*2 This value is for when the priority is set to depth of field. The depth of field changes depending on the set aperture.



Wide-Range Zoom Lens VH-Z100R/Z100T

100 ▶ 1000

Combines high resolution with ultra-large depth of field

This zoom lens was developed to offer magnified observation with high resolution, combined with a large depth of field.

Model	VH-Z100R/Z100T					
Magnification*1	100×	200×	300×	500×	700×	1000×
Field of view (mm inch)	Horizontal	3.05 0.12"	1.53 0.06"	1.02 0.04"	0.61 0.024"	0.44 0.017"
	Vertical	2.28 0.09"	1.14 0.045"	0.76 0.03"	0.46 0.018"	0.33 0.013"
	Diagonal	3.81 0.15"	1.90 0.07"	1.27 0.050"	0.76 0.03"	0.54 0.021"
Working distance (mm inch)	25 0.98" (20 0.79" *)					

*1 Magnification on a 15-inch monitor with a 1/2-inch CCD camera.

*2 With the triple illumination adapter mounted.



Dual-Light High-Magnification Zoom Lens VH-Z250T

250 ▶ 2500

Switchable coaxial and ring illumination at the touch of a button

This lens allows users to select the lighting that best suits the target while also enabling darkfield observation at magnifications of up to 2500×. Surface conditions, coloring, and other factors can also be observed clearly.

Model	VH-Z250T						
Magnification*	250×	300×	500×	1000×	1500×	2000×	2500×
Field of view (mm inch)	Horizontal	1.22 0.048"	1.02 0.040"	0.61 0.024"	0.31 0.012"	0.2 0.008"	0.15 0.006"
	Vertical	0.92 0.036"	0.76 0.030"	0.46 0.018"	0.23 0.009"	0.15 0.006"	0.11 0.0043"
	Diagonal	1.52 0.060"	1.27 0.050"	0.76 0.030"	0.38 0.015"	0.25 0.010"	0.19 0.007"
Working distance (mm inch)	6.5 0.26"						

* Magnification on a 15-inch monitor with a 1/2-inch CCD camera.



High-Resolution Zoom Lens VH-Z500T

500 ▶ 5000

Observation distance of 4.4 mm **0.17"** throughout a magnification range of 500× to 5000×

With its intelligent approach to 3D display, this zoom lens delivers high resolution and enables observation at up to 5000×, defying the conventional wisdom of microscope observation.

Model		VH-Z500T				
Magnification*		500×	1000×	2000×	3000×	5000×
Field of view (μm)	Horizontal	610	305	152	102	61
	Vertical	457	229	114	76	46
	Diagonal	762	381	191	127	76
Working distance (mm inch)		4.4 0.17"				

* Magnification on a 15-inch monitor with a 1/2-inch CCD camera.

TRIPLER-compliant lenses are fitted with Automatic Lens/Zoom Recognition units.

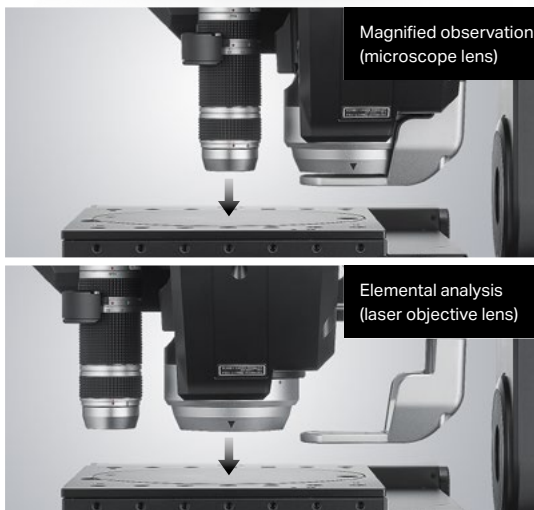
Elemental Analysis

Instantly identify materials at the click of a button

Laser-Based Elemental Analyzer EA-300

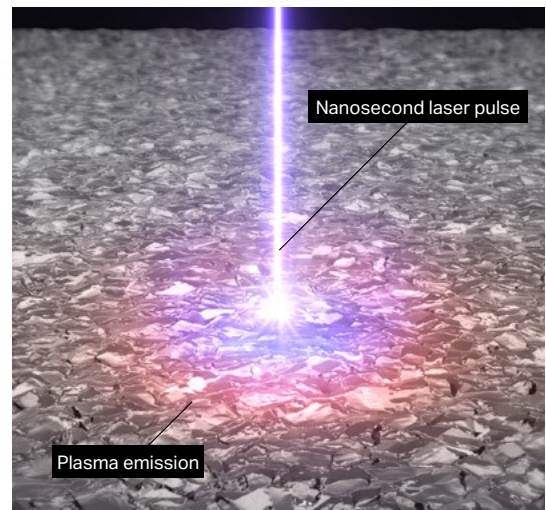


Step 1 Magnified observation



Field of View Alignment function

The Field of View Alignment function allows the microscope lens and laser objective lens to use the same field of view, eliminating the need for alignment and focus adjustment during elemental analysis.



Ultra-high-speed LIBS analysis

The laser turns the target surface into plasma while a broadband (deep UV to near-infrared) high-resolution spectrometer detects the emitted light color. The microscope optics are situated along the same axis to visualize the target area.

Step 2 One-click elemental analysis

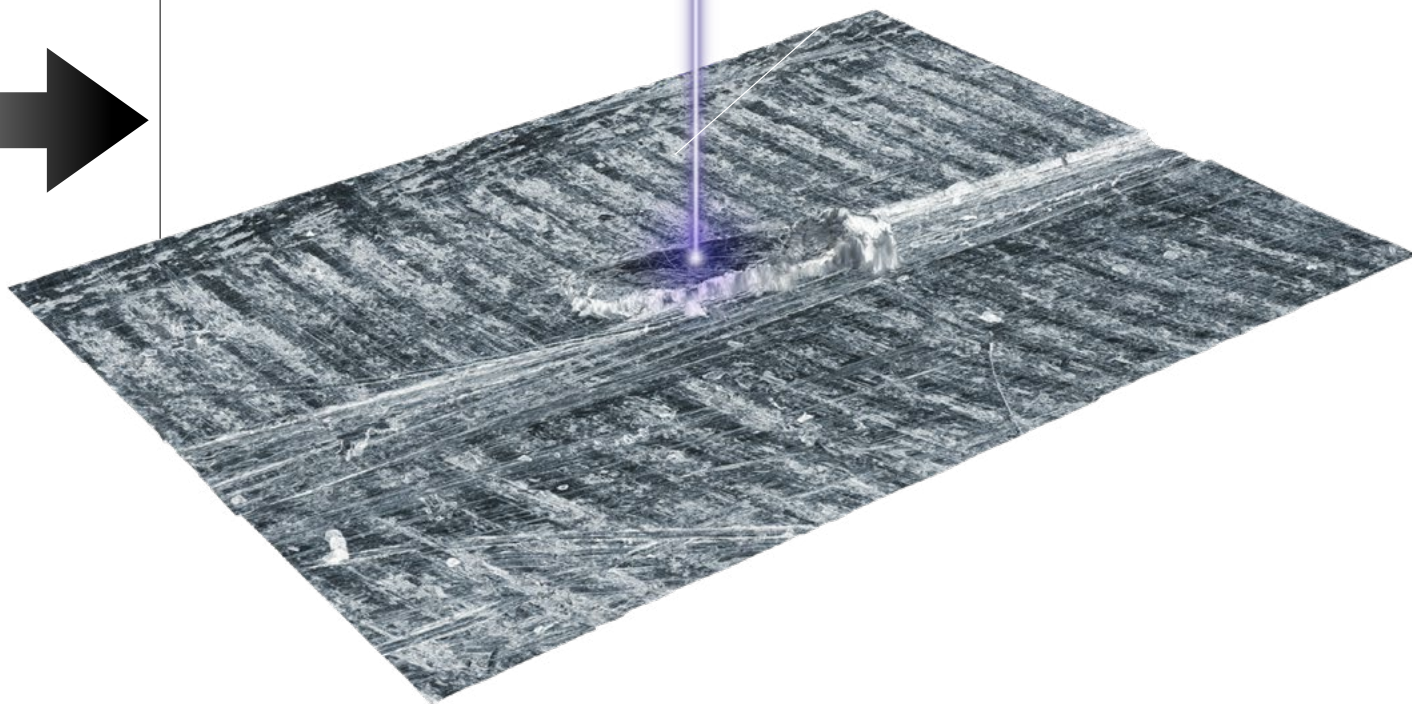
 Start analysis

Analysis result: SUS304

Detected elements: Fe (iron): 72.5%

Cr (chromium): 18.9%

Ni (nickel): 8.6%



Detected Elements	
Fe - Iron	77.1%
Cr - Chromium	15.9%
Ni - Nickel	7.0%

The detected elements are analyzed.

Presumed substance (score order)

Stainless steel > 300 Series > 301

Standard reference

- Stainless steel *
- 300 Series
- 301**
- 304

The most likely material is instantly suggested.

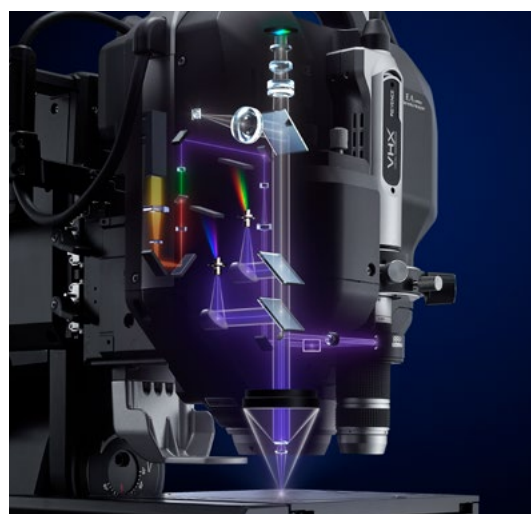
Stainless steel

An alloy of iron and chromium, and nickel may also be added in some cases. Due to its corrosion resistance, it is widely used across facility and equipment components.

Quick DB

AI-Suggest

An integrated database with thousands of elemental patterns enables not only instant identification of detected elements but also suggestions of the most likely material name. This makes it possible for anyone to identify a material instantly with no advanced technical skill required.



Triple optical elemental analysis head

The compact detachable head includes white light, laser, and spectroscopic optical systems. The combination of KEYENCE's proprietary optical, laser, and spectroscopic technologies enables both superior component miniaturization and impressive high performance.

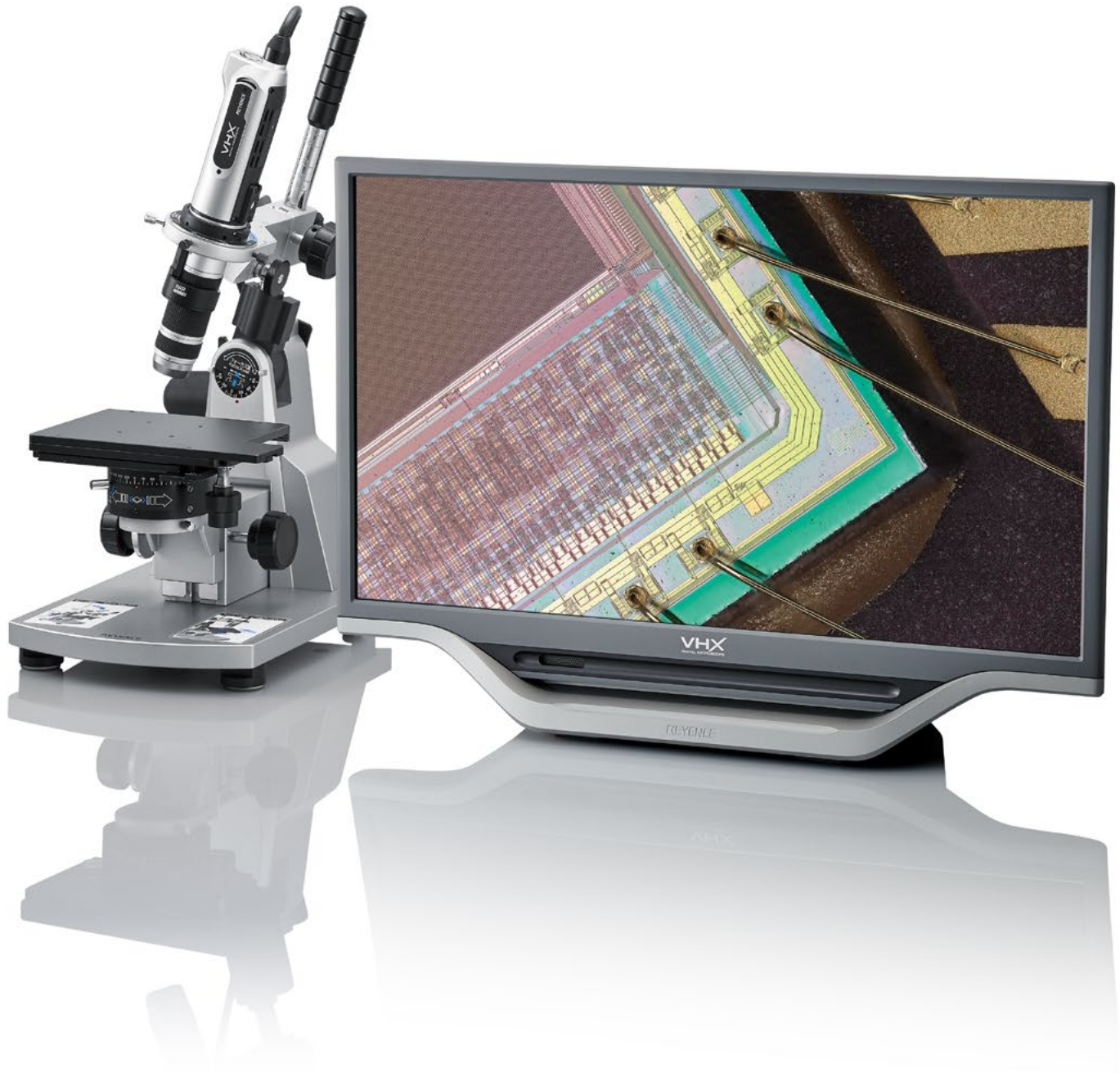
Base Model

Advanced microscope functions in an easy-to-use package

Base Model

VHX-X1F

Easy-to-use functions for viewing, capturing, and measuring make it possible even for novice users to operate the VHX-X1F.



Large depth of field

Take advantage of a depth of field that is 20 times greater than conventional optical microscopes.

Free-angle observation

Tilt and adjust the position of the lens and camera to easily view an object from any angle.

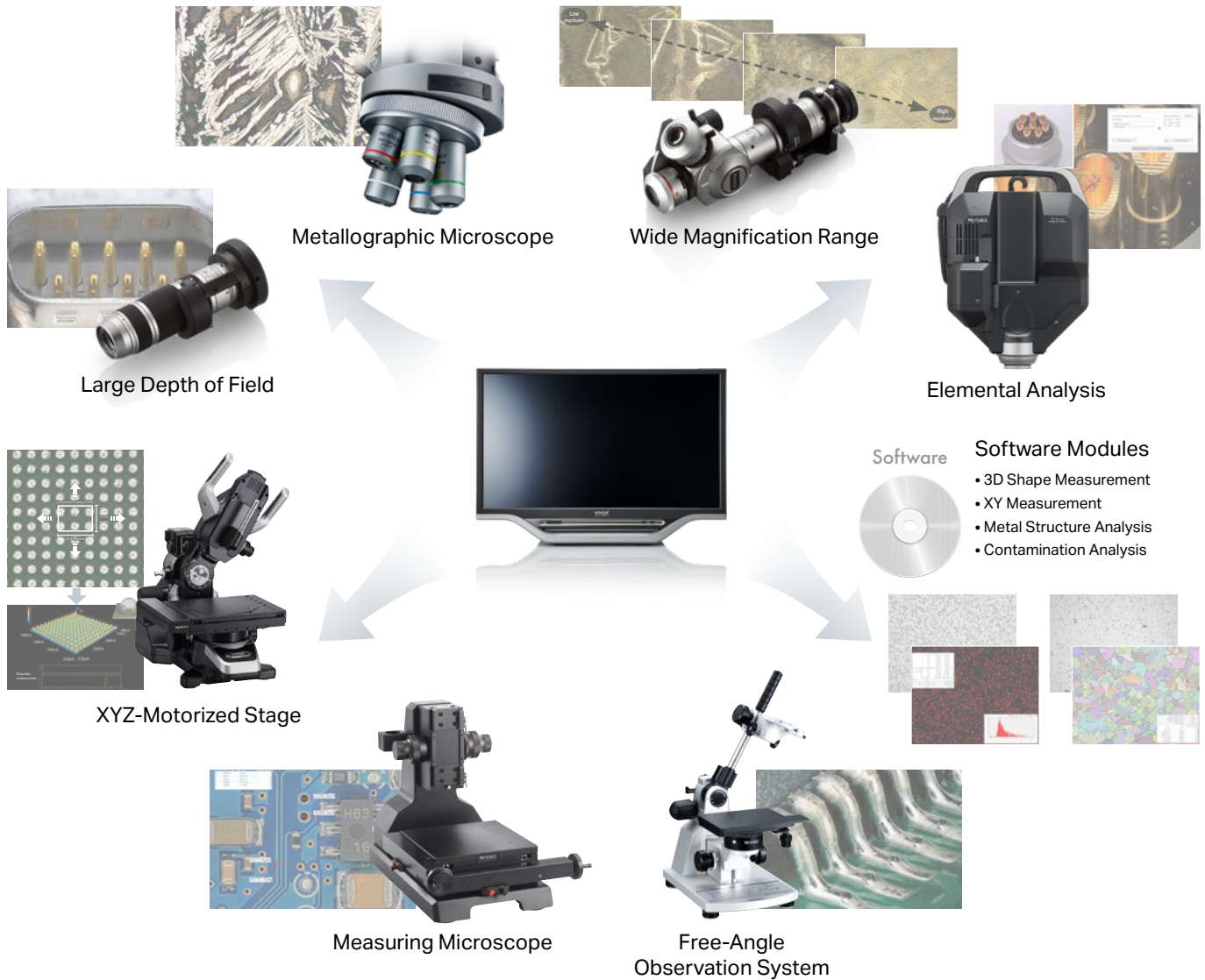
View, capture, and measure with just one device

Utilize advanced tools for observation, image capturing, and measurement—the core functions of the VHX Series.

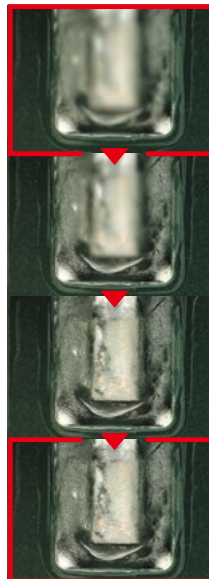
Custom specifications

Choose from a variety of stages and additional software to create a custom device tailored to suit your needs.

Mix-and-match compatibility for handling a variety of applications



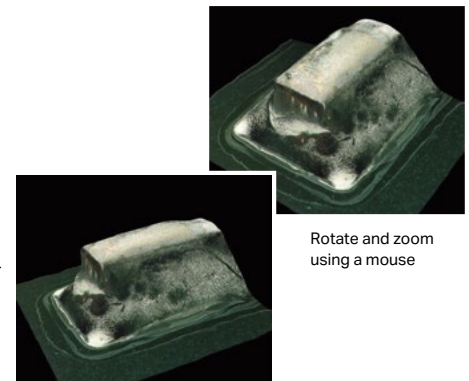
Focus on the lowest area...



"Depth composition" completed

Quick depth composition and 3D display functions

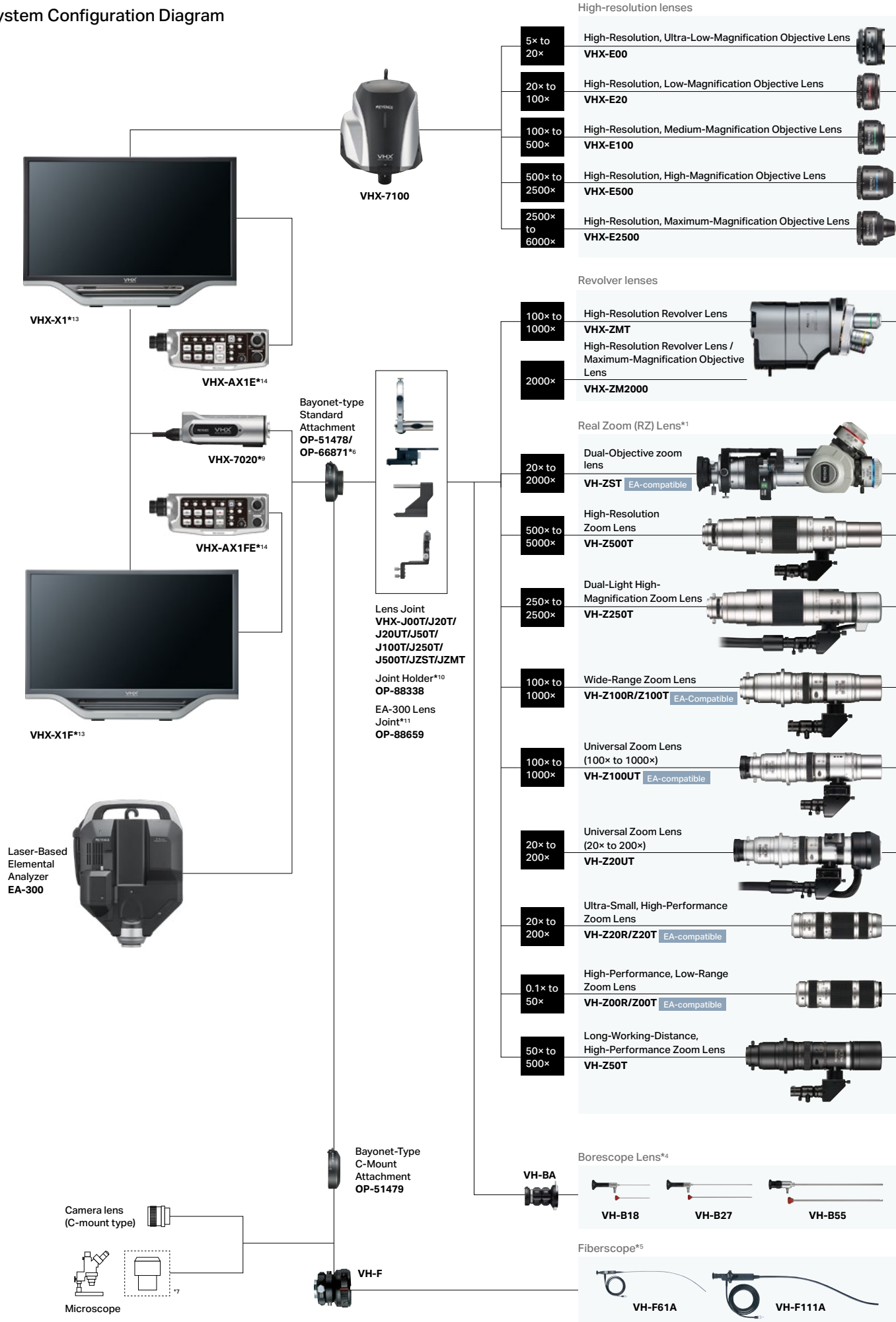
Capture a fully focused image and 3D display in seconds to gain a more complete understanding of an object or surface.

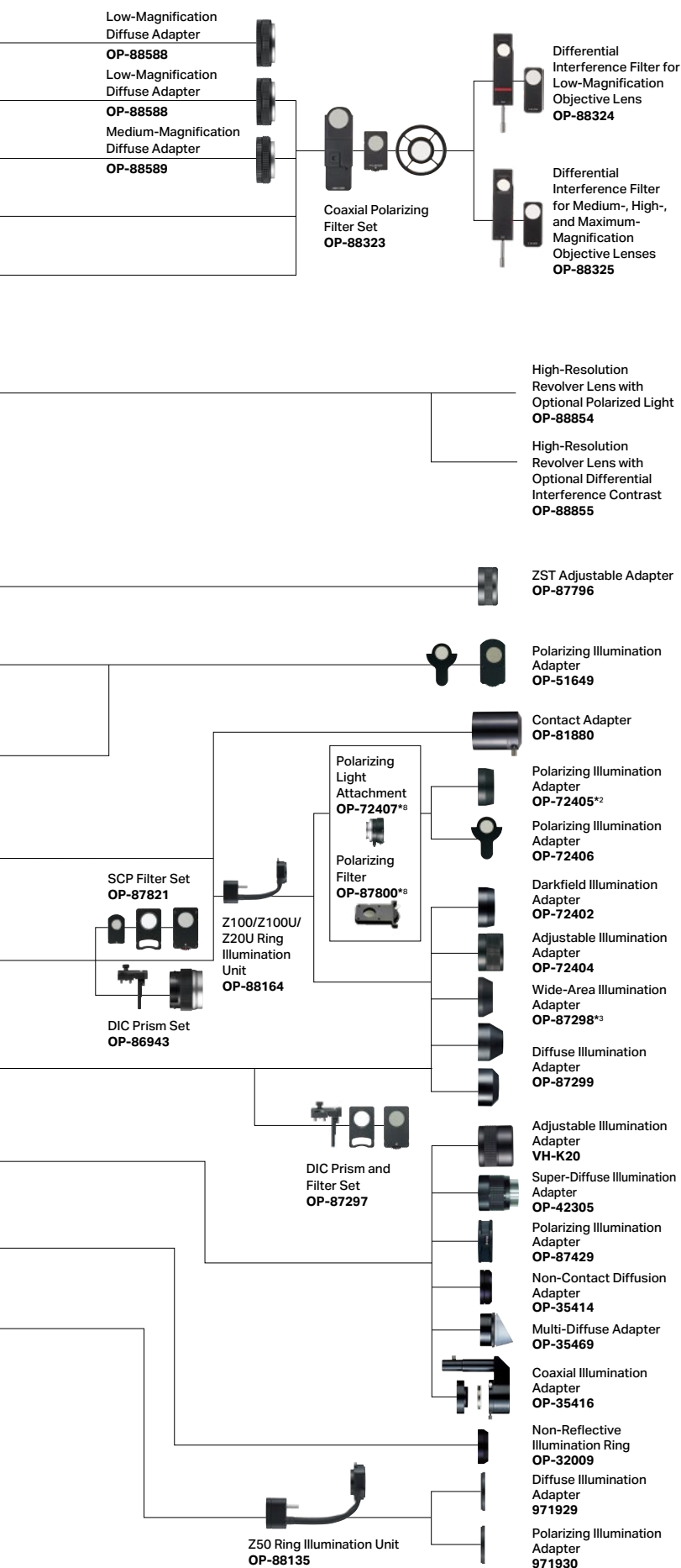


True-to-life 3D display

Rotate and zoom using a mouse

System Configuration Diagram





Stages



Free-Angle Observation System
VHX-S750E

EA-compatible

(XYZ motorized stage, Z motorized focus)



Large Free-Angle Observation System
VHX-S770E

EA-compatible

(XYZ motorized stage, Z motorized focus)



Free-Angle Observation System
VHX-S700

EA-compatible

(Z motorized focus)



Ultra-Large Free-Angle Observation System
VHX-SL1F/SL1B

EA-compatible



Free-Angle Observation System
VHX-S660E

(Large XYZ motorized)

VHX-S650E

(XYZ motorized)

VHX-S600E

(Z motorized)



Free-Angle Observation System
VH-S30F/S30B



VH Lens Mounting Stand
OP-25539

XY Stage
OP-22124



Z-Axis Motorized Stage
VHX-S700F/S600F

(Z motorized head only)



Vibration-Resistant High-Magnification Observation System
VH-S5

Modules, etc.

3D Shape Measurement Module
VHX-H6M

XY Measurement Module
VHX-H4M4

Metal Structure Analysis Software
VHX-H1MA

Contamination Analysis Software
VHX-C1MA



Camera Port Expansion Unit*12
OP-88662

Stand Branch Unit
OP-88590



Calibration Scale
OP-88592

*1 VH-Z00T/Z20T/Z20UT/Z50T/Z100UT/Z100T/Z250T/Z500T/ZST TRIPLE R-compliant lenses are fitted with Automatic Lens/Zoom Recognition units and connection recognition mounts. *2 For coaxial lighting, OP-72407 and OP-72406 are required. *3 Included as standard with the VH-Z20UT. *4 A real-bore cable (OP-87201) is required. *5 The dedicated light guide attachment (OP-88332) is required. *6 When the VH-Z00R or Z20R is used, the OP-66871 is required. *7 A C-mount adapter suitable for the microscope is required. *8 For the VH-Z100R, use the OP-72407. For the VH-Z100T/VH-Z100UT, use the OP-87800. *9 The illumination unit (OP-88329) is required to mount the VH-ZST, VH-Z500T, VH-Z250T, VH-Z100T/Z100UT, VH-Z20UT, or VH-Z50T onto the VHX-7020. *10 When mounting the RZ lens on the VHX-S700/S750E/S770E, the joint holder (OP-88338) is required. *11 When connecting the VH-Z00/Z100/Z100UT to the EA-300, the VH-Z00/Z100 spacer (OP-88661) is required. When connecting the VH-ZST, use the VH-ZST lens joint (OP-88660) as well. *12 Required when using the EA-300/VHX-7100/VHX-7020 at the same time. *13 Separate PC required for installing applications. *14 Models may vary according to the instrument language. (Japanese/English/German/Simplified Chinese/Traditional Chinese/French/Korean/Spanish/Thai/Italian/Czech/Hungarian/Polish).

Basic Functions: Controller

Model		VHX-X1	VHX-X1F
VHX-7020 High performance camera	Image sensor	1/1.8-inch, 3.19-megapixel CMOS image sensor; Total pixels: 2064 (H) × 1554 (V); Virtual pixels: 2048 (H) × 1536 (V)	1/1.8-inch, 3.19-megapixel CMOS image sensor; Total pixels: 2064 (H) × 1554 (V); Virtual pixels: 2048 (H) × 1536 (V)
	Scanning system	Progressive	Progressive
	Frame rate	50 fps (max.)	50 fps (max.)
	Resolution	Standard	2048 (H) × 1536 (V)
		High definition	6144 (H) × 4608 (V)*1
	High dynamic range	16-bit intensity range through RGB data from each pixel	—
	Gain	Manual, Preset	Manual, Preset
	Electronic shutter	Auto, Manual, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/9000, 1/19000	Auto, Manual, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/9000, 1/19000
VHX-7100 Fully-Integrated Head	Supercharge shutter	Can be set in 0.01 s increments from 0.02 to 16 s	Can be set in 0.01 s increments from 0.02 to 16 s
	White balance	Push-set, Manual, Preset (2700K, 3200K, 5600K, 9000K)	Push-set, Manual, Preset (2700K, 3200K, 5600K, 9000K)
	Resolution	Image sensor	1/1.7-inch, 12.22-megapixel CMOS image sensor; Total pixels: 4168 (H) × 3062 (V); Virtual pixels: 4024 (H) × 3036 (V)
		Scanning system	Progressive
		Frame rate	30 fps (max.)
		High speed	2048 (H) × 1536 (V)
	High definition	High-resolution (4K Mode OFF)	2880 (H) × 2160 (V)
		High-resolution (4K Mode ON)	4000 (H) × 3000 (V)
		High definition	12000 (H) × 9000 (V)*1
	High dynamic range	16-bit intensity range through RGB data from each pixel	—
	Gain	Manual, Preset	—
	Electronic shutter	Auto, Manual, 1/30, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000, 1/9000, 1/19000	—
	Supercharge shutter	Can be set in 0.01 s increments from 0.03 to 4 s	—
LCD Monitor	White balance	Push-set, Manual, Preset (2700K, 3200K, 5600K, 9000K)	—
	Back-focus adjustment	Not required	—
	Built-in light source	Type	High-intensity LED
		Service life	40000 hours (reference)
	Size	27-inch color LCD	27-inch color LCD
	Screen size	596.16 (H) × 335.34 (V) mm 23.47" × 13.20"	596.16 (H) × 335.34 (V) mm 23.47" × 13.20"
	Pixel pitch	0.15525 mm (H) × 0.15525 mm (V) 0.01" × 0.01"	0.15525 mm (H) × 0.15525 mm (V) 0.01" × 0.01"
	Number of pixels	3840 (H) × 2160 (V)	3840 (H) × 2160 (V)
Image format	Display colors	Approx. 1.07 billion colors*2	Approx. 1.07 billion colors*2
	Viewing angle	±89° (typical, horizontal), ±89° (typical, vertical)	±89° (typical, horizontal), ±89° (typical, vertical)
	Image format	JPEG (with compression), TIFF (without compression)	JPEG (with compression), TIFF (without compression)
	Observable image size	100000 (H) × 100000 (V) pixels (with stitching)	100000 (H) × 100000 (V) pixels (with stitching)
Power supply	Power voltage	100 to 240 VAC ±10%, 50/60 Hz	100 to 240 VAC ±10%, 50/60 Hz
	Power consumption	250 VA	250 VA
Environmental resistance	Operating ambient temperature	+5 to 40°C +41 to 104°F *3	+5 to 40°C +41 to 104°F *3
	Operating ambient humidity	80% RH or less (no condensation)	80% RH or less (no condensation)
Weight		Approx. 10.8 kg 23.81 lb	Approx. 10.8 kg 23.81 lb
Dimensions (excluding protrusions)		635 (W) × 450 (H) × 132 (D) mm 25.00" × 17.72" × 5.20" (when stored)	635 (W) × 450 (H) × 132 (D) mm 25.00" × 17.72" × 5.20" (when stored)

*1 When using the high-resolution function by means of the motorized stage shift.
*2 8-bit + FRC
*3 For hand-held observation with a standard camera: 5°C to 35°C **41°F to 95°F**

Basic Functions: Stage

Model		VHX-S750E	VHX-S770E	VHX-SL1F/VHX-SL1B	VH-S30F/VH-S30B
XYθ stage	XY stage: Motorized/Manual	Motorized	Motorized	Motorized	Manual
	XY motorized stage motor	2-phase stepping motor	2-phase stepping motor	2-phase stepping motor	—
	XY motorized stage movement speed	10 mm/sec 0.39 in/sec (max.)	20 mm/sec 0.79 in/sec (max.)	40 mm/sec 1.57 in/sec (max.)	—
	XY-stage movement range	±20 mm ±0.79"	±50 mm ±1.97"	±150 mm ±5.91"	X: ±37.5 mm ±1.48" , Y: ±25 mm ±0.98"
	θ rotation angle	±90°	—	—	360°
	XYθ stage size	Top surface: 171 mm × 168 mm 6.73" × 6.61" (Center disc: ø100)	Top surface: 233 mm × 185 mm 9.17" × 7.28" (Center disc: ø168)	376.5 mm × 378 mm 14.82" × 14.88"	Top surface: 180 mm × 136 mm 7.09" × 5.35"
	Transmitted illumination-compatible magnification	20× or higher	20× or higher	—	—
Focus Z axis	Z stage: Motorized/Manual	Motorized	Motorized	Motorized	Manual
	Z motorized stage motor	5-phase stepping motor	5-phase stepping motor	5-phase stepping motor	—
	Z motorized stage travel speed	17 mm/sec 0.67 in/sec (max)	17 mm/sec 0.67 in/sec (max)	17 mm/sec 0.67 in/sec (max)	—
	Z stage travel range	49 mm 1.93"	49 mm 1.93"	49 mm 1.93"	—
Side camera		Yes, VGA	Yes, VGA	None	None
Ratings	Power voltage	100 to 240 VAC ±10% 50/60 Hz	100 to 240 VAC ±10% 50/60 Hz	100 to 240 VAC ±10% 50/60 Hz	—
	Power consumption	130 VA	130 VA	80 VA	—
Environmental resistance	Operating ambient temperature	+5 to 40°C +41 to 104°F	+5 to 40°C +41 to 104°F	+5 to 40°C +41 to 104°F	—
	Operating ambient humidity	Up to 80% RH (no condensation)	Up to 80% RH (no condensation)	Up to 80% RH (no condensation)	—
Weight		23.8 kg 52.47 lb	25.3 kg 55.78 lb	50.7 kg 111.77 lb	Approx. 12 kg 26.46 lb
Load capacity		5 kg 11.02 lb	5 kg 11.02 lb	30 kg 66.14 lb	1 kg 2.20 lb

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