

KEYENCE

NEW Digital Microscope
VHX-6000 Series



**SUPERIOR ANALYSIS
THROUGH CLEARER OBSERVATION**

VHX
DIGITAL MICROSCOPE



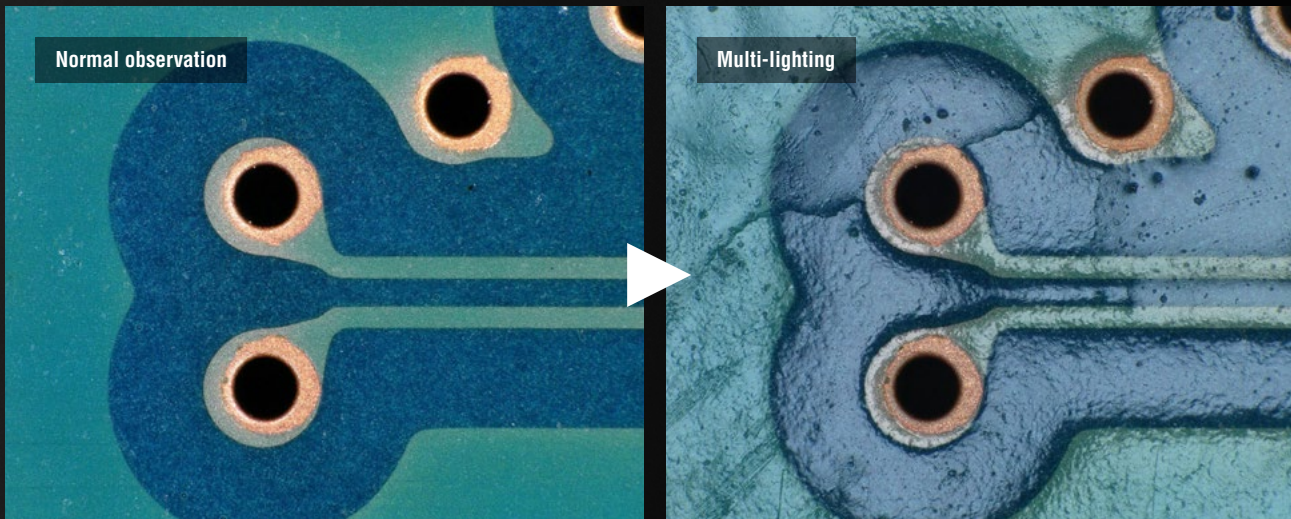
NEW
Digital Microscope
VHX-6000 Series

ADAPTIVE LIGHTING AND FOCUSING

Key Components of Observation

ADAPTIVE LIGHTING

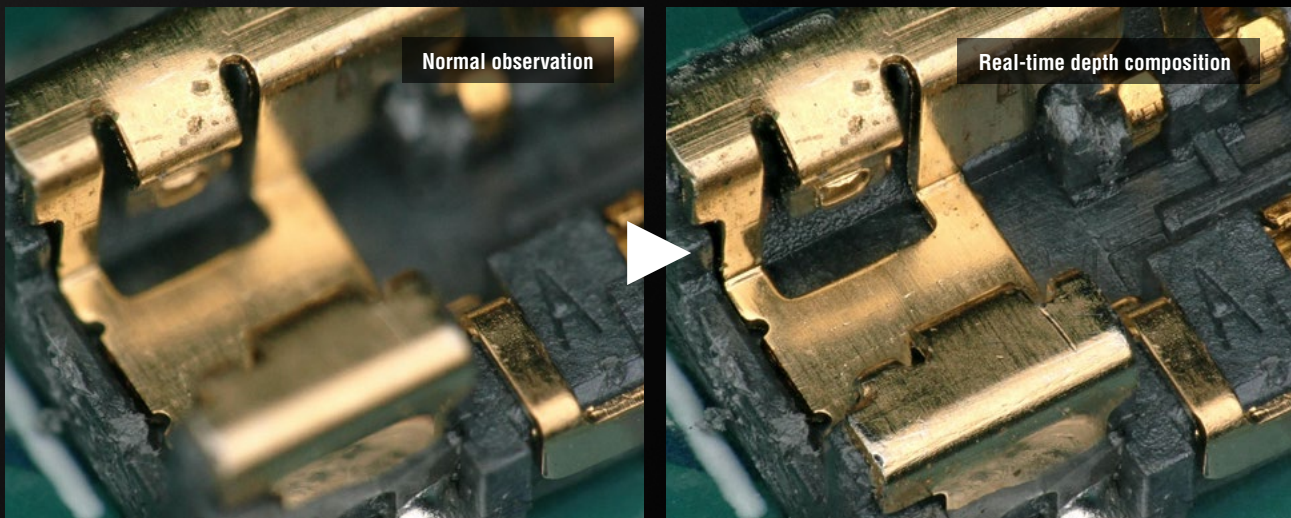
Auto illumination settings [→ P. 8](#)



Through-hole (200×)

ADVANCED FOCUSING

Fully-focused images at the push of a button [→ P. 10](#)



Connector (100×)

DIGITAL MICROSCOPE HISTORY

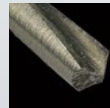
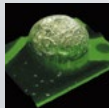
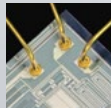


Improved Imaging, Simplified Operation

KEYENCE continues to develop highly advanced, easy-to-use products that allow anyone to obtain high-quality images instantly.

To ensure that each system meets and exceeds the needs of users, KEYENCE relies on customer feedback when developing future microscope products.

VHX
DIGITAL MICROSCOPE





VHX-500



VHX-600



VHX-900



VHX-1000



VHX-2000



VHX-5000



VHX-6000

KEYENCE Precision Optics

The optical lens plays an important role in microscopy. With that importance in mind, KEYENCE is dedicated to developing the best possible lenses. The result of that dedication is the RZ Series—the industry's leading high-resolution lenses. The RZ Lens Series is designed to be forward and backward compatible, ensuring usability even for future systems.



Fixed lenses

Zoom lenses

High-resolution RZ lenses

PRODUCT CONCEPT

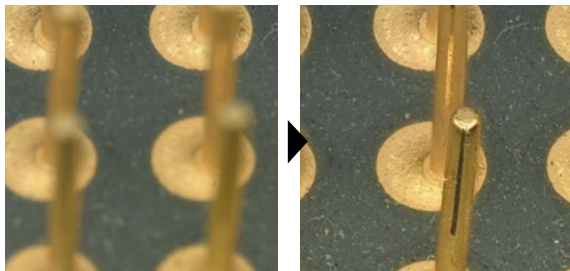
View, Capture, and Measure with Just One Device



VIEW

LARGE DEPTH-OF-FIELD

Depth-of-field is one of the fundamental features of a microscope that can greatly influence image quality and ease of operation. The lenses, camera, and graphics engine are all internally designed to optimize the relationship between depth-of-field, resolution, and brightness.



Connector Pins (100x)

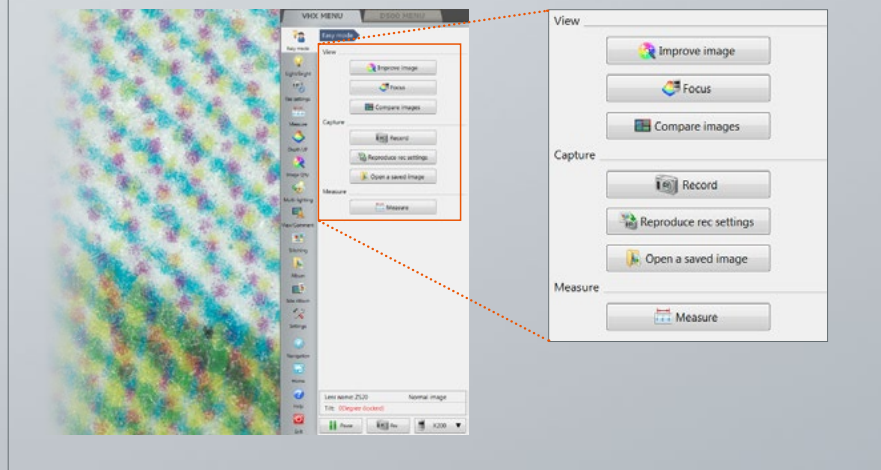
MULTI-ANGLE OBSERVATION

View an object from any angle by tilting the lens up to 90 degrees and rotating the stage 180 degrees. Observing a target from various angles can now be done without having to manipulate the sample by hand. Users can even image large objects that traditionally cannot be viewed with a microscope by using hand-held mode.



Easy Mode guides users through both basic and advanced functions

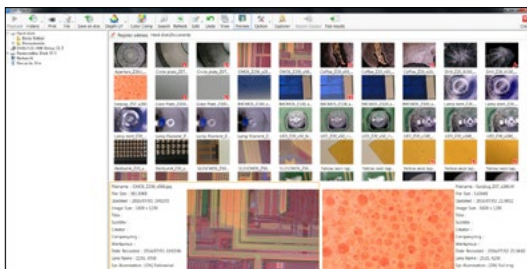
Easy Mode contains frequently used functions to allow everyone to perform analysis under optimal conditions. Even novice users can effectively utilize advanced functions.



CAPTURE

SAVE IMAGES AND VIDEO

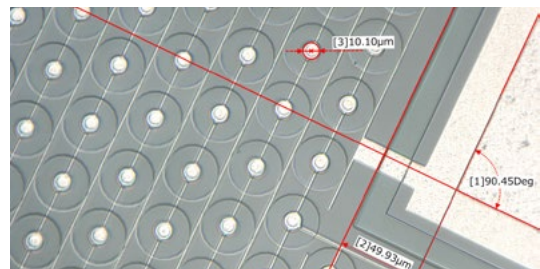
The built-in 500 GB HDD allows raw image, video, and measurement data to be saved to the system. Saved images can also be shared over LAN or with USB devices. Automatic creation of standard reports is possible with commercially available software.



MEASURE

REAL-TIME MEASUREMENT

Dimensional measurements can be made on the microscope just by clicking the area to be measured with the mouse. Measurement data is stored with the image file for easy information sharing, and results can even be exported as a CSV file.



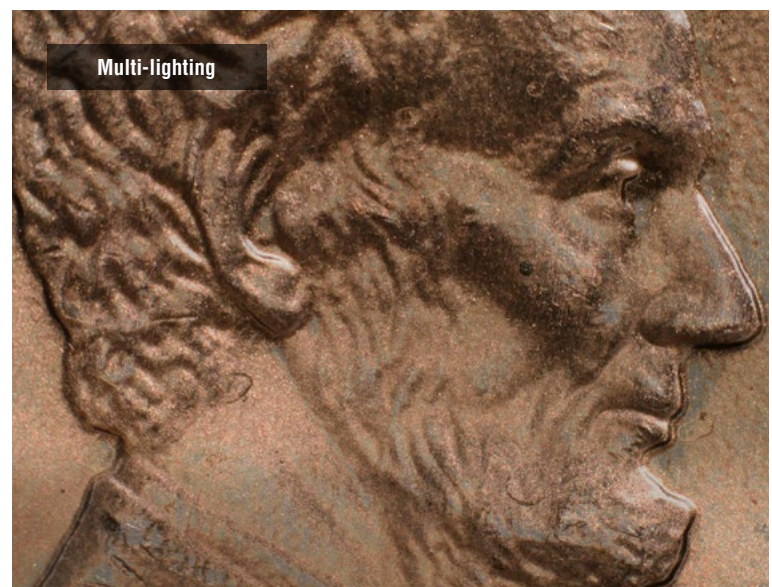
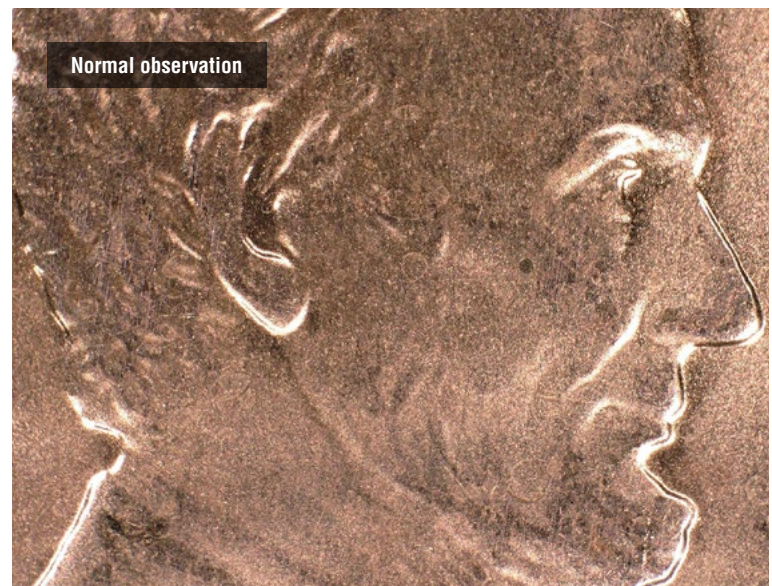
ADAPTIVE LIGHTING

MULTI-LIGHTING

AUTOMATICALLY ADJUSTS THE DIRECTION OF LIGHT AND LETS USERS SELECT THE IDEAL IMAGE FOR THEIR SAMPLE

Obtain high quality images at the push of a button

Lighting is the most important factor when it comes to capturing images. Until now, taking full advantage of lighting was a difficult task when performing magnified observation. Now, thanks to KEYENCE's Multi-lighting function, surface features that were previously impossible to view become clear at just the push of a button.



In attempts to obtain the clearest image possible, illumination settings are often changed and applied multiple times. This repetition is no longer necessary due to KEYENCE's multi-lighting capability.

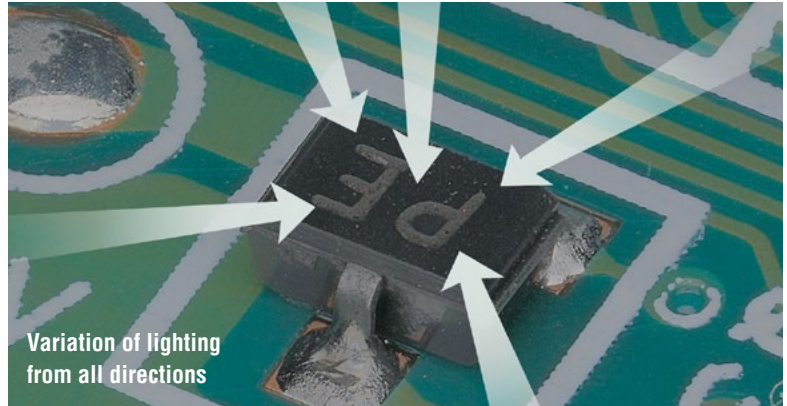
Coin (50x)

Lighting Data from Every Direction

With the VHX-6000 Series, lighting data from various angles can be instantly obtained at the push of a button. With absolutely no need to configure lighting—an essential step with conventional systems—anyone is able to acquire the optimal lighting effects easily.

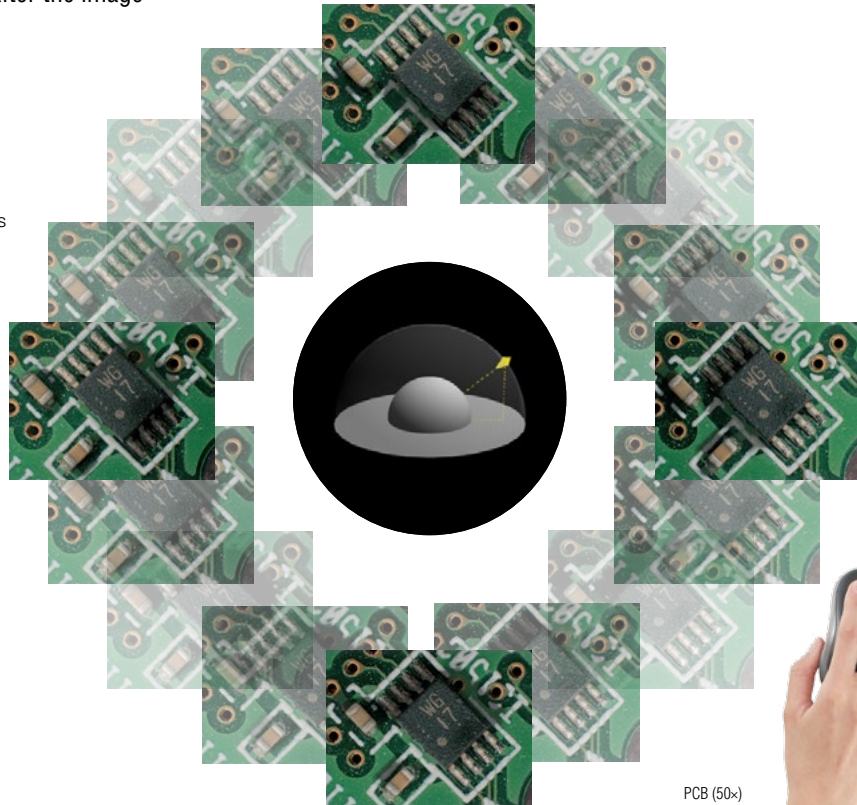


Just press the button!



Adjust lighting conditions after the image has been captured

Users are able to adjust the direction and combination of lighting used by simply moving a digital flashlight icon around the screen. Conditions can also be adjusted even after the image has already been captured or saved.



Change lighting even after data has been saved to a PC



PCB (50x)

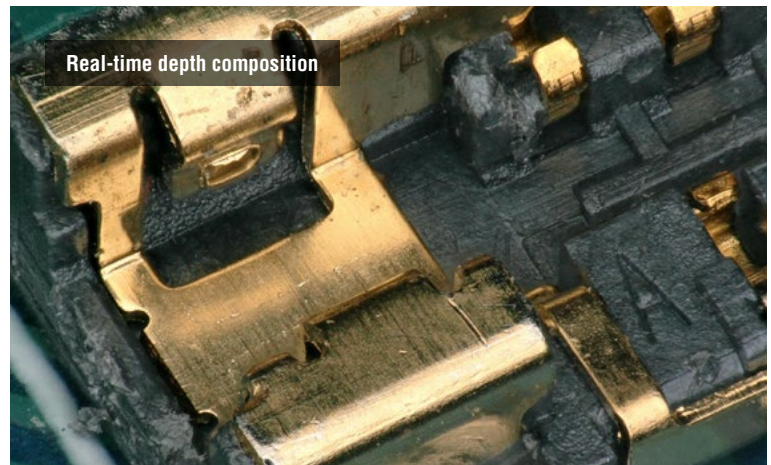
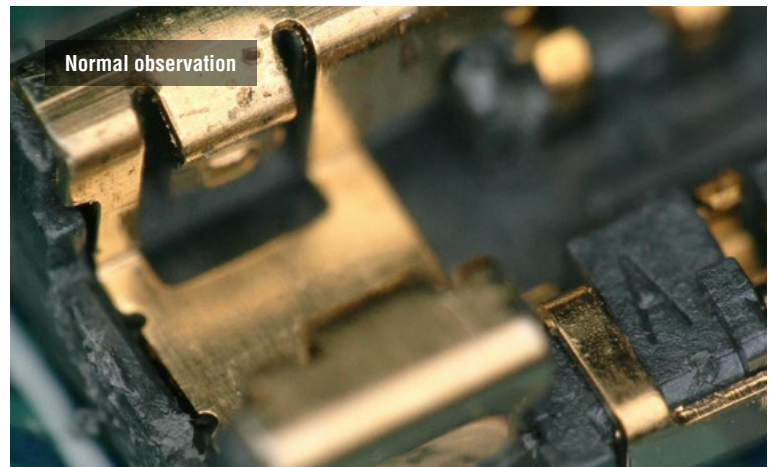
ADVANCED FOCUSING

REAL-TIME DEPTH COMPOSITION

ALWAYS IN FULL FOCUS

Capture Fully-focused Images in Seconds

Due to its high frame rate camera, the VHX can instantly scan through the focal range of a sample, recognize which areas are in focus, and build a fully-focused image. This provides users with more in-depth information and in a fraction of the time of conventional systems.



Connector (100x)

Fully-focused images reduce inspection errors

Faster inspection allows for more data collection and improved analysis



No need for focus adjustment



No need for manual depth composition

Real-time depth composition allows target locations to be observed in full focus at any time.

No Need for User Adjustments

After deciding on the observation location, just press the button on the console to obtain a fully focused image in as little as 1 second. Then, observing a different location is as easy as moving the motorized stage. The VHX-6000 Series offers a new observation method that instantly provides fully focused images of objects without the need for focus adjustments and depth composition procedures.



CONVENTIONAL SYSTEMS



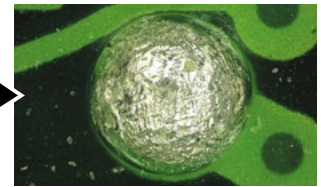
Select the field-of-view...



adjust the focus...



move the lens through the Z range for composition...



and obtain a fully focused image.

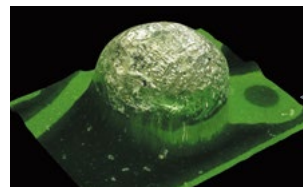
VHX-6000



Just select the area to view...



and obtain a fully focused image.



3D image

A fully focused image is captured in as little as 1 second, and 3D image data is captured simultaneously.

DEPTH
COMPOSITION

+

MULTI-LIGHTING

With conventional microscopes, determining how to apply the lighting is difficult if the image is not in focus. The combination of Depth Composition and Multi-lighting allows users to obtain a fully focused image and to select the desired lighting pattern for that image.



Normal image



Depth composition



Depth composition + Multi-lighting

Nut (100x)

TECHNOLOGY

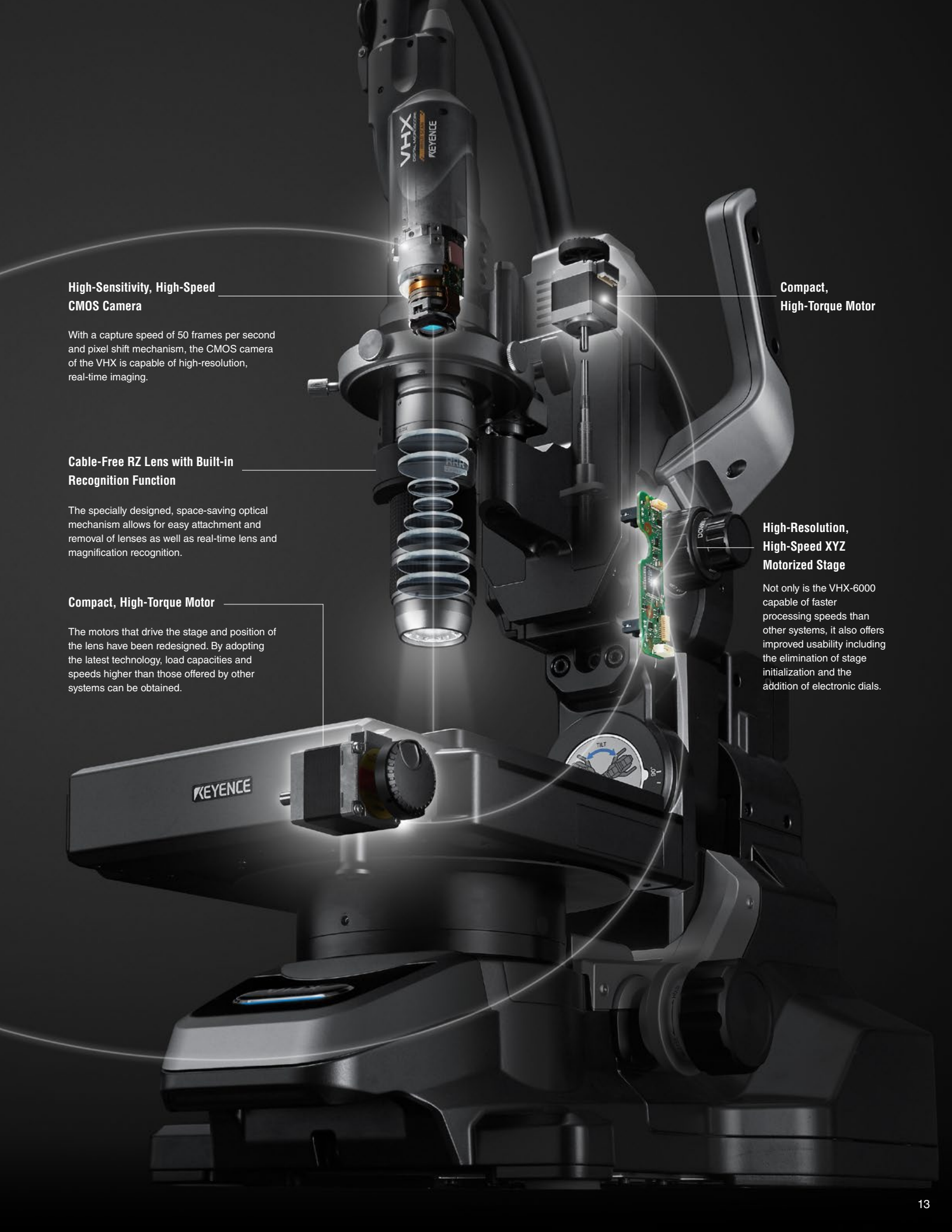
All-in-one System for Unmatched Versatility

By designing the VHX Series with top-of-the-line technology in the lenses, camera, graphics engine, and stage, KEYENCE has developed a system that optimizes the performance between each device and provides users with a flawless operational experience.

Newly developed REMAX VI high-performance graphics engine

The VHX-6000 is equipped with a newly-developed image processing engine that embodies KEYENCE's expertise. Synchronous control of the camera, stand, and pixel shift mechanism of the camera enables real-time, high-quality depth composition, HDR, and image stitching capabilities.





**High-Sensitivity, High-Speed
CMOS Camera**

With a capture speed of 50 frames per second and pixel shift mechanism, the CMOS camera of the VHX is capable of high-resolution, real-time imaging.

**Cable-Free RZ Lens with Built-in
Recognition Function**

The specially designed, space-saving optical mechanism allows for easy attachment and removal of lenses as well as real-time lens and magnification recognition.

Compact, High-Torque Motor

The motors that drive the stage and position of the lens have been redesigned. By adopting the latest technology, load capacities and speeds higher than those offered by other systems can be obtained.

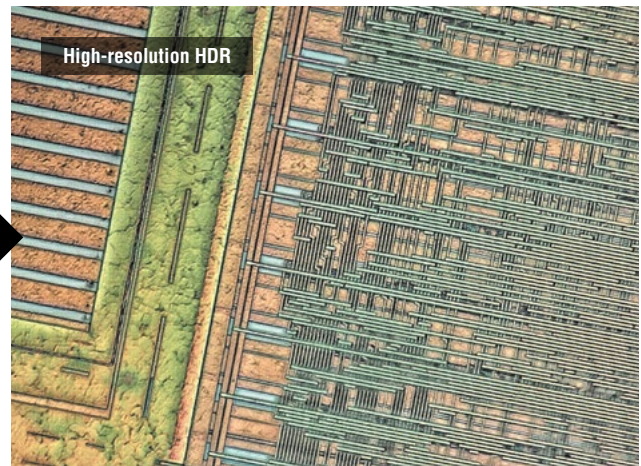
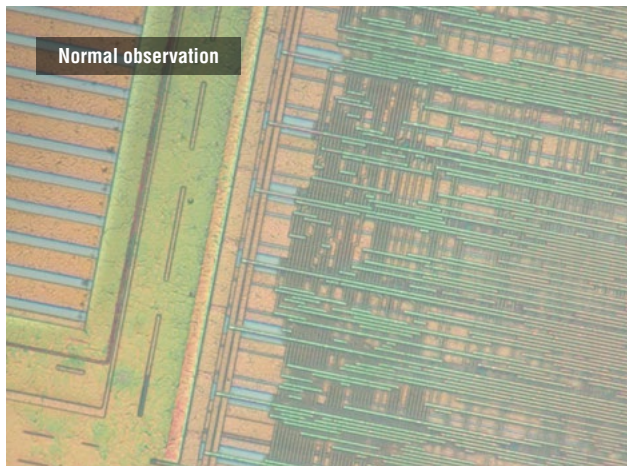
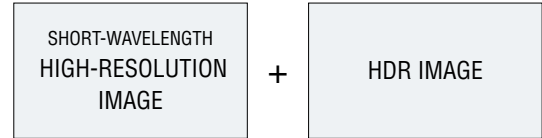
**Compact,
High-Torque Motor**

**High-Resolution,
High-Speed XYZ
Motorized Stage**

Not only is the VHX-6000 capable of faster processing speeds than other systems, it also offers improved usability including the elimination of stage initialization and the addition of electronic dials.

Improved Image Resolution: High-Resolution HDR

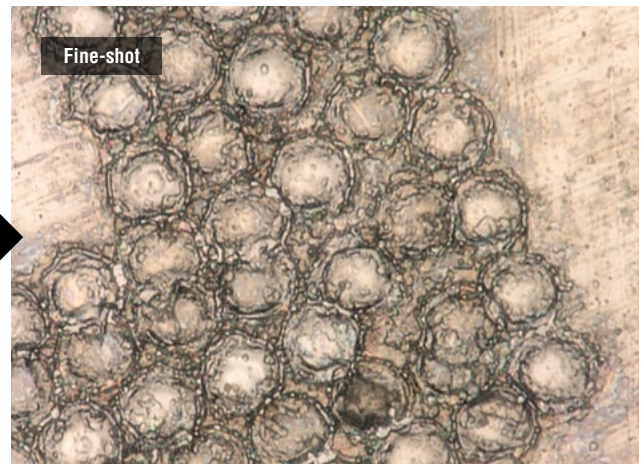
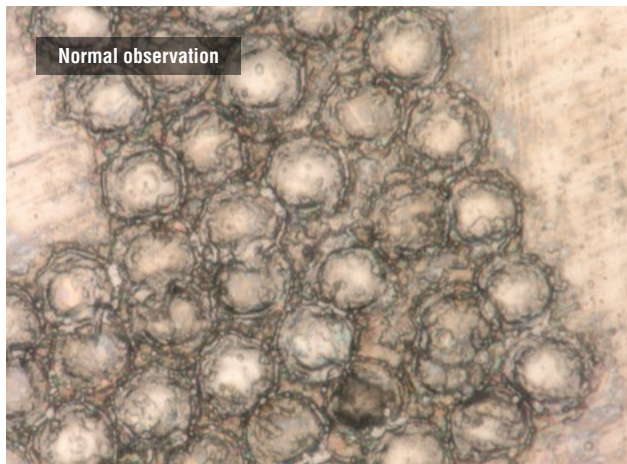
Images with high color gradation are obtained by using short-wavelength light to capture high-resolution images in addition to the HDR (High Dynamic Range) function to capture multiple images at varying shutter speeds. The combination of these two features allows for high-definition, high-contrast observation that was not possible with conventional microscopes.



IC (1500x)

Fine-Shot

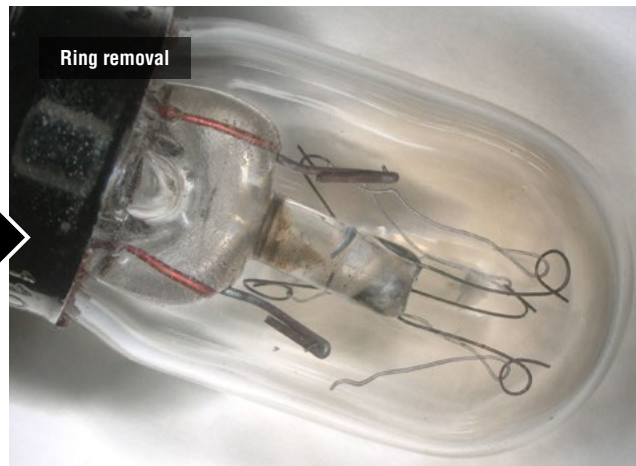
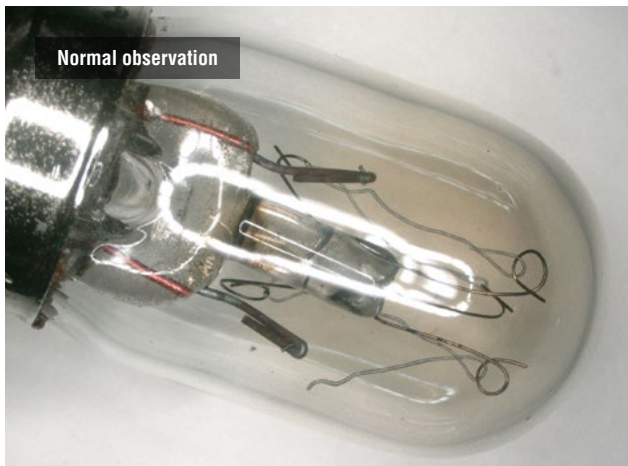
The VHX-6000 is capable of capturing images at even higher resolutions than that of conventional microscopes by removing the aberration characteristics that are known for each lens. This produces a sharper, higher contrast image.



Laser processing (2000x)

Ring-reflection Removal

To prevent certain parts of the image from being unobservable due to glare, multiple images are acquired while changing the direction of the ring light. This makes it possible to remove unwanted reflections on the surface of the target at the press of a button.



Light bulb (20x)

HDR Plus Function

The camera captures multiple images at different brightness levels by varying the shutter speed, and then produces an image with a high level of color gradation data. This allows for clear observation of targets with glare or low contrast that would be difficult to image accurately with conventional microscopes. A new algorithm that accurately represents the colors of the target makes observation more similar to that with the naked eye.



| CONTRAST ENHANCEMENT | GLARE REMOVAL | COLOR REPRODUCTION |
|--------------------------------------|--------------------------------|-------------------------------|
| | | |
| Conventional [8 bits] | Conventional [8 bits] | Conventional [8 bits] |
| | | |
| With HDR [16 bits] Plastic cap (50x) | HDR [16 bits] Solar cell (50x) | HDR [16 bits] Printing (400x) |

8 bits (256 shades) Conventional method

Intensity range obtained by using a single shutter speed

DISADVANTAGES

- The narrow range of brightness causes glare in oversaturated areas.
- Subtle changes in contrast cannot be visualized because of coarse color resolution.
- Colors differ between what the human eye sees and what the captured image shows.

16 bits (65536 shades) HDR function

Intensity range obtained by varying the shutter speed

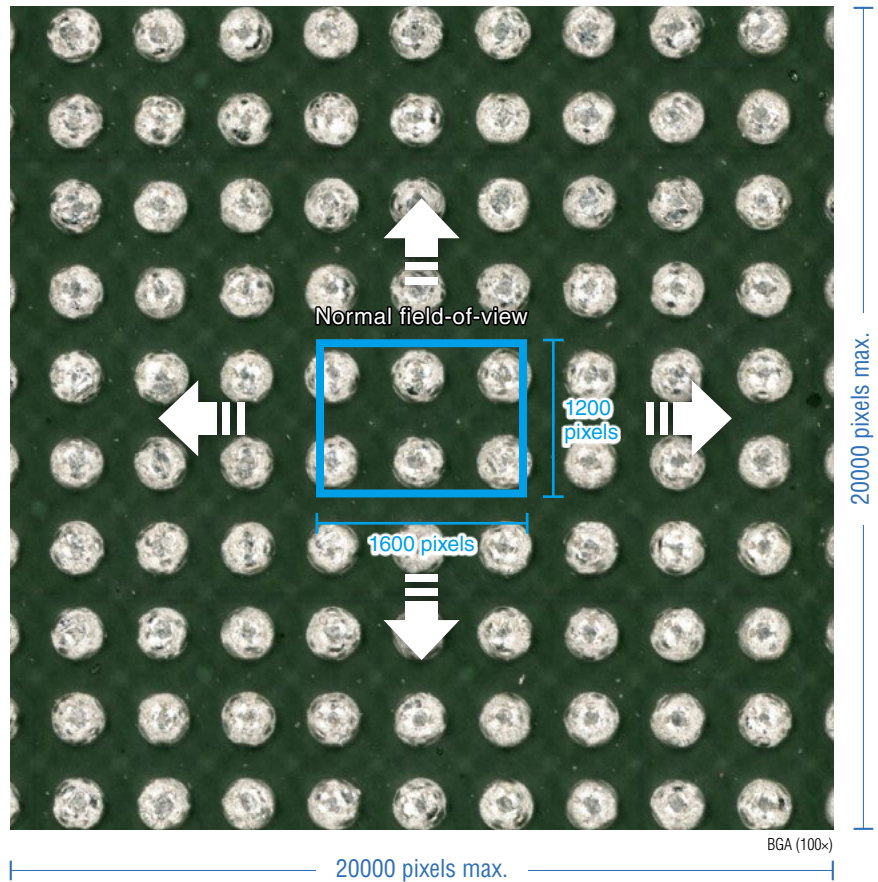
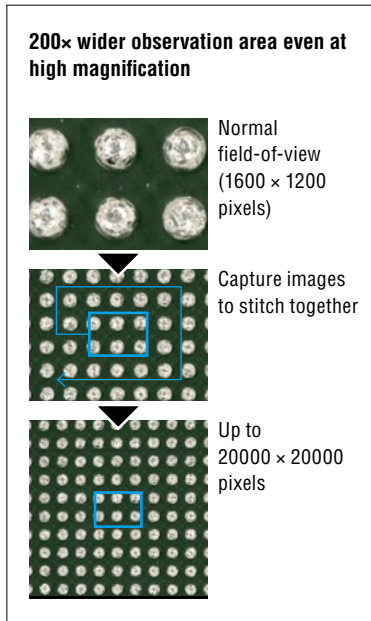
256 times the gradations compared to conventional methods

ADVANTAGES

- A wider range of brightness diminishes the perceived glare.
- Enhanced low contrast areas improve detail.
- Natural colors are accurately reproduced.

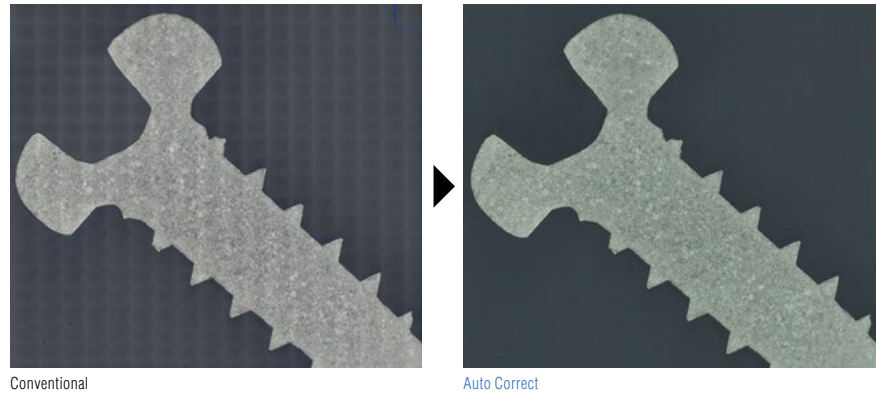
High-Speed Image Stitching

With any optical system, as the magnification is increased the field-of-view decreases. The VHX incorporates an image stitching algorithm with a motorized XY stage to automatically move and stitch together adjacent images in real-time. This will provide users with a high-resolution (up to 20000 × 20000 pixels), overall view of the target, while preventing any misalignment typically associated with other stitching techniques.



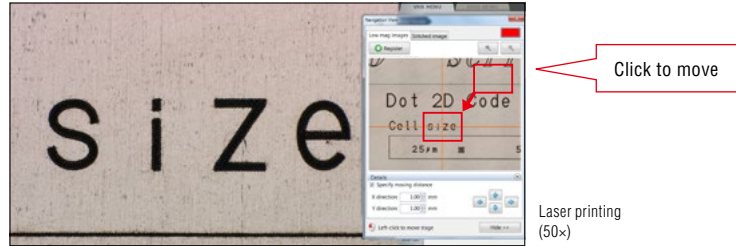
Auto Correct Function

Aberration inherent around the periphery of lenses can cause slight changes in brightness. When stitching multiple images together, this can result in shading differences at the edge of each image. The Auto Correct Function is able to remove these changes and produce a high-quality, seamless stitched image.



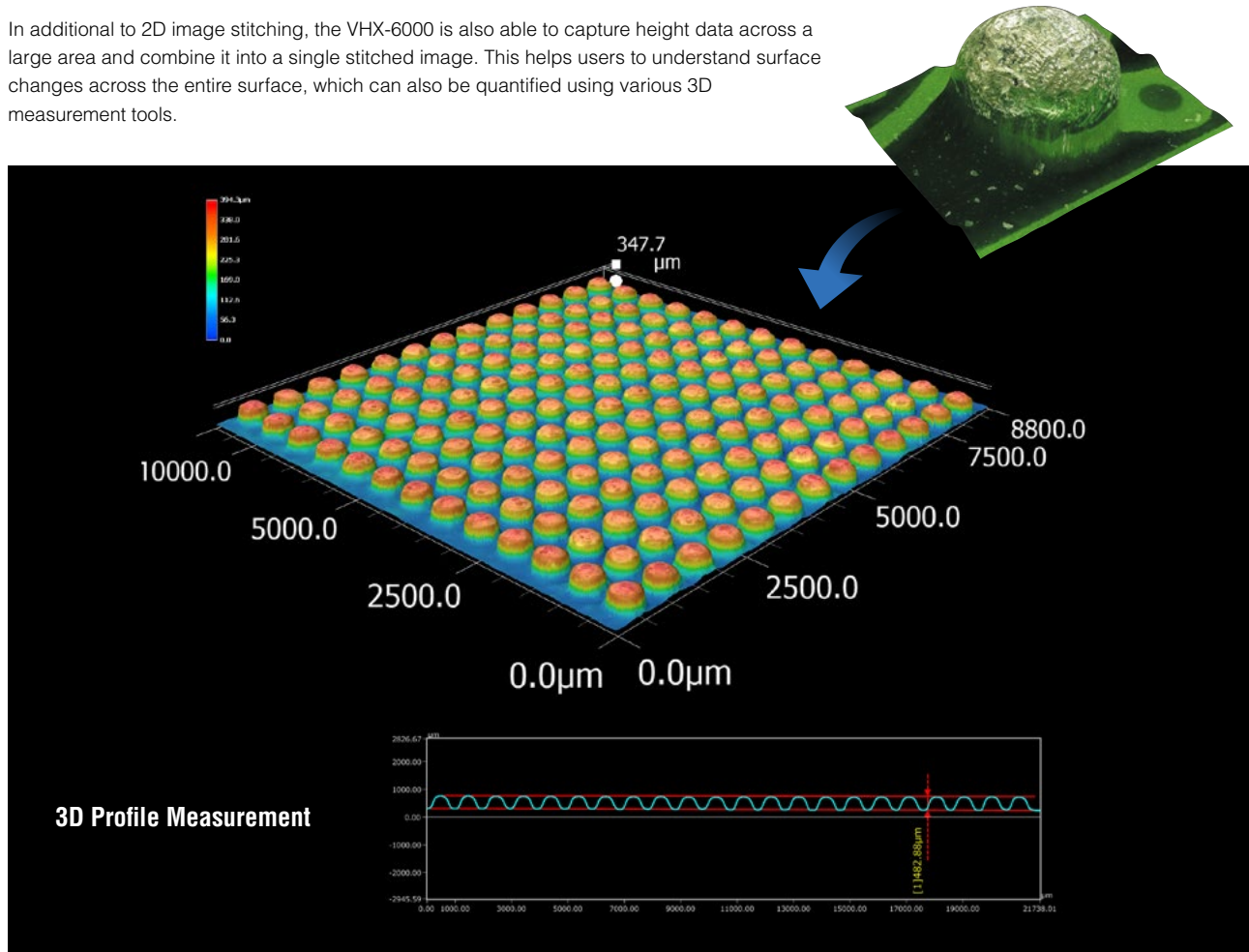
Navigation Function

When viewing an object at high magnification, it can sometimes be difficult to understand the area being viewed in relation to the overall surface. With the built-in navigation system, users can use a macro image to instantly see their current field-of-view and dramatically improve the imaging process. Users can even click on an area within the navigation window, and the motorized XY stage will automatically move the stage to the desired location.



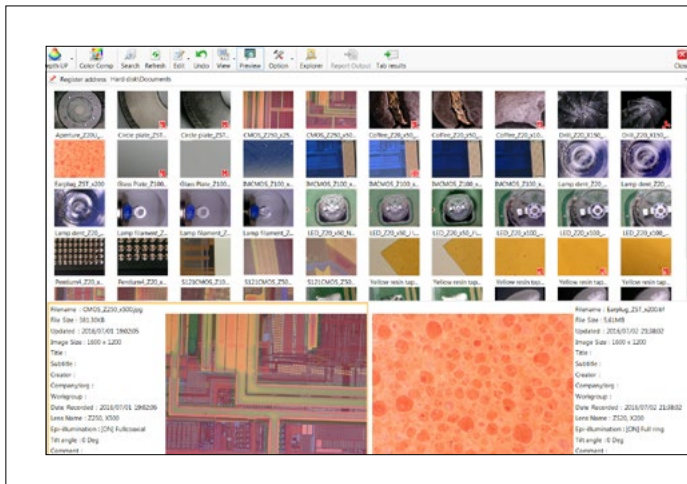
3D Image Stitching

In addition to 2D image stitching, the VHX-6000 is also able to capture height data across a large area and combine it into a single stitched image. This helps users to understand surface changes across the entire surface, which can also be quantified using various 3D measurement tools.



Simple Recording Functionality at the Press of a Button

The VHX-6000 is equipped with a 500 GB hard disk drive for easy storage of images, video, and measurement data. KEYENCE's original high-speed filing system ensures effortless handling of a high volume of images. File names, titles, organization names, lenses, and comments can be registered with each image, allowing for quick database searches.



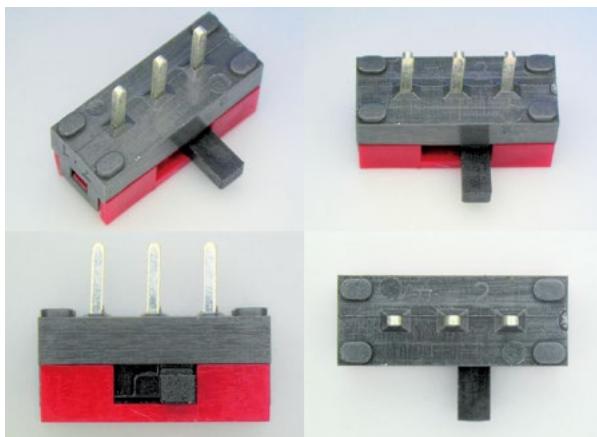
REPORT FUNCTION (REPORT PREPARATION)

Instantly create reports containing images by installing Microsoft Word or Excel and then setting up a standard template. Details such as the capture date, lens, and magnification are recorded automatically.



Split Screen/Comment Entry Function

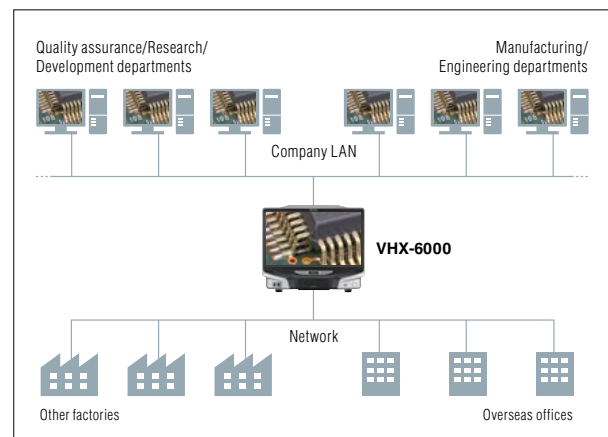
The viewing area can be split horizontally, vertically, or into quadrants. This can be used to quickly perform side-by-side image comparison of good and bad parts or when viewing a low-magnification and high-magnification image.



4-segment split screen

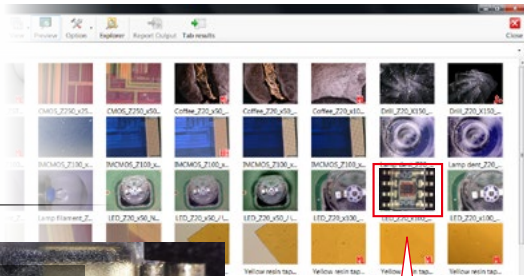
Network Connectivity

The VHX can be connected to a network via LAN to allow sharing/transfer of images with other departments or remote locations. This image and data sharing ensures immediate and accurate action in urgent situations.

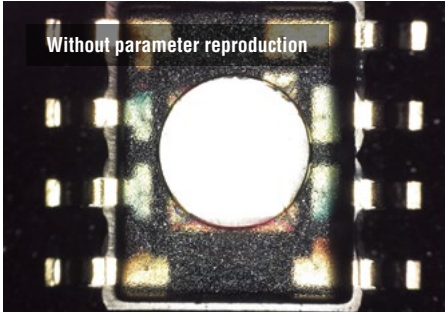


Reproducing of Capture Parameters

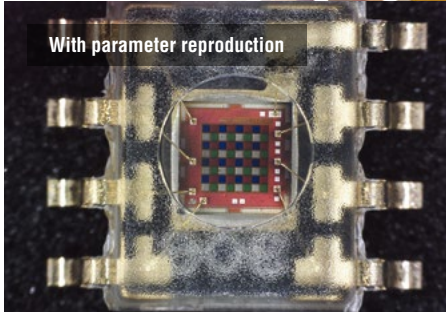
Capture parameters such as brightness and camera settings will be saved as file data with each image. Users can apply these exact same settings later by simply loading the file. This allows evaluations to be performed under the same conditions even if the user changes.



Without parameter reproduction



With parameter reproduction



SHUTTER SPEED

GAIN

LIGHT SHIFT

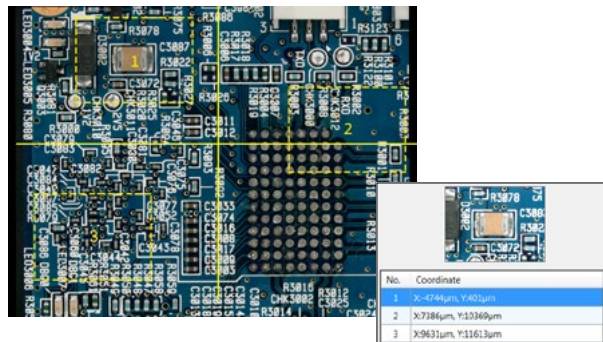
EDGE ENHANCEMENT

WHITE BALANCE

LIGHT INTENSITY

Register Coordinates for Repeated Capture

Registering the coordinates for the desired capture position allows for high-speed repeated capture at fixed positions. Using this function in combination with the navigation image lets users check where the registered position is within the entire image view.



| No. | Coordinate |
|-----|---------------------|
| 1 | X:4274µm, Y:4022µm |
| 2 | X:7386µm, Y:10369µm |
| 3 | X:9463µm, Y:11613µm |

PC Mode/Anti-Virus Software

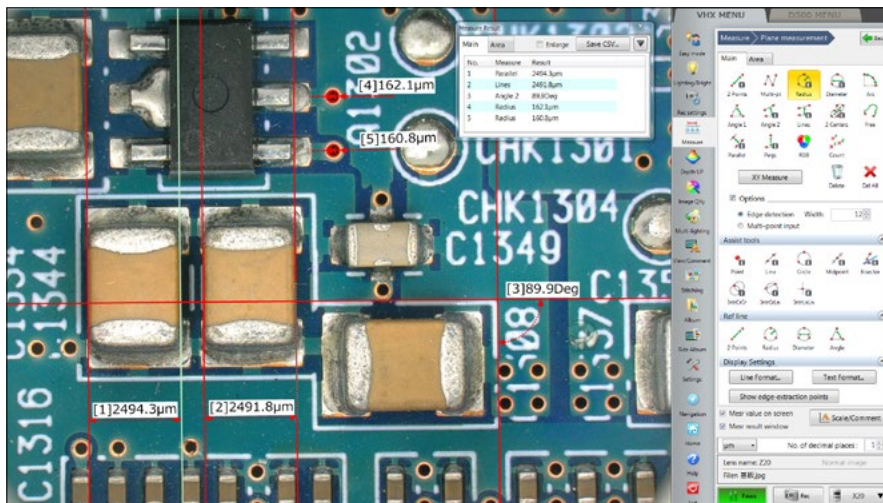
With PC mode, various drivers for software and peripheral equipment can be installed on the microscope, including drivers for printers, Microsoft Word and Excel, and anti-virus software. This makes it possible to use the microscope in a way that best fits your operating environment.

Video Recording Function

Accurately capture a target's changes over time or an inspection process using the video recording/playback function. Video can be captured at up to 50 frames per second with recording times of up to 50 minutes. The function allows users to fast forward, advance frame by frame, and capture still images from the video. Each video is saved as an AVI file that can be played on the VHX-6000 or on a PC.

Real-Time Measurement

Users can perform any kind of measurement—including 2-point, angle, diameter, parallel line, and area—directly on the screen with just a few clicks of the mouse. Data can also be saved in an album and accessed later for further measurement. Moreover, the free communication software makes it possible for anyone to utilize the measurement functions from their own PC.



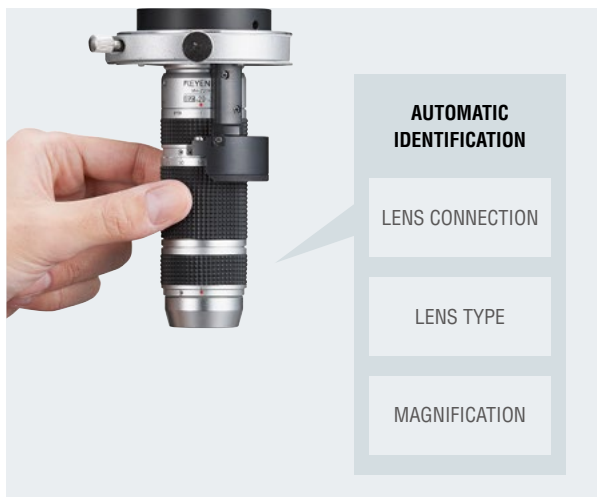
VARIOUS MEASUREMENT TOOLS

With over 20 different measurement functions available, users can choose the right tool to meet any measurement need.

- 2 Points
- Multi-pt
- Radius
- Diameter
- Arc
- Angle 1
- Angle 2
- Lines
- 2 Centers
- Free
- Parallel
- Perp.
- RGB
- Count
- Polygon
- Circle
- Rectangle

TRIPLE'R Function for Automatic, Cable-Free Recognition of Lens/Magnification

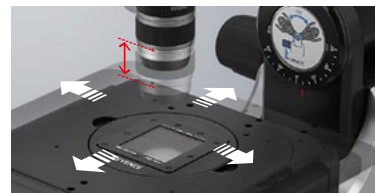
KEYENCE's advanced sensor technology and accumulated microscopy and optical expertise have been combined to provide the VHX with the ability to recognize three types of information: lens connection (no cable required), lens type, and magnification. With the TRIPLE'R function, there's no need to re-calibrate every time the magnification is changed.



One-Push Calibration

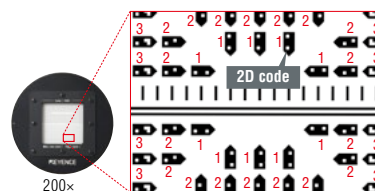
With conventional systems, calibration can be both time-consuming and difficult to perform, often times requiring a specialist to do the calibration. With the VHX-6000, calibration can be done by anyone onsite using our NIST-traceable scale with just the push of a button.

Auto-focus adjustment & auto-position alignment



Calibrate each magnification by just placing the scale on the stage and pressing a button. This eliminates the need to find the correct location and adjust the focus manually.

Reading the 2D codes of dedicated scales

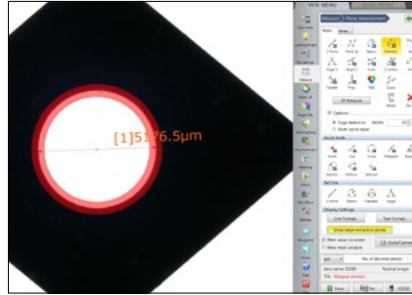


The VHX-6000 automatically moves to the optimum position on the reference chart according to the magnification. Because the position on the reference chart is detected automatically, there is no chance for calibration errors to occur.

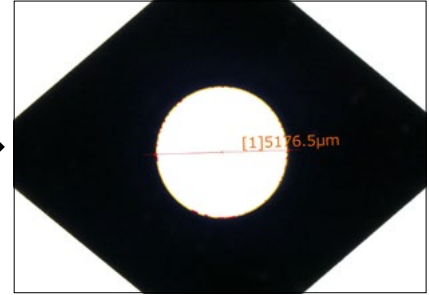
Reference chart
OP-87427

Edge Detection Function for Improved Measurement Accuracy

Conventional measurement systems require the user to manually select a measurement edge, which can lead to variations in the results. With KEYENCE's automatic edge detection function, the least squares method is used to automatically detect the edge to be measured, reducing the measurement variation between users.



Automatic edge detection using over 100 points



Shape recognition using the least squares method

XY measurement system **VH-M100E**

Fusion of a Digital Microscope and a Measuring Microscope

Measure objects up to 100 mm × 100 mm **3.94" × 3.94"** by simply moving the XY stage. This system functions similarly to a measurement microscope, but users can also take advantage of all of the functions of a digital microscope as well.



Display Unit **OP-84483**

Digitally displays the distance traveled by the stage

Transmitted Lighting Unit **OP-84484**

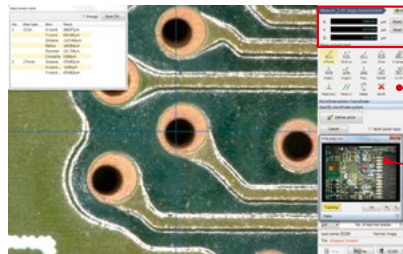
Clearly projects the edges of an object

Supports traceability for highly reliable measurement

The X-Y measurement system ensures highly reliable measurements based on a traceability system.



VHX-H2M2 Measurement Software for Improved Usability



REAL-TIME SCREEN DISPLAY

The XYD measurement results are displayed on the monitor screen in real time.

VARIOUS MEASUREMENT MODES

Distance between two points, radius, angle, and other measurement modes are included.

WIDE IMAGE CAPTURE

Record a wide-field image at low magnification and use it as a reference when navigating at a higher magnification. The measurement points across the entire image can be easily monitored and tracked.

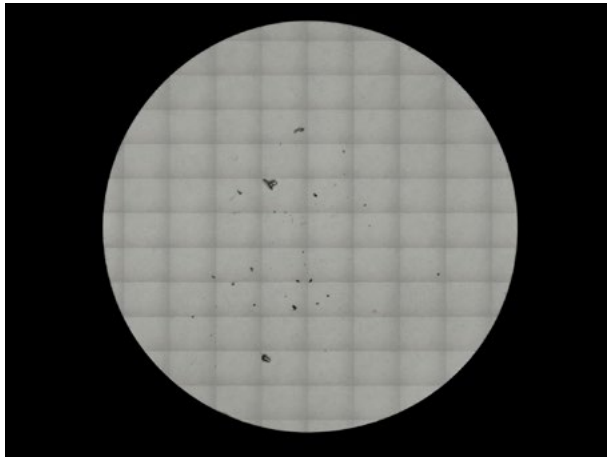
Contamination Analysis

The VHX-6000 allows users to analyze contamination and cleanliness compliant with ISO 16232 standards. By dividing the image into multiple regions and analyzing each region individually, this function allows users to perform contamination analysis over a large area. The analysis displays the number of detected particles and the cleanliness level for each maximum diameter class (B through K). The results can then be saved as a CSV file.

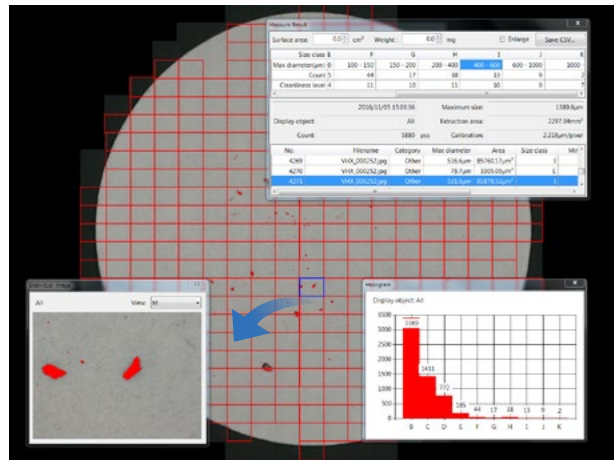
ISO 16232 COMPLIANT

AUTOMATIC SETTING RECOMMENDATION

LARGE AREA MEASUREMENT



Contamination on filter



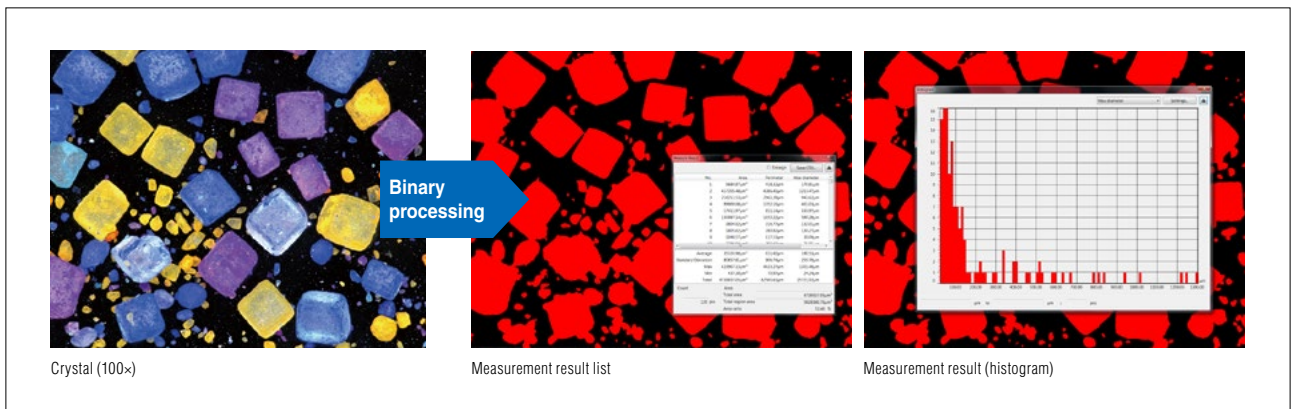
Contamination analysis

Automatic Area Measurement/Count

Easily count and measure objects to determine area, perimeter, and other 2D measurement parameters.

AREA MEASUREMENT

PARTICLE COUNT



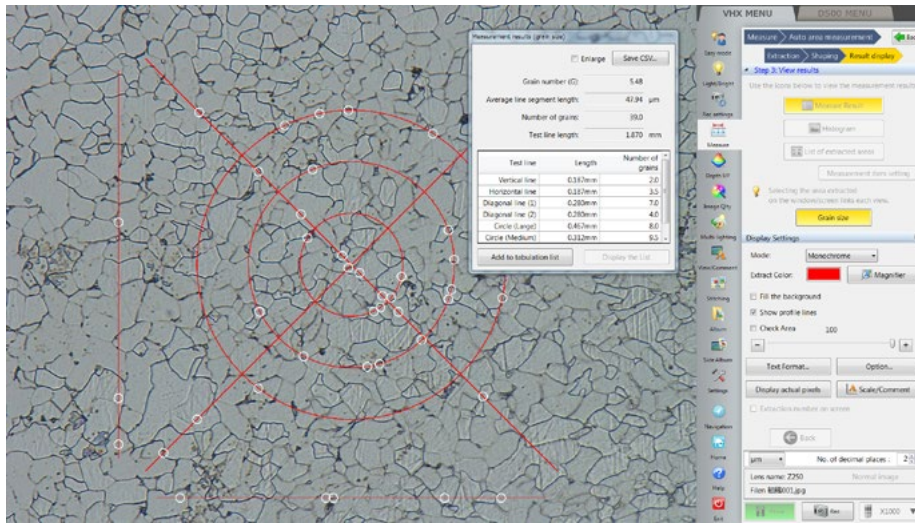
Crystal (100x)

Measurement result list

Measurement result (histogram)

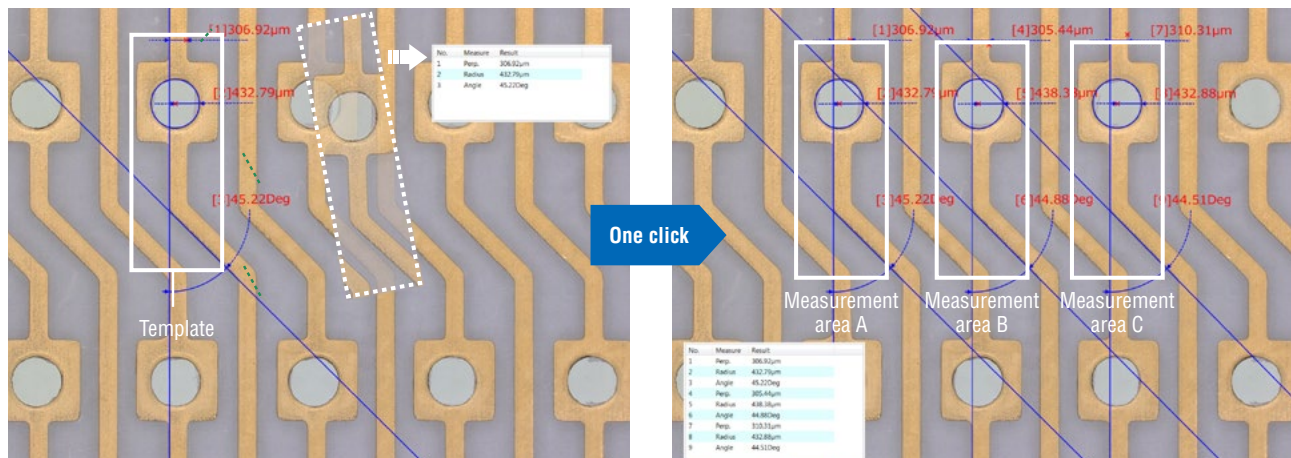
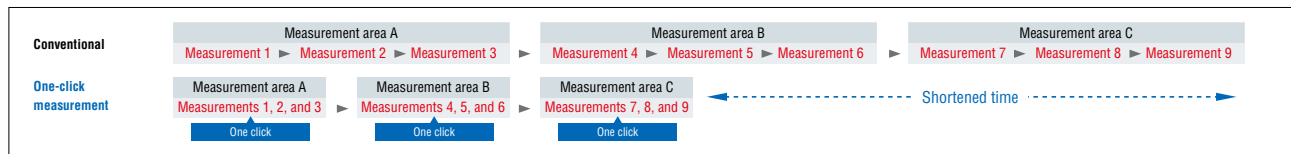
Grain Size Measurement and Analysis

Calculate grain size for any sample completely to ASTM standards, and automatically save the results or easily export the data into a report. Our latest software offers quick and automatic analysis that eliminates the user's need to manually count grains or perform 'Chart Comparisons'. Users can also save their workflow for fast and repeatable measurements.



One-Click Auto Measurement

In addition to point-and-click measurements, the VHX-6000 is also able to create a measurement template of the area or object being measured and use pattern matching to automatically perform the same measurements across similar objects. All of the measurement data can be compiled and processed together to greatly reduce the time required for inspection and reporting.



Template saving Searching for pattern to be measured

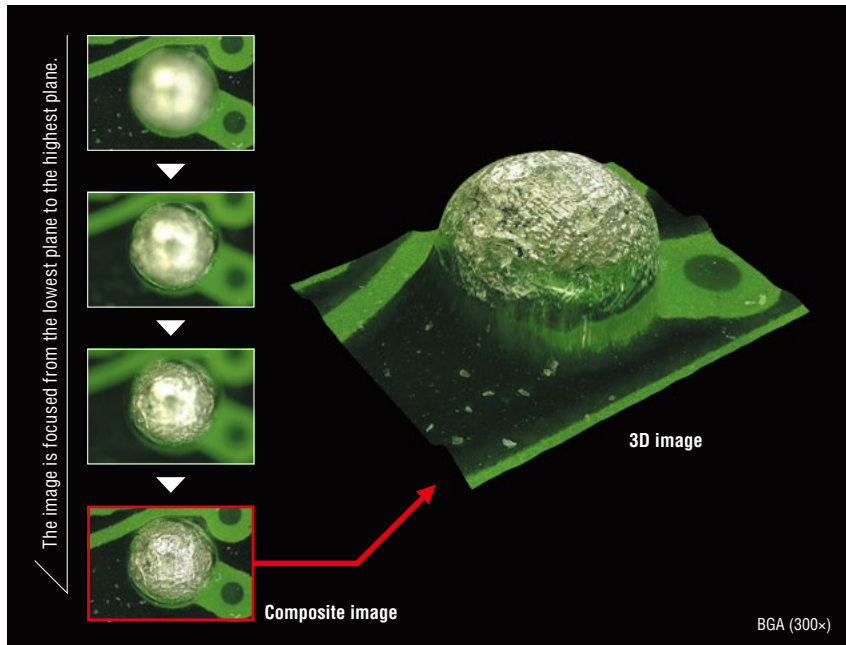
One-click auto-measurement Automatic measurement in action

3D Display Function

Even when a target's surface has significant variation in height, a fully-focused image can be obtained instantly by compiling images at different focal planes. After the composite image is created, the focal position data can then be used to construct a 3D model. When a motorized stage is used, this 3D image can be created easily with just the push of a button

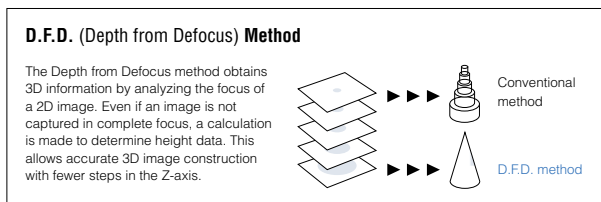
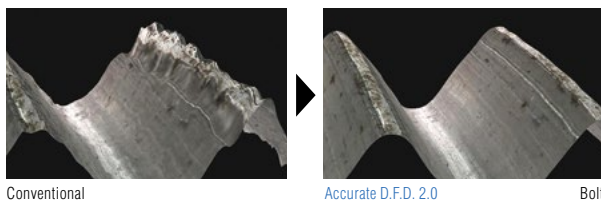


Just press the button on the console



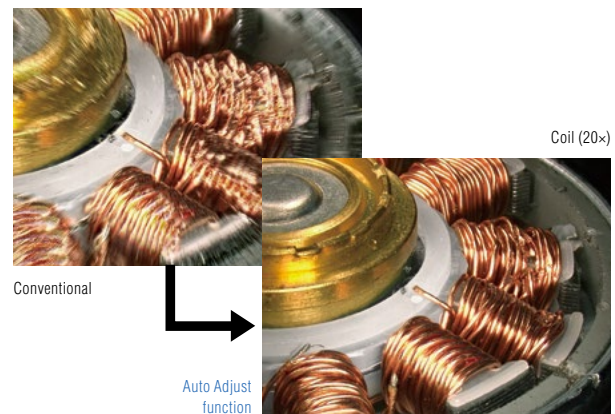
Accurate D.F.D. 2.0 Method

KEYENCE's Accurate D.F.D. method creates a 3D image by calculating height and analyzing extremely small changes in texture. Even difficult to image areas such as those with low contrast or oversaturated/undersaturated pixels can be accurately reconstructed.



Auto Adjust Function for Depth Composition even when Imaging at an Angle

Edge displacement and vibration that can occur during image capture are automatically corrected and a comprehensive, fully-focused image is constructed. The composition can use not only images captured perpendicular to the sample, but also those captured from an angle.

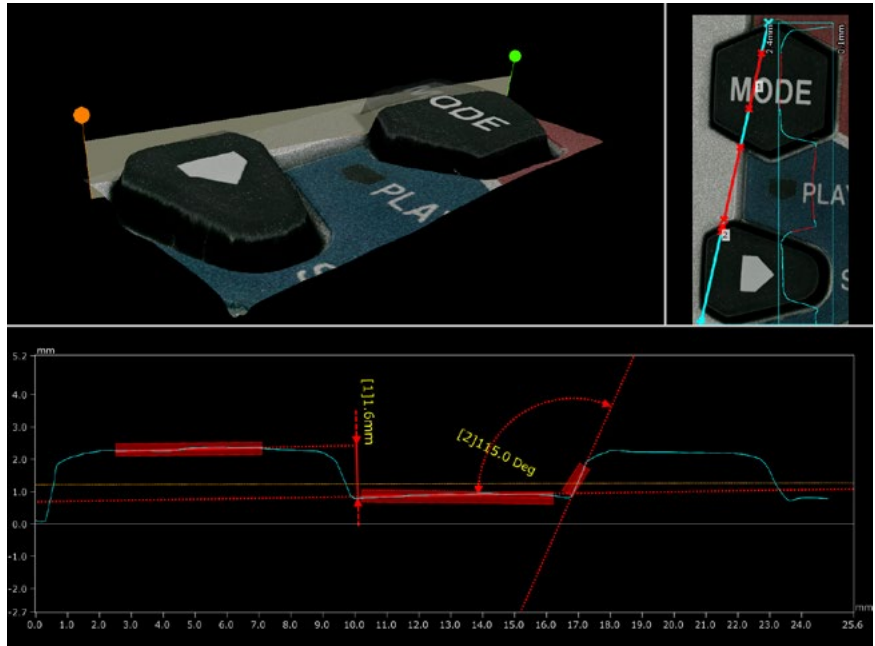
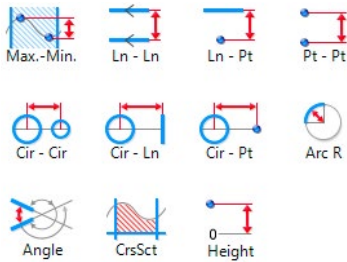




3D Measurement Function

Using 3D data, the VHX-6000 makes it possible to measure at any targeted point. Data can be collected to calculate the profile, height, and volume for any area within the field-of-view.

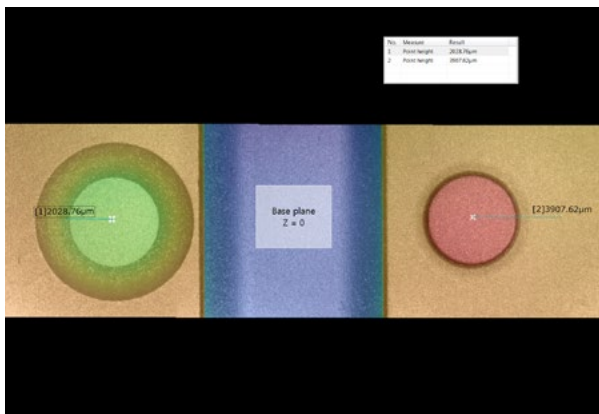
3D Measurement Tools



Console (50x)

Height Measurement

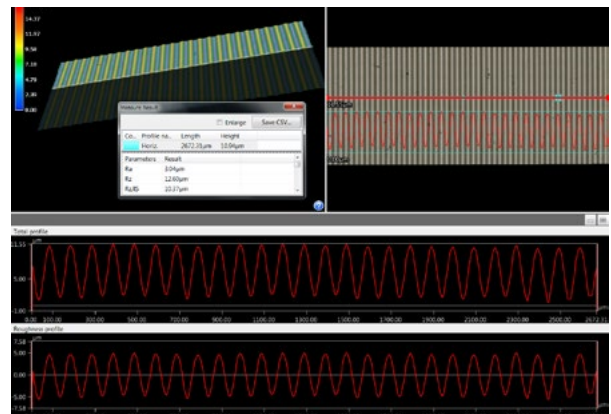
Height difference and distance can be measured simply by clicking two points on the screen. Using the auxiliary “Max. height” and “Min. height” tools, users can measure the height difference and distance between the highest or lowest points on two objects.



Processed metal component (50x)

Roughness Measurement

Roughness measurement can be performed using typical parameters such as Ra and Rz. Through line roughness and surface roughness measurements, users can quantify the differences in surface conditions.



Standard roughness measurement scale (1500x)

100 × 100 mm 3.94" × 3.94" XYZ Motorized Stage VHX-S660E

KEYENCE's 100 × 100 mm 3.94" × 3.94" XYZ motorized stage allows users to image large objects while maintaining the ability to tilt and rotate for complete visualization and inspection.

LARGE XY TRAVEL RANGE

The stage travel distance has been greatly increased to accommodate movement up to 100 × 100 mm 3.94" × 3.94", allowing for larger objects to be imaged quickly.

HIGH-SPEED XY STAGE

Improved movement speed reduces the time required to navigate around an object and lets users perform image stitching in a fraction of the time.

IMAGE FROM ANY ANGLE

Users can tilt the lens and camera up to 90 degrees, eliminating the need to adjust the object by hand and simplifying any inspection task.

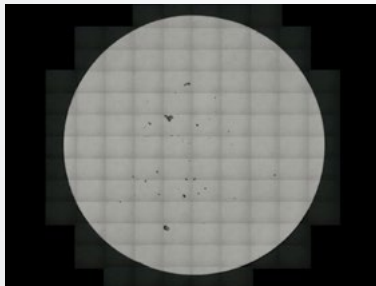
INCREASED LOAD CAPACITY

A revised drive structure provides the stage with five times the load capacity (up to 5 kg) compared with conventional systems.

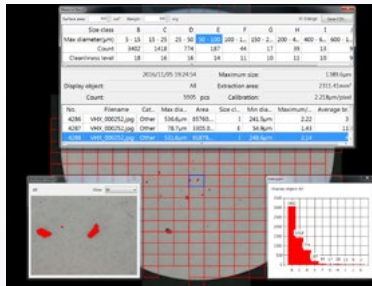


Contamination Analysis ISO 16232 Compliant

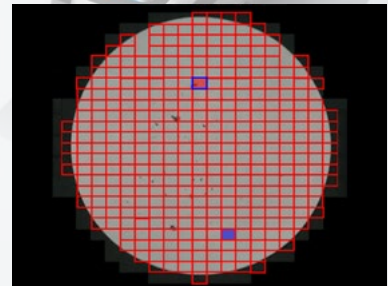
This instrument is capable of ISO 16232-compliant contamination analysis. The large depth-of-field even enables users to accurately image, measure, and analyze objects with uneven surfaces.



Capture images over $\varnothing 46$ mm $\varnothing 1.81$ " range in about 40 seconds

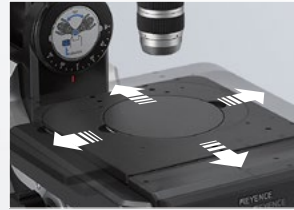


Measure particles down to 1 μ m

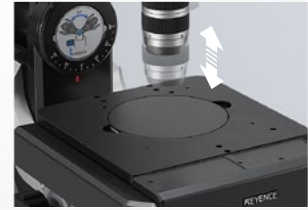


Automatic display of areas with low and high particulate counts

Console for Easily Accessible XYZ Control



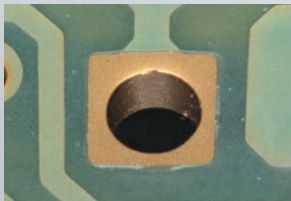
Just move the joystick in order to move the XY stage.



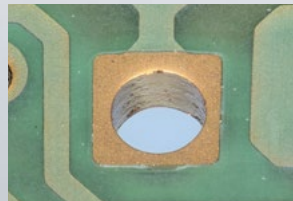
To adjust the lens in the Z-axis, simply rotate the dial. The operation functions similarly to the dial on a conventional microscope, making it intuitive for even first time digital microscope users.

LED Transmitted Illumination

Transmitted lighting comes standard with the motorized XY stage, producing consistent brightness from low to high magnifications. It is also possible to use the LED transmitted lighting in conjunction with reflected illumination from the lens. The light from each source can be adjusted independently, making it possible to perform observation with an optimum balance of light intensity.



Ring lighting



Ring lighting + backlighting

Through-hole (100x)



Rotation Sensor for Accurate Position Recognition*

With this particular XY motorized stage, θ rotation is also possible. The built-in rotation sensor identifies the rotation position from the stage and moves the screen in the same way as shown on the screen when the stage is rotated. This allows users to operate the instrument intuitively and with as little stress as possible.

*VHX-S650E



Rotation angle:
0 degree



The rotation angle does not affect the view

20× to 2000× MAGNIFICATION with a SINGLE LENS

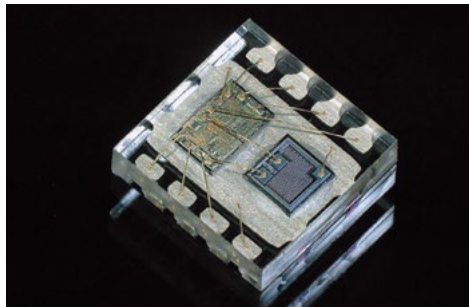


20 ▶ 2000

| | |
|--------------|----------------|
| Polarization | Brightfield |
| Darkfield | Mixed lighting |

100× zoom ratio with a single lens

LOW
MAGNIFICATION



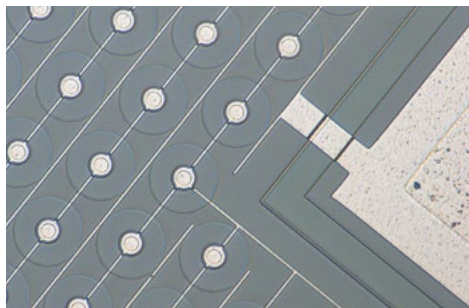
Light sensor (50×)



Metal cross-section (20×)



HIGH
MAGNIFICATION



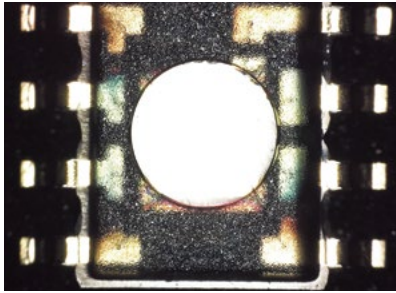
Light sensor (1500×)



Metal cross-section (1500×)

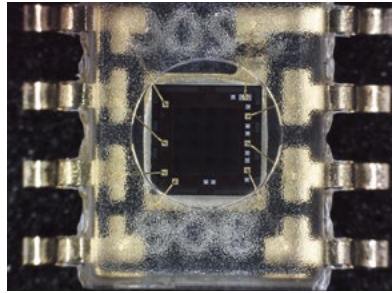
Built-in brightfield, darkfield, and mixed lighting to view any sample

Combines the lighting techniques of a metallurgical microscope (brightfield) and stereoscope (darkfield) so that optimal lighting can be achieved for any sample. Exact lighting conditions can be saved and recalled later for fast, reproducible imaging.



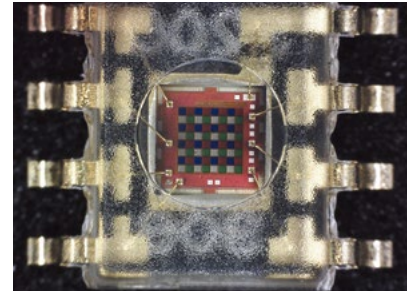
BRIGHTFIELD

The surface of the package area reflects too much light, and it cannot be seen clearly.



DARKFIELD

The light is scattered and not enough light is received by the lens to observe the sensor.



MIXED LIGHTING

Combining brightfield and darkfield lighting allows for clear observation of the entire sample.

Easy observation, even at an angle



The compact design of the dual objective zoom lens along with the flexibility of the free-angle stand means that you can easily view your sample from any angle, at any magnification.

| Model | | VH-ZST | | | | | |
|-----------------------------|----------------|-------------|--------------|--------------|--------------|--------------|--------------|
| Magnification ^{*1} | | 20x | 100x | 200x | 500x | 1000x | 2000x |
| Field-of-view (mm inch) | H (Horizontal) | 15.24 0.60" | 3.05 0.12" | 1.52 0.0598" | 0.61 0.0240" | 0.30 0.0118" | 0.15 0.0059" |
| | V (Vertical) | 11.4 0.45" | 2.28 0.0898" | 1.14 0.0449" | 0.46 0.0181" | 0.23 0.0091" | 0.11 0.0043" |
| | D (Diagonal) | 19.05 0.75" | 3.81 0.15" | 1.91 0.0752" | 0.76 0.0299" | 0.38 0.0150" | 0.19 0.0075" |
| Working distance (mm inch) | | 15 0.59" | | | | | |

*1 Magnification using a 1/2-inch CCD camera and 15-inch monitor.

Industry-Leading High-Resolution RZ Lenses



TRIPLE'R-compliant lenses are fitted with Automatic Lens/Zoom Recognition units.

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

0.1 ▶ 50

Macro zoom lens

With a magnification range from 0.1x to 50x, a target can be viewed from its entirety down to more in-depth observation. This macro lens excels in workability and high performance with click-style magnification adjustment, an aperture mechanism, and a viewing distance of 95 mm 3.74" or more.

| Model | VH-Z00R/Z00T | | | | | | | |
|----------------------------|----------------------------|-----------------|--------------------------|---------------|---------------|---------------|---------------|--------------|
| Magnification* | 0.1x | 0.5x | 1x | 5x | 10x | 30x | 50x | |
| 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" | 6.1 0.24" |
| | Vertical | 2400 94.49" | 480 18.90" | 240 9.45" | 45.5 1.79" | 22.8 0.90" | 7.6 0.30" | 4.6 0.18" |
| | Diagonal | 4000 157.48" | 800 31.50" | 400 15.75" | 76.2 3.00" | 38.1 1.50" | 12.7 0.50" | 7.6 0.30" |
| Working distance (mm inch) | Approx. 7700 303.15" | Approx. 1500 | Approx. 720 28.35" | 95 3.74" | | | | |

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



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

20 ▶ 200

High-resolution imaging with a large depth-of-field

The VH-Z20R/Z20T offers high-resolution observation at general purpose magnifications of 20x - 200x. This lens has been designed to optimize both depth-of-field and resolution and can also be used in handheld mode.

| Model | VH-Z20R/Z20T | | | | | | |
|----------------------------|---------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|
| Magnification* | 20x | 30x | 50x | 100x | 150x | 200x | |
| Field of view (mm inch) | Horizontal | 15.24 0.60" | 10.16 0.40" | 6.10 0.24" | 3.05 0.12" | 2.03 0.0799" | 1.52 0.0598" |
| | Vertical | 11.40 0.45" | 7.60 0.30" | 4.56 0.18" | 2.28 0.0898" | 1.52 0.0598" | 1.14 0.0449" |
| | Diagonal | 19.05 0.75" | 12.70 0.50" | 7.62 0.30" | 3.81 0.15" | 2.54 0.10" | 1.91 0.0752" |
| Depth of field (mm inch)*2 | 34 1.34" | 15.5 0.61" | 6.0 0.24" | 1.6 0.0630" | 0.74 0.0291" | 0.44 0.0173" | |
| 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

High-performance lens with long working distance

This innovative lens was developed to satisfy the need for high-resolution, long working distance, and large depth-of-field.

- Brightfield
- Darkfield
- Polarization

| Model | VH-Z100R/Z100T | | | | | | |
|----------------------------|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Magnification* | 100x | 200x | 300x | 500x | 700x | 1000x | |
| Field of view (mm inch) | Horizontal | 3.05 0.12" | 1.53 0.0602" | 1.02 0.0402" | 0.61 0.0240" | 0.44 0.0173" | 0.30 0.0118" |
| | Vertical | 2.28 0.0898" | 1.14 0.0449" | 0.76 0.0299" | 0.46 0.0181" | 0.33 0.0130" | 0.23 0.0091" |
| | Diagonal | 3.81 0.15" | 1.90 0.0748" | 1.27 0.0500" | 0.76 0.0299" | 0.54 0.0213" | 0.38 0.0150" |
| Working distance (mm inch) | 25.098" (20 0.79")* | | | | | | |

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

*2 With triple illumination adapter attached



Dual-Light High-Magnification Zoom Lens VH-Z250R/Z250T

250 ▶ 2500

Observe with both brightfield and darkfield at high-magnification

Easily switch between ring and coaxial illumination with just the touch of a button. View objects at up to 2500x magnification while still maintaining a 6.5 mm 0.26" working distance.

- Brightfield
- Darkfield

| Model | VH-Z250R/Z250T | | | | | | | |
|----------------------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Magnification* | 250x | 300x | 500x | 1000x | 1500x | 2000x | 2500x | |
| Field of view (mm inch) | Horizontal | 1.22 0.0480" | 1.02 0.0402" | 0.61 0.0240" | 0.31 0.0122" | 0.2 0.0079" | 0.15 0.0059" | 0.12 0.0047" |
| | Vertical | 0.92 0.0362" | 0.76 0.0299" | 0.46 0.0181" | 0.23 0.0091" | 0.15 0.0059" | 0.11 0.0043" | 0.09 0.0035" |
| | Diagonal | 1.52 0.0598" | 1.27 0.0500" | 0.76 0.0299" | 0.38 0.0150" | 0.25 0.0098" | 0.19 0.0075" | 0.15 0.0059" |
| 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-Z500R/Z500T

500 ▶ 5000

Our highest magnification/resolution zoom lens

This zoom lens incorporates high-quality fluorite optics to provide the highest resolution in its class. With an N.A. of 0.82, achieve up to 5000x magnification with a 4.4 mm 0.17" working distance.

| Model | VH-Z500R/Z500T | | | | | |
|----------------------------|----------------|---------------|---------------|--------------|--------------|-------------|
| Magnification* | 500x | 1000x | 2000x | 3000x | 5000x | |
| Field of view (mm inch) | Horizontal | 610 24.05" | 305 12.01" | 152 5.99" | 102 4.01" | 61 2.39" |
| | Vertical | 457 18.00" | 229 9.01" | 114 4.50" | 76 2.99" | 46 1.81" |
| | Diagonal | 762 29.99" | 381 15.00" | 191 7.50" | 127 5.00" | 76 2.99" |
| Working distance (mm inch) | 4.4 0.17" | | | | | |

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



Dual Objective Zoom Lens – 20x to 2000x with no need to change lenses

Dual Objective Zoom Lens **VH-ZST**

20 → 2000

Unmatched 100:1 zoom ratio

Achieve a wide magnification range without changing the lens. Utilizing lens-controlled mixed lighting and various optical adapters, the VH-ZST provides a wide variety of illumination options to enable observation that best suits the target.

| | |
|----------------|--------------|
| Brightfield | Darkfield |
| Mixed lighting | Polarization |

| Model | VH-ZST | | | | | | |
|----------------------------|------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Magnification* | 20x | 100x | 200x | 500x | 1000x | 2000x | |
| Field of view (mm/inch) | Horizontal | 15.24 0.60" | 3.05 0.12" | 1.52 0.0598" | 0.61 0.0240" | 0.30 0.0118" | 0.15 0.0059" |
| | Vertical | 11.4 0.45" | 2.28 0.0898" | 1.14 0.0449" | 0.46 0.0181" | 0.23 0.0091" | 0.11 0.0043" |
| | Diagonal | 19.05 0.75" | 3.81 0.15" | 1.91 0.0752" | 0.76 0.0299" | 0.38 0.0150" | 0.19 0.0075" |
| Working distance (mm/inch) | 15 0.59" | | | | | | |

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



A Single Lens Capable of Performing a Variety of Observations

RZ LENS
Real Zoom Lens

TRIPLE'R-compliant lenses are fitted with Automatic Lens/Zoom Recognition units.

Universal Zoom Lens **VH-Z20UR/Z20UT**

20 → 200

Optimal lighting with the touch of a button

This lens has the ability to perform brightfield, darkfield, and DIC observation, even at lower magnification ranges. A unique illumination system allows users to switch between three different types of lighting by simply pressing a button.

| | |
|-------------|-----------|
| Brightfield | Darkfield |
| Partial | DIC |

| Model | VH-Z20UR/Z20UT | | | | | | |
|----------------------------|----------------|----------------|---------------|---------------|-----------------|-----------------|-----------------|
| Magnification*1 | 20x | 40x | 80x | 100x | 160x | 200x | |
| Field of view (mm/inch) | Horizontal | 15.24 0.60" | 7.62 0.30" | 3.81 0.15" | 3.05 0.12" | 1.91 0.0752" | 1.52 0.0598" |
| | Vertical | 11.40 0.45" | 5.70 0.22" | 2.85 0.11" | 2.28 0.0898" | 1.43 0.0563" | 1.14 0.0449" |
| | Diagonal | 19.05 0.75" | 9.53 0.38" | 4.76 0.19" | 3.81 0.15" | 2.38 0.0937" | 1.91 0.0752" |
| Working distance (mm/inch) | 20.8 0.82**2 | | | | | | |

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

*2 When used with the wide-area illumination attachment.



Universal Zoom Lens **VH-Z100UR/Z100UT**

100 → 1000

Differential Interference Contrast (DIC) lens

Brightfield, darkfield, polarized, transmitted, and DIC observation can be performed with this lens. DIC observation makes it possible to clearly visualize surface topography of low-contrast and transparent objects - typically difficult with conventional brightfield lighting.

| | |
|--------------|-----------|
| Brightfield | Darkfield |
| Polarization | DIC |

| Model | VH-Z100UR/Z100UT | | | | | | |
|----------------------------|-----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Magnification*1 | 100x | 200x | 300x | 500x | 700x | 1000x | |
| Field of view (mm/inch) | Horizontal | 3.05 0.12" | 1.53 0.0602" | 1.02 0.0402" | 0.61 0.0240" | 0.44 0.0173" | 0.30 0.0118" |
| | Vertical | 2.28 0.0898" | 1.14 0.0449" | 0.76 0.0299" | 0.46 0.0181" | 0.33 0.0130" | 0.23 0.0091" |
| | Diagonal | 3.81 0.15" | 1.90 0.0748" | 1.27 0.0500" | 0.76 0.0299" | 0.54 0.0213" | 0.38 0.0150" |
| Working distance (mm/inch) | 25 0.98" (20 0.79**2) | | | | | | |

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

*2 With triple illumination adapter attached



Capture clear images from a distance – LW Lenses

LW LENS
Long Working Lens

TRIPLE'R-compliant lenses are fitted with Automatic Lens/Zoom Recognition units.

Long-Working-Distance, High-Performance Zoom Lens **VH-Z50L/Z50T**

50 → 500

Long-Range Lens with an 85 mm 3.35" Working Distance

Enables high-magnification observation while maintaining a long working distance. This lens is ideal for viewing objects that have highly-irregular surfaces or recesses that cannot be observed up close.

| Model | VH-Z50L/Z50T | | | | | |
|----------------------------|--------------|---------------|-----------------|-----------------|-----------------|-----------------|
| Magnification* | 50x | 100x | 200x | 300x | 500x | |
| Field of view (mm/inch) | Horizontal | 6.09 0.24" | 3.05 0.12" | 1.53 0.0602" | 1.02 0.0402" | 0.76 0.0299" |
| | Vertical | 4.57 0.18" | 2.28 0.0898" | 1.14 0.0449" | 0.76 0.0299" | 0.57 0.0224" |
| | Diagonal | 7.62 0.30" | 3.81 0.15" | 1.90 0.0748" | 1.27 0.0500" | 0.95 0.0374" |
| Working distance (mm/inch) | 85 3.35" | | | | | |

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



Base Model
VHX-900F

Advanced Microscope Functions in a Simple-to-Operate Package



LARGE DEPTH-OF-FIELD

Get more than 20 times the depth-of-field compared with optical microscopes.

VIEW, CAPTURE, AND MEASURE WITH JUST ONE DEVICE

By integrating optics, a digital camera, electronics, and software, users can perform the complete inspection and analysis process using a single system.

FREE-ANGLE OBSERVATION

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

QUICK DEPTH COMPOSITION AND 3D DISPLAY FUNCTIONS

Capture fully focused images even for targets with irregular surfaces.

Free-Angle Observation System VH-S30F/S30B

EASY FOCUS ADJUSTMENT

X-Y stage movement and rotation, and oblique axis motion. A custom mechanism allows the target to stay centered in the field-of-view even if the lens unit is tilted or rotated.

QUICK SETUP MARKS

Setup marks are provided as a guide for setting the ideal positions for different lenses, allowing for quick lens exchange.

CABLE HOLDER

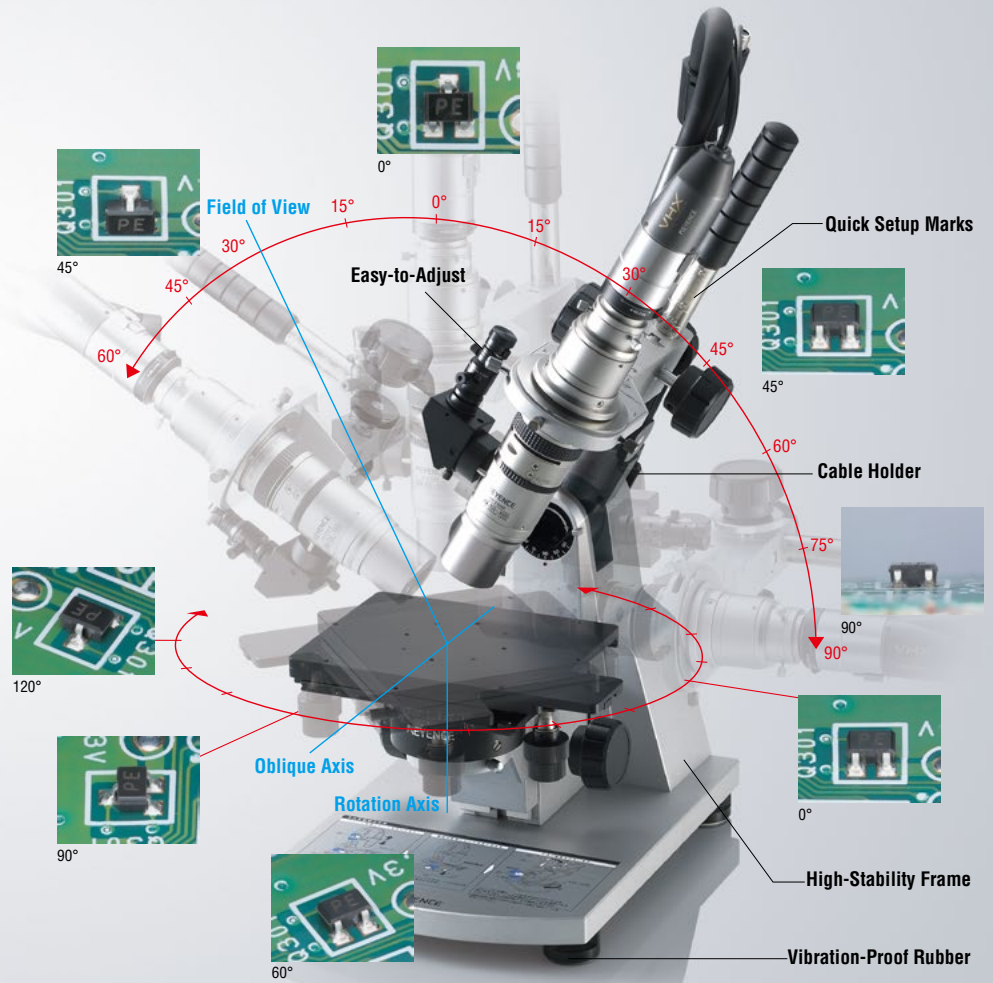
The cable is held in place to prevent vibrations and to protect the cable from abrasions and deterioration.

VIBRATION-PROOF RUBBER

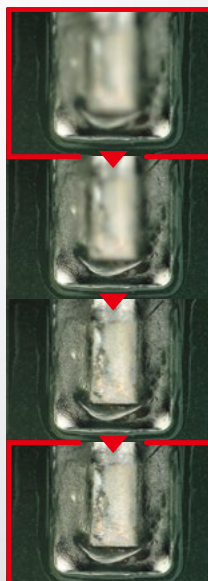
Absorbs low- to high-frequency vibrations so users can perform stable imaging at all magnifications.

HIGH-STABILITY FRAME

The die-cast main body provides a high-rigidity structure with a low center of gravity that allows for highly stable observations.



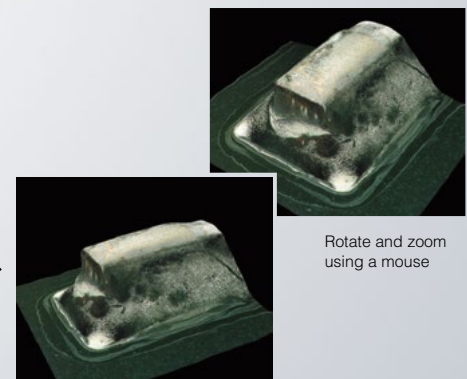
Focus on the lowest area...



"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.



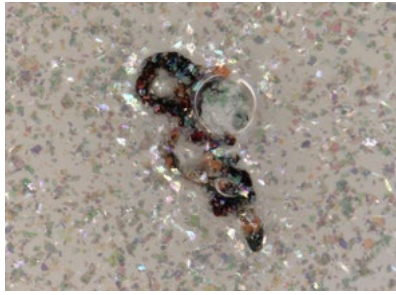
Rotate and zoom using a mouse

True-to-life 3D display

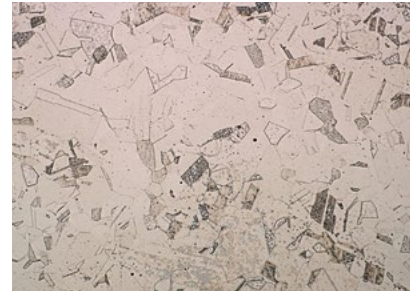
AUTOMOTIVE AND METAL INDUSTRIES



Gear (50x)

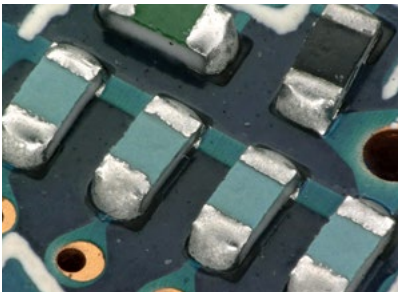


Foreign particle in paint (500x)

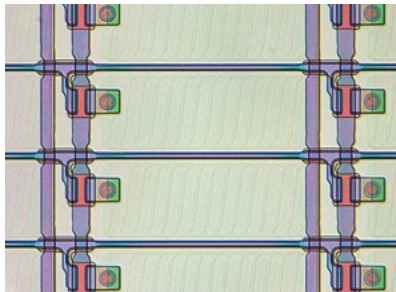


Metal structure (100x)

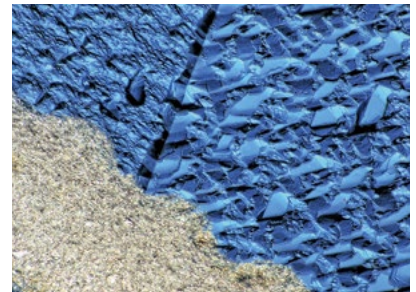
ELECTRICAL MACHINERY AND ELECTRONICS INDUSTRIES



Capacitor (100x)

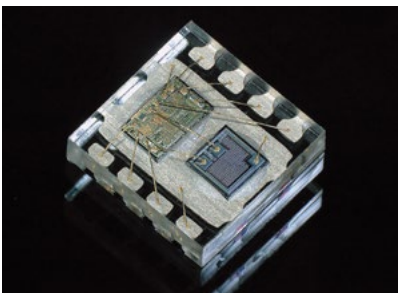


ITO film (1000x)

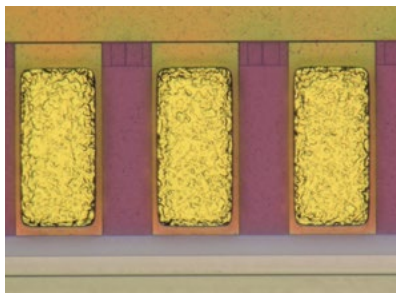


Solar cell (1000x)

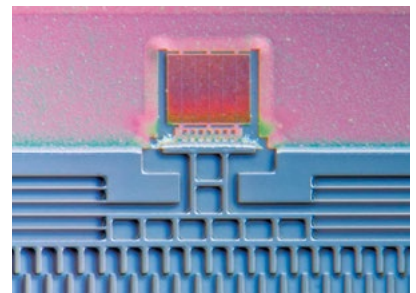
SEMICONDUCTOR INDUSTRY



Light sensor (50x)



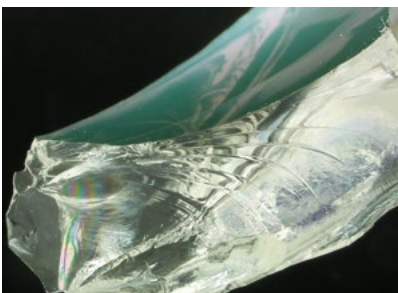
Solder bump (1000x)



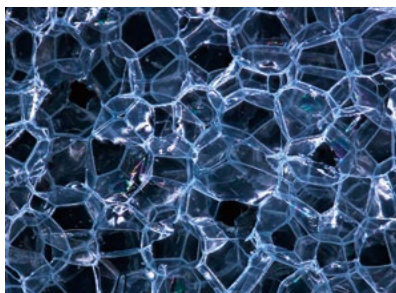
MEMS red variable-cycle guided mode resonant grating (1000x)

Made available by Hane-Sasaki/Kanamori Labs,
Department of Nanomechanics,
Tohoku University Graduate School of Engineering

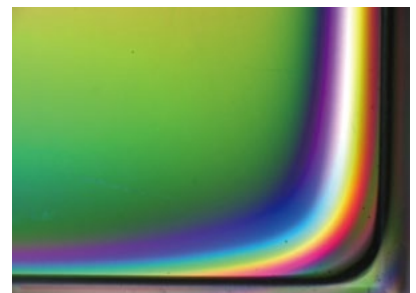
MATERIAL AND CHEMICAL INDUSTRIES



Fractured glass (20x)



Insulation material (100x)

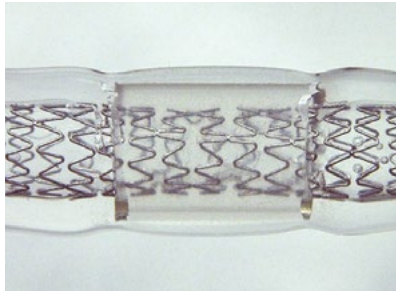


Residual stress (700x)

PHARMACEUTICAL AND MEDICAL DEVICE INDUSTRIES

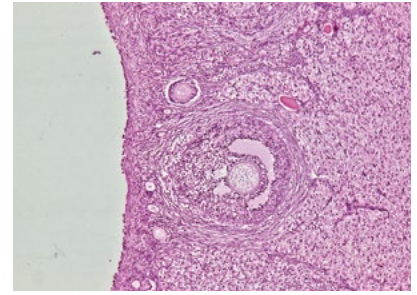


Bath additive (20x)



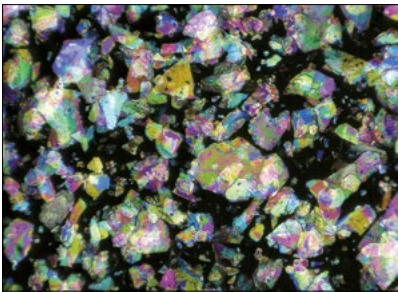
Stent for expanding catheters (100x)

Offered by the Center for Advanced Biomedical Sciences, TWIns, Waseda University, and the Umezū Laboratory, Faculty of Science and Engineering, School of Creative Science and Engineering

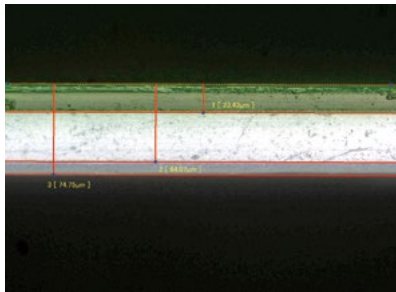


Ovary (200x)

OTHER INDUSTRIES



Mica (500x)



Cross-section of multi-layered film (1000x)



Human skin (50x)

VHX
DIGITAL MICROSCOPE

Stereoscopic microscope

Metallurgical microscope

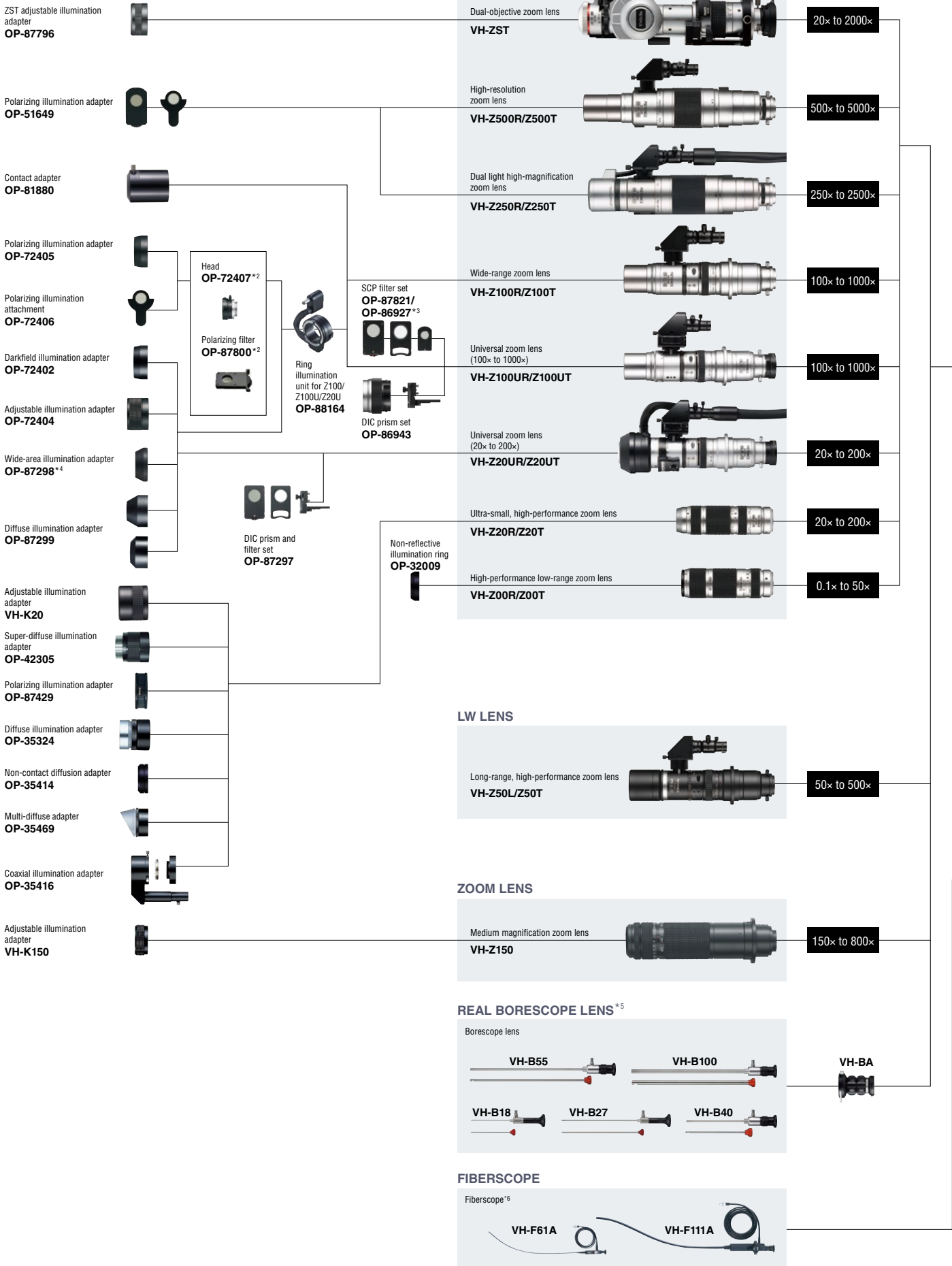
Achieve 0.1x to 5000x with a single unit

Electron microscope

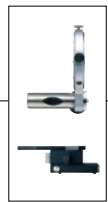
Measuring microscope

SYSTEM CONFIGURATION DIAGRAM

VHX Series System Line Up



Lens joint
**VHX-J00T/
 J20T/J20UT/
 J50T/J100T/
 J250T/J500T/
 JZST**



Bayonet-type
 standard
 attachment
**OP-51478/
 OP-66871**^{*7}

VHX-6100

VHX-6020

VHX-A60^{*8}

VHX-6000

VHX-5020

VHX-A90F^{*9}

VHX-900F

Bayonet-type C-mount
 attachment
OP-51479

Camera lens (C-mount type)

^{*10}

Microscope

Stages



Free-angle
 observation system
VHX-S650E
 (XYZ motorized)
VHX-S600E
 (Z motorized)



Large free-angle observation
 system
VHX-S660E
 (XYZ motorized)



Free-angle observation system
VH-S300
 (Manual)



Free-angle observation system
VH-S30F/S30B



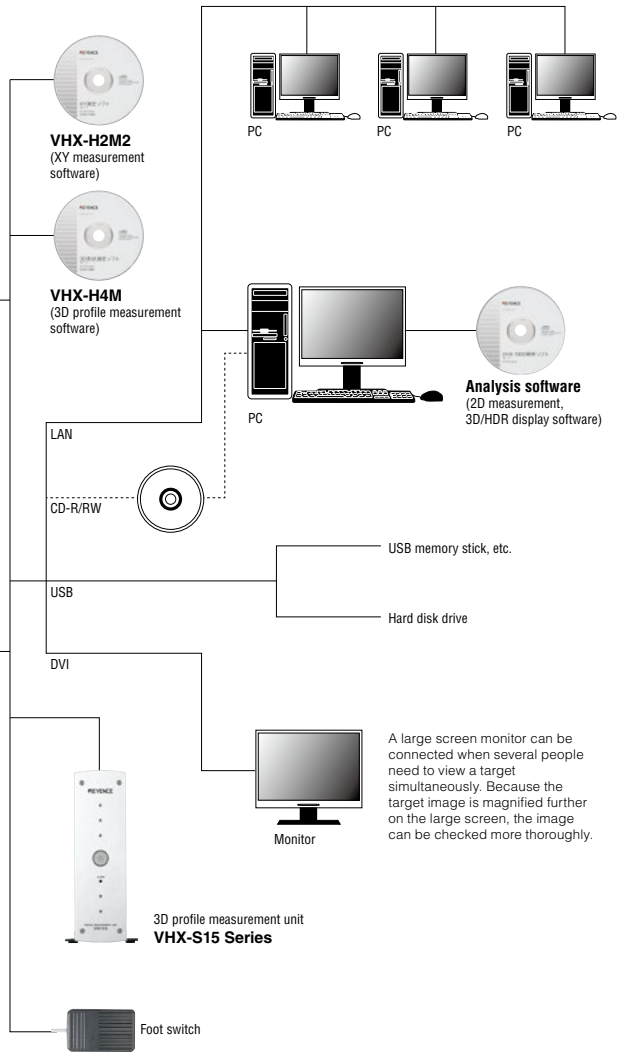
VH lens mounting stand
OP-25539
 XY stage
OP-22124



XY measurement system
VH-M100E



Z-axis motorized stage
VHX-S600F
 (Z motorized head only)



VHX-H2M2
 (XY measurement
 software)

VHX-H4M
 (3D profile measurement
 software)

Analysis software
 (2D measurement,
 3D/HDR display software)

PC PC PC

PC

LAN

CD-R/RW

USB

DVI

USB memory stick, etc.

Hard disk drive

Monitor

A large screen monitor can be
 connected when several people
 need to view a target
 simultaneously. Because the
 target image is magnified further
 on the large screen, the image
 can be checked more thoroughly.

3D profile measurement unit
VHX-S15 Series

Foot switch

^{*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} OP-72407 is required when using VH-Z100R. Use OP-87800 when using the VH-Z100T/VH-Z100UR/VH-Z100UT. ^{*3} For the VH-Z100UT, use the OP-87821. For the VH-Z100UR, use the OP-86927.
^{*4} Included as standard with the VH-Z20UR/Z20UT. ^{*5} A real-bore cable (OP-87201) is required. ^{*6} The dedicated light guide attachment (OP-87790) is required.
^{*7} OP-66871 is required when the VH-Z00R or Z20R is used. ^{*8} Models may vary according to the instrument language. VHX-A60 (Japanese) / VHX-A60D (German) / VHX-A60C (Simplified Chinese) / VHX-A60W (Traditional Chinese) / VHX-A60F (French) / VHX-A60K (Korean) / VHX-A60M (Spanish).
^{*9} Models may vary according to the instrument language. VHX-A90F (Japanese) / VHX-A90FE (English) / VHX-A90FD (German) / VHX-A90FC (Simplified Chinese) / VHX-A90FW (Traditional Chinese) / VHX-A90FF (French) / VHX-A90FK (Korean) / VHX-A90FM (Spanish). ^{*10} A C-mount adapter suitable for the microscope is required.

SPECIFICATIONS

Basic functions: Controller

| Model | | VHX-6000 | VHX-900F | |
|--|--|--|--|--|
| Camera | Image sensor | 1/1.8-inch CMOS image sensor Virtual pixels: 1600 (H) × 1200 (V) | 1/1.8-inch CMOS image sensor Virtual pixels: 1600 (H) × 1200 (V) | |
| | Scanning system | Progressive | Progressive | |
| | Frame rate | 50 F/s (max.) | 50 F/s (max.) | |
| | Image resolution | Normal | 1600 (H) × 1200 (V), Approx. 1000 TV lines | 1600 (H) × 1200 (V), Approx. 1000 TV lines |
| | | 3CMOS ^{*1*} | 1600 (H) × 1200 (V), Approx. 1200 TV lines or more (2 million pixels × 3CMOS mode, Excellent color reproducibility) | Not available |
| | | High resolution ^{*3} | 3200 (H) × 2400 (V), Approx. 1600 TV lines | Not available |
| | | Super Fine ^{*3} | 4800 (H) × 3600 (V), Approx. 2000 TV lines or more | Not available |
| | Super Fine × 3CMOS ^{*2*} | 4800 (H) × 3600 (V), Approx. 2000 TV lines or more (18 million pixels × 3CMOS mode, Excellent Color reproducibility) | Not available | |
| | High Dynamic Range | 16-bit intensity range through RGB data from each pixel | Not available | |
| | Gain | Auto, Manual, Preset | Auto, 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 | | |
| Supercharge shutter | 0.02 to 4 s | 0.02 to 4 s | | |
| White balance | Push set, Auto, Manual, Preset (2700K, 3200K, 5600K, 9000K) | Push set, Auto, Manual, Preset (2700K, 3200K, 5600K, 9000K) | | |
| Back-focus adjustment | Not required | Not required | | |
| LCD monitor ^{*5} | Size | Color LCD (IPS) 23" | Color LCD (IPS) 23" | |
| | Screen size | 509.184 (H) × 286.416 (V) mm 20.05"(H) × 11.28"(V) | 509.184 (H) × 286.416 (V) mm 20.05"(H) × 11.28"(V) | |
| | Pixel pitch | 0.2652 (H) × 0.2652 (V) mm 0.01"(H) × 0.01"(V) | 0.2652 (H) × 0.2652 (V) mm 0.01"(H) × 0.01"(V) | |
| | Number of pixels | 1920 (H) × 1080 (V) (FHD) | 1920 (H) × 1080 (V) (FHD) | |
| | Display colors | Approx. 16770000 colors ^{*4} | Approx. 16770000 colors ^{*4} | |
| | Brightness | 300 cd/m ² (Center 1 Point, typical) | 300 cd/m ² (Center 1 Point, typical) | |
| | Contrast ratio | 1000:1 (typical) | 1000:1 (typical) | |
| | Field of view | ±89° (typ., horizontal), ±89° (typ., vertical) | ±89° (typ., horizontal), ±89° (typ., vertical) | |
| CD-R/CD-RW/DVD drive unit | Unit | DVD-ROM super-multi drive unit | DVD-ROM super-multi drive unit | |
| | Applicable disk | CD-R/CD-RW/DVD±R/DVD±R DL/DVD±RW/DVD-RAM | CD-R/CD-RW/DVD±R/DVD±R DL/DVD±RW/DVD-RAM | |
| | Storage capacity | 8.7 GB (when using DVD±R DL) | 8.7 GB (when using DVD±R DL) | |
| Hard disk drive unit | Storage capacity | 500 GB (including 165 GB reserved area) Approx. 1680000 images (when a 2-million-pixel image is compressed) to approx. 550000 images (when a 2-million-pixel image is not compressed) | 500 GB (including 165 GB reserved area) Approx. 1680000 images (when a 2-million-pixel image is compressed) to approx. 550000 images (when a 2-million-pixel image is not compressed) | |
| | | Image format | JPEG (with compression), TIFF (without compression) | |
| Observable image size | | 20000 (H) × 20000 (V) pixels (when stitched) | 1600 (H) × 1200 (V) pixels | |
| Light source | Lamp | High-brightness LED | High-brightness LED | |
| | Lamp life | 40000 hours (reference) | 40000 hours (reference) | |
| | Color temperature | 5700K (typical) | 5700K (typical) | |
| Video output | Output method | DVI-I (1920 × 1080 pixels) | DVI-I (1920 × 1080 pixels) | |
| | Scanning frequency | Special LCD monitor | 66 kHz (H), 60 Hz (V) | |
| | | External monitor | 66 kHz (H), 60 Hz (V) | |
| Input | Mouse input | USB mouse supported | USB mouse supported | |
| | Keyboard input | USB keyboard supported | USB keyboard supported | |
| | External remote input | Pause/Recording, Non-voltage input (Contact/Noncontact) | Pause/Recording, Non-voltage input (Contact/Noncontact) | |
| Interfaces | LAN | RJ-45 (10BASE-T/100BASE-TX/1000BASE-T) | RJ-45 (10BASE-T/100BASE-TX/1000BASE-T) | |
| | USB 2.0 Series A | 6 types | 6 types | |
| | USB 3.0 Series A | 2 types | 2 types | |
| Power supply | Power voltage | 100 to 240 VAC, 50/60 Hz | 100 to 240 VAC, 50/60 Hz | |
| | Power consumption | 280 VA | 280 VA | |
| Environmental resistance | Ambient temperature | +5 to 40°C 41 to 104°F | +5 to 40°C 41 to 104°F | |
| | Relative humidity | 35 to 80% RH (No condensation) | 35 to 80% RH (No condensation) | |
| Weight | Controller | Approx. 12.5 kg | Approx. 12.5 kg | |
| | Camera unit | Approx. 1.2 kg (VHX-6100/6020) | Approx. 1.0 kg (VHX-5020) | |
| | Console | Approx. 0.5 kg | Approx. 0.3 kg | |
| Dimensions (Excluding the projected areas) | | 550 (W) × 470 (H) × 200 (D) 21.65"(W) × 18.50"(H) × 7.87"(D) (when stored) | 550 (W) × 470 (H) × 200 (D) 21.65"(W) × 18.50"(H) × 7.87"(D) (when stored) | |

*1. Compared with the standard mode, resolution and color reproducibility are improved.

*2. Compared with the high-resolution HD mode, color reproducibility is improved.

*3. Supported only with the VHX-6100 multi-scan camera.

*4. Approx. 16.77 million colors can be reproduced with the FRC processing of the display controller.

*5. The LCD monitor provided with the VHX Series is based on advanced technology. Rarely, an unlit pixel (black spot) or lit pixel (bright spot) may exist on the monitor screen. However, this is not an indication of the LCD monitor being defective.

Basic functions: Stage

| | | VHX-S660E | VHX-S650E | VHX-S600E | VH-S300 | VH-S30F/S30B |
|--------------------------|-----------------------------------|--|--|--|--|--|
| XYθ stage | XY stage: Motorized/Manual | Motorized | Motorized | Manual | Manual | Manual |
| | XY-motorized stage motor | 2-phase stepping motor | 2-phase stepping motor | — | — | — |
| | XY-motorized stage resolution | 1 μm (typ.) | 1 μm (typ.) | — | — | — |
| | XY-motorized stage movement speed | 20 mm 0.79"/sec (max.) | 10 mm 0.39"/sec (max.) | — | — | — |
| | XY-stage movement range | ±50 mm ±1.97" | ±20 mm ±0.79" | ±35 mm ±1.38" | ±35 mm ±1.38" | X: ±37.5 mm ±1.48", Y: ±25 mm ±0.98" |
| | θ rotation angle | — | ±90° | 360° | 360° | 360° |
| | XYθ stage size | Top surface: 233 × 185 mm 9.17" × 7.28" (Center disc: ø168 ø6.61") | Top surface: 171 × 168 mm 6.73" × 6.61" (Center disc: ø100 ø3.94") | Top surface: 198 × 150 mm 7.80" × 5.91" (Center disc: ø136 ø5.35") | Top surface: 190 × 150 mm 7.48" × 5.91" | Top surface: 180 × 136 mm 7.09" × 5.35" |
| Transmitted lighting | Provided | Provided | Provided | — | — | |
| Z stage | Z stage: Motorized/Manual | Motorized | Motorized | Motorized | Manual | Manual |
| | Z-motorized stage motor | 5-phase stepping motor | 5-phase stepping motor | 5-phase stepping motor | — | — |
| | Z-motorized stage resolution | 0.1 μm (typ.) | 0.1 μm (typ.) | 0.1 μm (typ.) | — | — |
| | Z-motorized stage travel speed | 17 mm 0.67"/sec (max) | 17 mm 0.67"/sec (max) | 17 mm 0.67"/sec (max) | — | — |
| | Z-stage movement range | 49 mm 1.93" | 49 mm 1.93" | 49 mm 1.93" | 53 mm 2.09" | 28 mm 1.10" |
| Ratings | Power voltage | 100 to 240 VAC, 50/60 Hz | 100 to 240 VAC, 50/60 Hz | — | — | — |
| | Power consumption | 60 VA | 60 VA | 50 VA | — | — |
| Environmental resistance | 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 | — | — |
| | Relative humidity | 35 to 80% RH (No condensation) | 35 to 80% RH (No condensation) | 35 to 80% RH (No condensation) | — | — |
| Weight | | Approx. 20 kg | Approx. 18 kg | Approx. 17.2 kg | Approx. 17.4 kg | Approx. 12 kg |
| Load capacity | | 5 kg | 5 kg | 5 kg | 1 kg | 1 kg |

Other functions

| Model | | VHX-6000 | Console compatibility | VHX-900F | Console compatibility |
|---|---|---|-----------------------|---|-----------------------|
| Observation functions | Auto-focus function | Available | ✓ | Available | ✓ |
| | Focus amount display function | Available | | Not available | |
| | Lighting switch function (Uneven surface enhancement) | Available (Full, partial, lateral, darkfield, brightfield, combination lighting) | ✓ | Available (Full, partial, lateral, darkfield, brightfield, combination lighting) | ✓ |
| | Multi-lighting function | Available | ✓ | Not available | |
| | Camera-shake correcting function | Available | ✓ | Available | ✓ |
| Display function | Full-screen display | Available | ✓ | Available | ✓ |
| | Screen segmentation function | Vertical, horizontal, 2 × 2 split, 3 × 3 split, linked display function | | Vertical, horizontal, 2 × 2 split, 3 × 3 split, linked display function | |
| | Real-time digital zoom | 1.0x to 10.0x | | 1.0x to 10.0x | |
| | Comment display function | Available | | Available | |
| Image quality improvement function | Glare removal function | Available | ✓ | Available | ✓ |
| | Ring removal function | Available | ✓ | Not available | |
| | HDR function | Available | ✓ | Not available | |
| | High-resolution HDR function | Available | ✓ | Not available | |
| | Optimize mode (9 types) (Optimal image) | Available (Automatically lists 9 image modes, allowing optimal image selection) | | Available (Automatically lists 9 image modes, allowing optimal image selection) | ✓ |
| | Fine-shot function | Available | ✓ | Not available | |
| Stitching function | 2D image stitching | Available | ✓ | Not available | |
| | 3D image stitching | Available | ✓ | Not available | |
| | Navigation function | Available | | Not available | |
| 3D function | Real-time depth composition | Available | ✓ | Not available | |
| | Quick composition & 3D function | Available | ✓ | Available | ✓ |
| | High-quality depth composition | Available | | Available | |
| | 3D display function | Available | | Available | |
| | 3D shape correction function | Available (Slope/Sphere/Cylinder) | | Available (Slope) | |
| | 3D comparison function | Available (Combination/Comparison/Difference display mode) | | Available (Combination/Comparison/Difference display mode) | |
| Recording function | Report output (Excel/Word) | Available | | Available | |
| | Capture setting reproduction function | Available | | Available | |
| | Timer capture function | Available | | Available | |
| | Video recording/playback function | 50 frames/sec. max. (Image size: 1600 × 1200, 800 × 600, 640 × 480) | | 30 frames/sec. max. (Image size: 1600 × 1200, 800 × 600, 640 × 480) | |
| Measuring functions | Distance, angle, radius, area, etc. | Variously available | | Variously available | |
| | Automatic edge detection | Available | | Available | |
| | Scale display | Variously available | ✓ | Variously available | ✓ |
| | Automatic count and area measurement function | Available (Enables distance/area measurement through brightness/color extraction) | | Available (Enables distance/area measurement through brightness/color extraction) | |
| | Automatic area measurement | Available | | Not available | |
| | Grain size analysis | Available | | Not available | |
| | Contamination analysis | Available | | Not available | |
| | One-click measurement | Available | | Not available | |
| | Auto measurement | Available | | Not available | |
| | Automatic lens/zoom recognition function (TRIPLE'R) | Available | | Available | |
| | Auto calibration | Available (No input of values required) | | Available (No input of values required) | |
| | One push calibration function | Available (No scale position adjustment required) | | Not available | |
| | CSV storage | Available | | Available | |
| 3D measurement function (VHX-H4M/VHX-S15 optional function) | 3D profile measurement | Available | | Available | |
| | Point height measurement | Available | | Not available | |
| | 3D volume measurement | Available | | Available | |
| | Roughness measurement | Available | | Not available | |
| Manual XY measurement system (VHX-H2M2 optional function) | XY stage measurement | Available | | Available | |
| | Wide image display function | Available | | Available | |
| Utilities | Simple mode | Available | ✓ | Available | ✓ |
| | Space-saving all-in-one design | Available | | Available | |
| | Foot switch compatibility | Available | | Available | |
| | User-specific setting memory | Available | | Available | |
| | System protection setting | Available | | Available | |
| | PC mode | Available | | Available | |
| | Network connection function | Available (Communication software / File sharing / FTP) | | Available (Communication software / File sharing / FTP) | |
| | Function guide | Available | | Available | |
| Video help | Available | | Not available | | |
| PC software (Available free of charge) | Communication software | Easily transmits image data between the VHX and the PC. (LAN) | | Easily transmits image data between the VHX and the PC. (LAN) | |
| | 3D image playback software for the PC | Plays back 3D images saved on the VHX using the PC. | | Reproduces 3D images saved on the VHX using the PC. | |
| | Multi-lighting playback software | Allows for the direction of lighting to be adjusted after an image has already been captured. | | Not available | |
| | HDR playback/measurement/stitched image playback software | Adjusts HDR parameters, plays back stitched images, and performs measurement. | | Performs measurement using the PC. | |
| | One-click measurement compilation software | Collects one-click measurement results and exports the results to Excel. | | Not available | |

VHX-6000/900F (Module details)

| Module | | |
|--------|---------------------------------------|---|
| Module | Video recording module | Allows recording/playback of videos. |
| | High-quality depth composition module | Captures multiple images focused on different heights from which a single image is composed |
| | Area measurement module | Measures an area of a 2D image. |
| | Timer capture module | Captures images automatically at specified time intervals. |
| | Screen splitting module | Displays vertical, horizontal, or four-division split screens. |
| | Comment input module | Allows inputting and displaying of comments such as characters and markers on an image. |
| | Image touch-up module | Provides image processing functions for modifying images to make observation easier. |



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SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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| | | | | | | | | | |
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