KEYENCE

NEW Digital Microscope
VHX-600

54 million pixel 3CCD Microscope

VHX
DIGITAL MICROSCOPE

54 million pixel 3CCD

For sharper, clearer images. The VHX has completely changed to perform more precise observation.

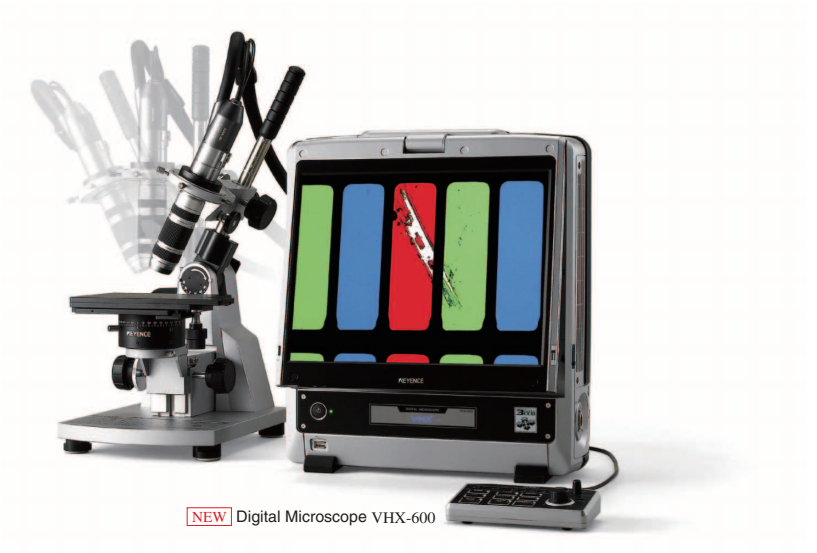
VHX
DIGITAL MICROSCOPE

VHX is the best choice in terms of both image sharpness and comprehensive functionality.

Imaging Technology

3D Observation Technology

Usability & Measurement Technology



NEW Digital Microscope VHX-600

How can we produce sharp and clear observation images?

Versatile functionality and analysis is only of use if high-quality original images can be obtained.
The VHX has succeeded in producing sharper, super high resolution observation images by applying sophisticated technologies to every process from lighting to image generation.

RZ Lens

High-resolution lens which minimizes chromatic aberration and distortion by incorporating high-grade lens components with leading-edge optical design and advanced illumination technology.

54 million pixels 3CCD

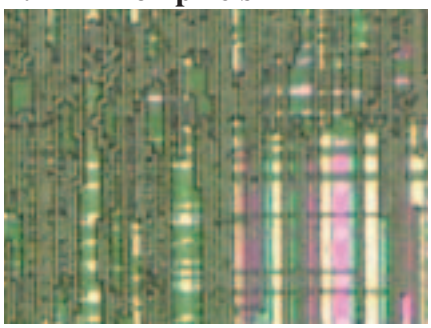
High-performance camera which has achieved minute positioning in the order of sub-pixels through the world's smallest drive mechanism using a piezo actuator.

World's first

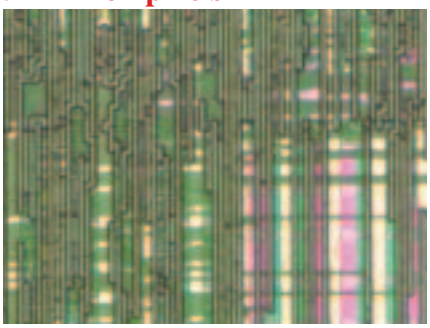
54 million pixel 3CCD handheld camera *1

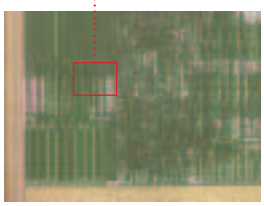
Despite its compact size, the camera includes an actuator to offer a pixel-shift method, achieving observation with super-high resolution of up to 54 million pixels. A flicker-free progressive scan method allows texture expression and color reproduction similar to observation with the naked eye.

2.11 million pixels



54 million pixels





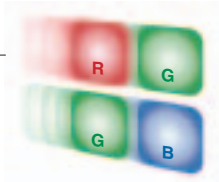
IC (400x)

Selectable resolutions suited for observation purposes

- 54 Mega-pixel, 18 Mega-pixel x 3CCD mode (2000TV lines)
- 18 Mega-pixel ultra-high-definition mode (2000 TV lines)
- 8 Mega-pixel high-definition mode (1600TV lines)
- 6 Mega-pixel, 2 Mega-pixel x 3CCD mode (1200TV lines)
- 4 Mega-pixel-equivalent clear mode [Equivalent to moving image] (1200TV lines)
- 2.11 Mega-pixel normal mode (1000TV lines)

What is the pixel-shift method?

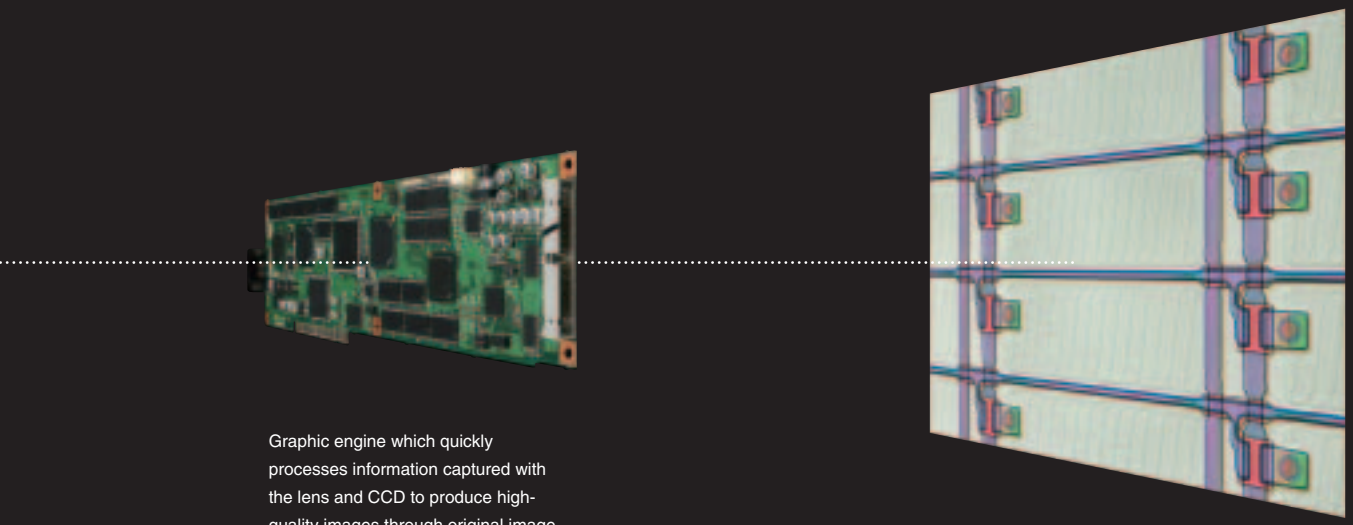
The camera takes a total of nine images to produce a single image by actually shifting the CCD horizontally and vertically by 1/3 pixel. Moreover, it obtains RGB data from each pixel. This produces sharp observation images with excellent color reproduction.



Frame rate 15 F/sec

With a frame rate of 15 frames/second, the VHX-600 provides excellent tracking ability, allowing magnification change and focus adjustment to be performed smoothly.

*1= The 18 million pixels x 3CCD mode achieves both excellent color reproduction and super high resolution images.



Graphic engine which quickly processes information captured with the lens and CCD to produce high-quality images through original image processing technology.

Quick processing to produce superior images

High-performance graphic engine

This high-performance graphic engine quickly processes complicated information to enable observation of profiles which could not be observed with conventional systems. It is ideal for magnified observation.

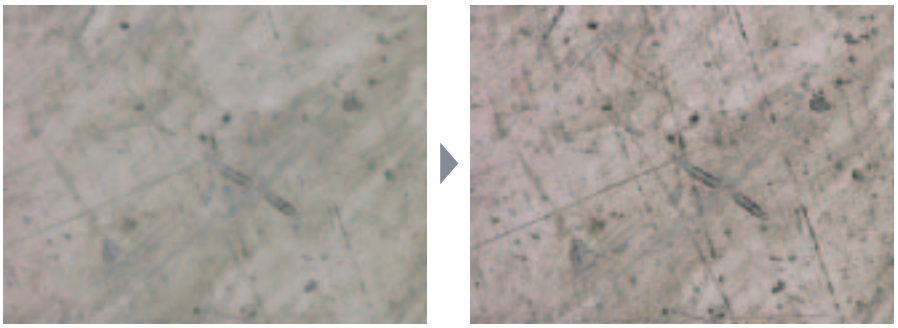


Image processed with conventional engine

VHX-600 Image

Vivid & sharp image mode

Industry-first

The image of a target with complicated texture information can be produced by enhancing a desired area.

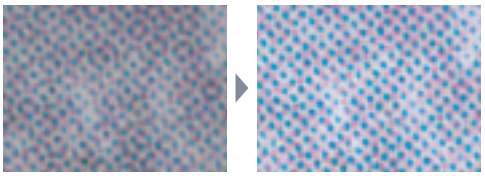


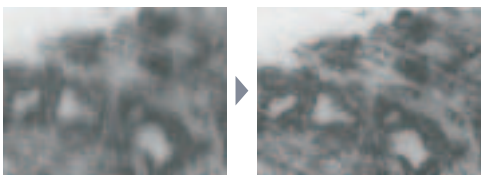
Image processed with conventional engine

Vivid and sharp image

Camera-shake correction function

Industry-first

Through further improvement of the processing capacity, the VHX-600 has real-time camera-shake correction. This function allows high-magnification observation without being affected by environmental vibration.



Without camera-shake correction

With camera-shake correction

Achieving the highest resolution in the industry

High-resolution RZ lens

The VHX-600 uses the RZ (real zoom) lens, a high-performance lens that can correct chromatic aberration to an ideal value. Through the leading-edge optical design and advanced illumination technology, the VHX-600 can minimize aberration distortion. Furthermore, with the highly-telecentric lens design, the RZ lens can create extremely clear depth composition images and 3D images.

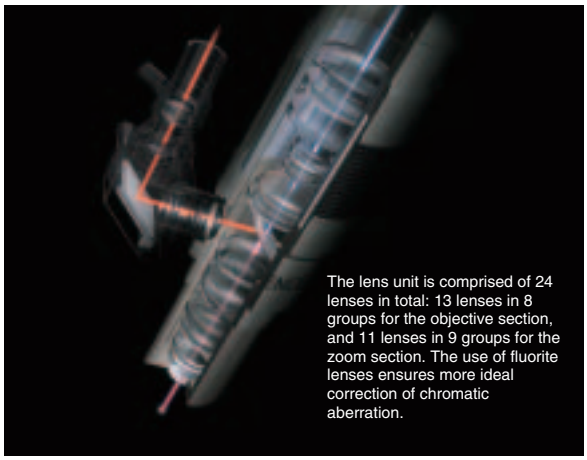
RZ LENS
Real Zoom Lens

High-performance low-range zoom lens
VH-Z00R 0 ▸ 50

Ultra-small, high-performance zoom lens
VH-Z20R 20 ▸ 200

Wide-range zoom lens
VH-Z100R 100 ▸ 1000

High-resolution zoom lens
VH-Z500R 500 ▸ 5000



The lens unit is comprised of 24 lenses in total: 13 lenses in 8 groups for the objective section, and 11 lenses in 9 groups for the zoom section. The use of fluorite lenses ensures more ideal correction of chromatic aberration.

Ease of operation superior to conventional microscopes

Clear 3D observation with a large depth of field

The VHX-600 provides a depth of field at least 20 times larger than optical microscopes. Thus, the VHX-600 can accurately observe a target (even with a large height difference) that could not be focused on with conventional microscopes. Furthermore, the number of steps required for observation including focus adjustment can be reduced considerably.

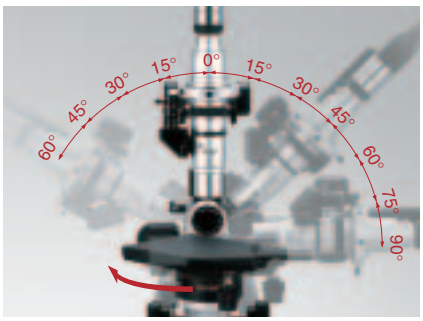
Image captured with an optical microscope

Image captured with a digital microscope

Observation at all angles

You can freely observe a target with the lens unit held by hand or mounted to the stand. You can capture any phenomenon exactly as it is and not overlook a defect by changing the observation angle. Furthermore, the time required for observation can be reduced considerably.

Hand-held observation



Free-angle observation system

Observation available from 0x to 5000x

A wide selection of lenses is available from 0x to 5000x magnifications. You can select a suitable lens for every application.

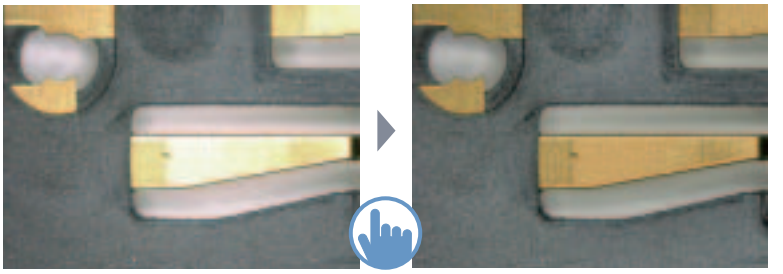
Optimize the image for various surface conditions

Contrast

Anti-halation For a moving image

Eliminating the glare of a target

In addition to the contrast optimization, the KEYENCE Anti-halation function can suppress the glare of a target subjected to strong reflected light. This function can remarkably reduce the time required for illumination adjustment.



Terminal (50x)

Simply with the push of a button

Two algorithms for Anti-halation

A.B.S. algorithm	A.B.S.=Adaptive Brightness Selection

Brightness adjustment based on the observation condition of the entire screen.

L.C.I.algorithm	L.C.I.=Local Contrast Improvement

Instead of just changing brightness, contrast is improved pixel by pixel.

Additional image improvement functions

Optimal contrast

With the optimal contrast algorithm, the VHX-600 automatically adjusts dark and bright areas to the optimal contrast, without changing the area with proper sensitivity.

Supercharge shutter

When the displayed image is dark due to insufficient light quantity, the shutter time can be specified in 0.1-second steps up to 17 seconds (max).

Gamma correction

Provides contrast for a target without brightness difference.

Edge enhancement function

Enhances the edges of an observation area, enabling easy detection of a minute flaw.

Noise elimination

Eliminates noise components only, with original image data retained.

Lighting

Lighting shift function Industry-first

Simply with the push of a button

One-button control for enhancing projections and depressions

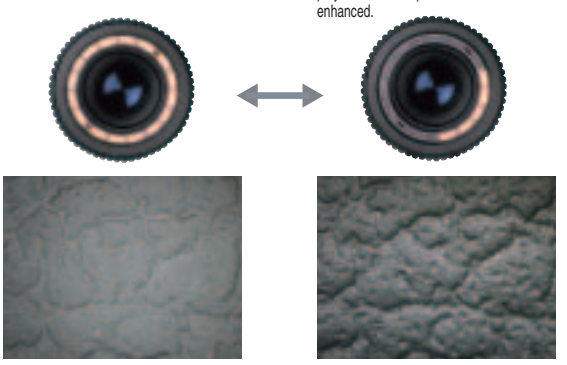
Simply by pushing the Height Difference Enhancement button on the console, the illumination mode is switched instantaneously to partial illumination that enhances target edges.

Full illumination

All illuminations at the tip of the camera unit turn on.

Partial illumination

Only one-fourth of the illuminations at the tip of the camera unit turn on. The projections and depressions are enhanced.



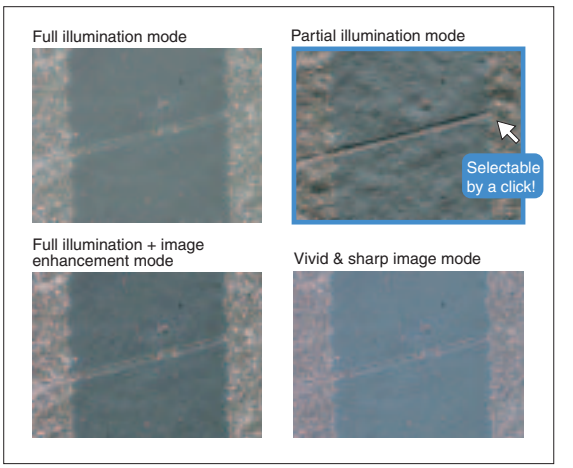
Gold plating (100x)

e-Preview mode Industry-first

Simply with the push of a button

One-click operation selects the image mode optimal for observation.

Simply by pushing the Optimal Image button, four types of image modes are listed. Then, you can click on an image suitable for your observation purpose.



Coating surface condition (500x)

Digital Focus

The VHX-600 can remarkably reduce observation time during the inspection of targets with uneven surface conditions.

Real-time depth composition

Highest speed in the industry Approx. 5 times higher speed than conventional microscopes

Effective for quick confirmation of the whole image

Real-time depth composition is so quick that you may not realize that you have executed the composition. You can view the overall-in-focus image in real time simply by turning the focus adjusting dial while observing a target. With the KEYENCE-original graphic engine, the VHX-600 can quickly display a composed image on the large (UXGA) screen. Therefore, you can save a considerable amount of labor and time required for composition.

Observation at high magnification

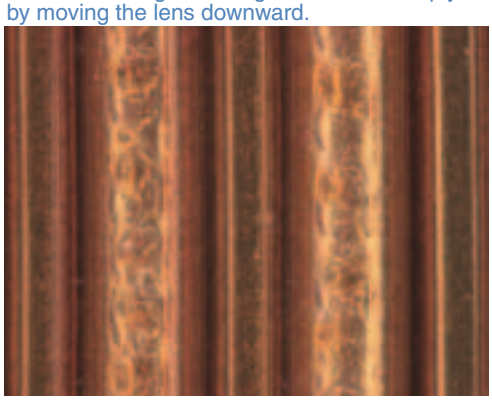
The microscope cannot be focused on the whole image.

When a higher area is brought into focus

When a lower area is brought into focus

Observation using the VHX digital microscope

The whole image is brought into focus simply by moving the lens downward.



Coil (400x)

High-quality depth composition

Three times faster than the conventional ratio

Composing sharp images with superior depth-of-field while correcting the edge deviations

With the KEYENCE-original hybrid D.F.D depth composition method, the VHX-600 can display a high-definition, overall-in-focus image without being affected by extraneous light. Furthermore, the VHX-600 provides the position correction function as a standard feature, which can correct edge displacement of a target image and magnification fluctuations caused by shift of the focus position. The VHX-600 can create a high-quality composed image.

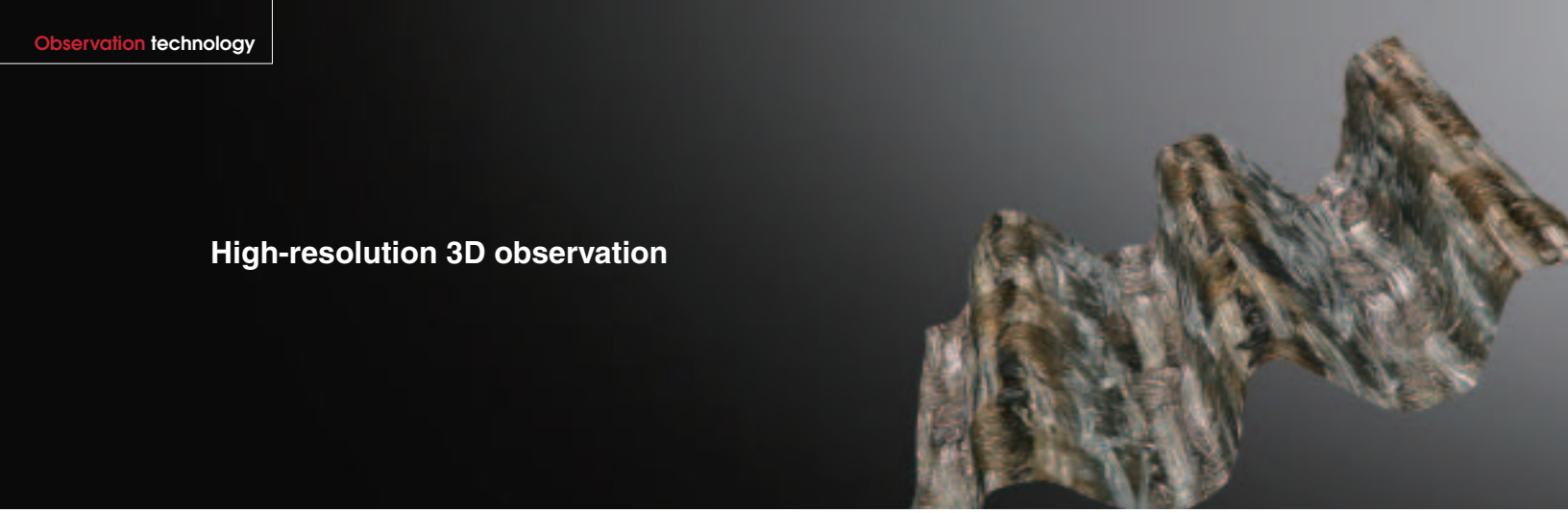
Capable of carrying out depth composition with edge displacement correction

Auto position adjustment function

Edge displacement and image blurring due to camera-shake while capturing an image with a non-telemetric lens are automatically corrected, and a highly comprehensive image including all focus points is constructed. This method is at least five times faster and more accurate than conventional position correction methods, and obtains accurate information even for easily distorted low magnification areas.

Conventional

Adjusted by the Auto Position Adjust Function

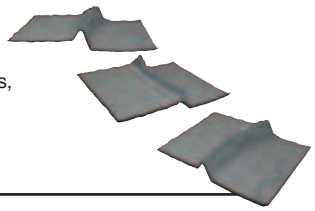


High-resolution 3D observation

New method **More accurate 3D display**

Accurate D.F.D. method

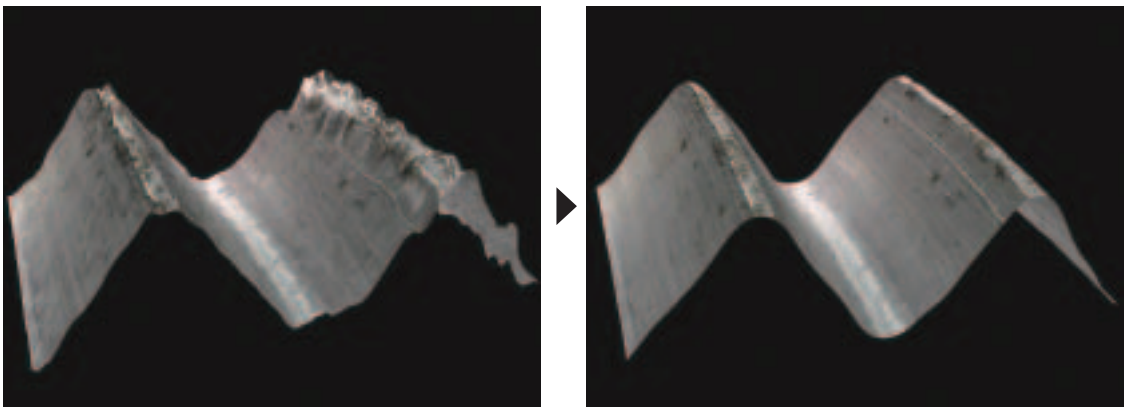
The D.F.D. method provides accurate 3D construction of finely detailed depth composition images, which allows accurate observation of the target object in three dimensions. A new stereogram algorithm acquires fine texture changes in order to estimate target height.



Conventional image

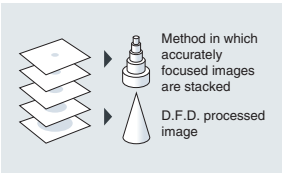
Accurate D.F.D.

Bolt (100x)



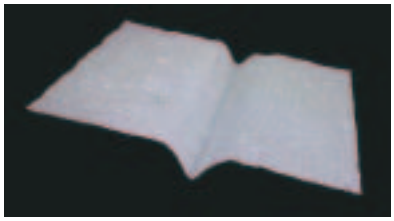
[What is the D.F.D. method?] **D.F.D.=Depth from Defocus**

The D.F.D. (Depth from Defocus) method analyzes the degree of blurring in a two-dimensional image to obtain depth information. Even if an image can not be captured perfectly in focus, the height can be obtained by calculation, and a 3D image synthesized from a smaller amount of sampling image data than required in existing methods. Since it is not necessary to take images of all the focus point positions, analysis can be performed more efficiently.

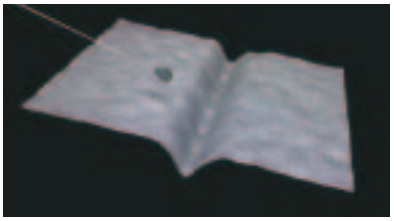


3D lighting simulation

Since the illumination direction can be changed freely through mouse control, the VHX-600 can capture optimal images according to the purpose of observation, such as inspecting the profile and surface condition. This function is effective for observation of fine surface conditions.



Ceramic substrate (1000x) Normal 3D image



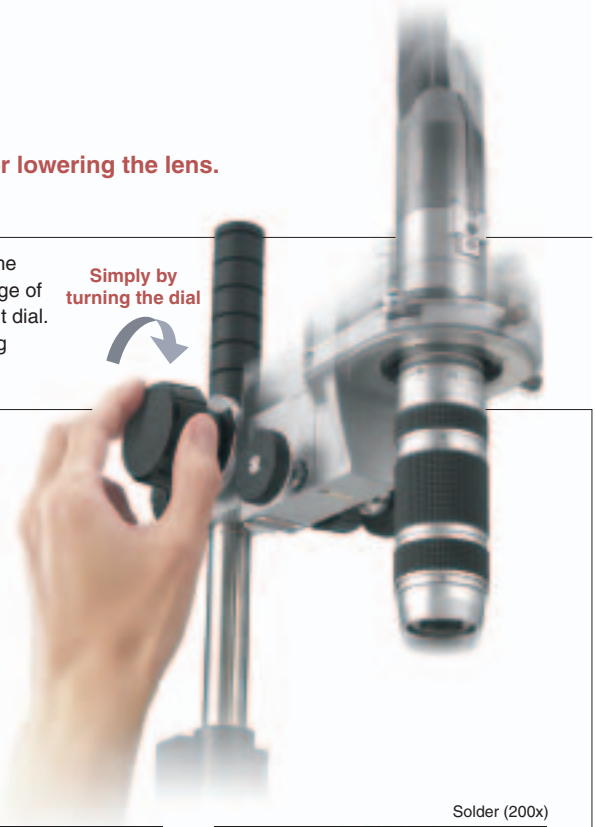
3D illumination simulation image

Fastest in the industry (twice as fast as conventional instruments)

3D observation is possible simply by raising or lowering the lens.

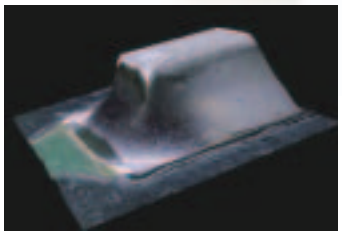
Quick 3D Display Function

High speed processing is made possible even while using the Accurate D.F.D. method. You can observe a high quality image of the target in real time simply by turning the focus adjustment dial. A new algorithm has been adopted that achieves processing speeds twice that of conventional methods.



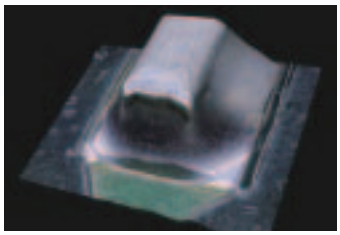
Focus on the highest point. Gradually shift the focus point downward.

Depth composition is complete.



Unprocessed 3D display

Solder (200x)

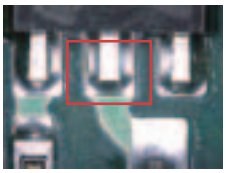


The 3D image can be rotated freely or zoomed through mouse operations.

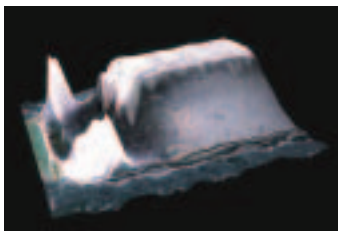
Anti-halation and Quick 3D

Even images with glare can be displayed clearly in 3D

Once applicable only to still images, we've now enabled the anti-halation function to be used with moving images and 3D display. By removing halation (scattered reflection), accurate 3D display of the target surface becomes possible.



Solder (200x)



Conventional image

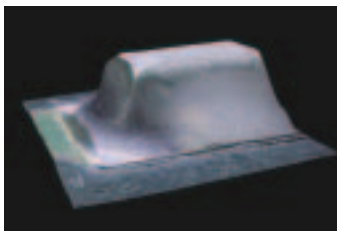
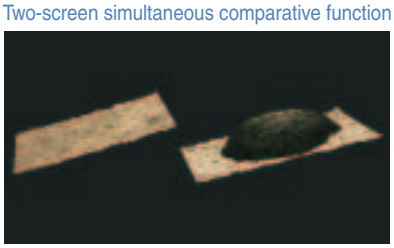


Image subjected to anti-halation and Quick 3D display processing

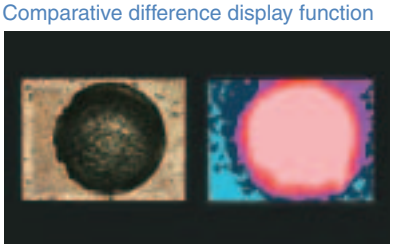
3D comparative function

This function compares two different targets placed side by side, while changing the observation angle. Furthermore, the newly added comparative difference display, allows you to capture a profile difference visually with two types of 3D data superimposed.

Two-screen simultaneous comparative function



Comparative difference display function



All In One

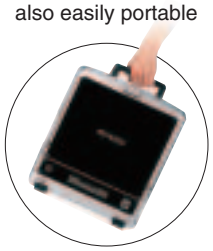
All-in-one design allows observation, recording, and measurement

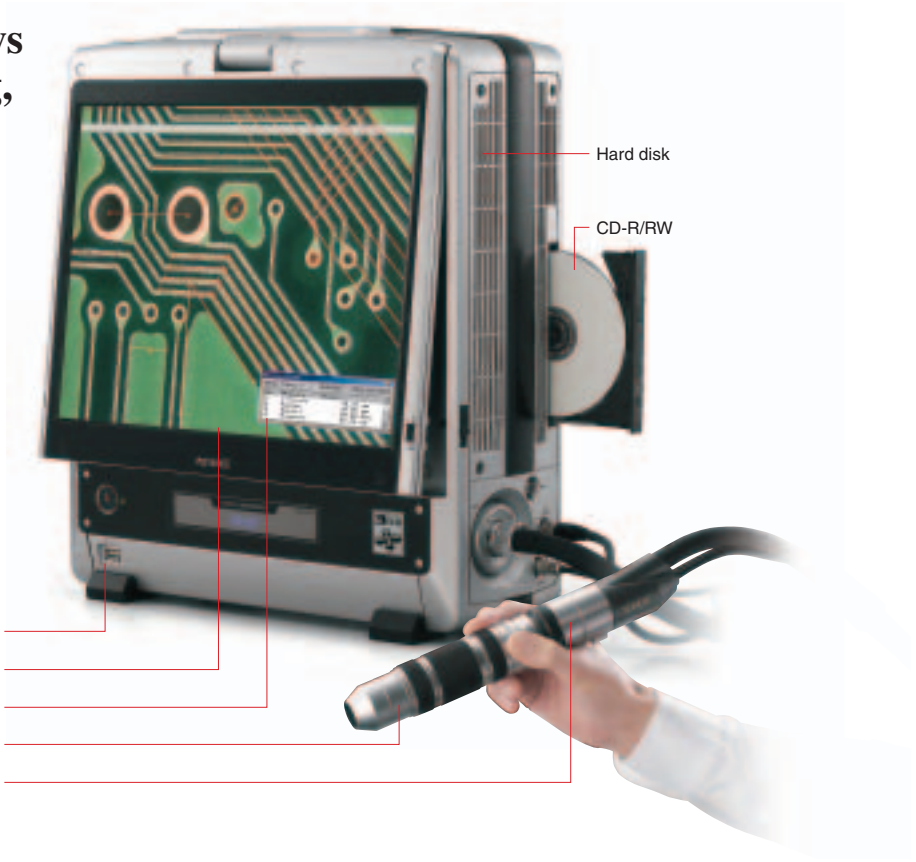
The VHX-600 includes a UXGA (1600 x 1200 pixels) high-resolution, 15-inch LCD monitor. It features observation functions, a hard disk drive, a CD-R/RW drive, and even measurement functions. This makes observation, recording, and measurement all possible with a single unit. Since the VHX-600 supports USB2.0 and LAN, it can also be used together with various storage devices and a personal computer.

Compatible with USB2.0

Compatible with LAN

The VHX-600 is also easily portable





Professional observation with the push of a button.

Just press a button

The console is intended to perform observation more quickly and easily. Commonly used functions are provided on the console, allowing you to observe any target clearly with the push of a button.

Optimal contrast
Adjusts the contrast automatically according to the sensitivity of human eyes.

Height Difference Enhancement
The full and partial illumination modes can be switched simply by pressing this button.

REC
Recording

PAUSE
Pause

Remove Halation
Eliminates the glare of a target surface caused by light reflection.

Optimal Image
Four types of image modes are listed, allowing you to select a suitable image according to the purpose of observation.

Real Digital Zoom
You can instantly zoom in on a desired observation spot.

Camera-Shake Correction
Corrects minute vibration such as environmental vibration, ensuring stable observation.

Real-time depth composition
Simultaneously composes images of a target with a height difference.

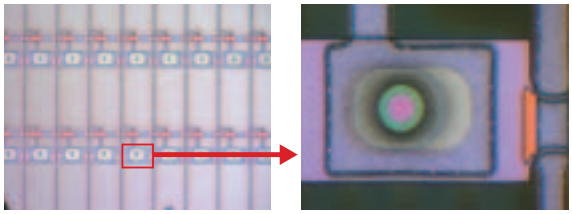
Quick 3D display
Creates a 3D image simply by moving the focus downward.

Real-time on screen measurement

High-resolution dimensional measurement

Accurate measurement on the 4800 x 3600 sub-pixel screen

With an overall view, it is difficult to accurately select measurement points. With a close-up view, the measurement points may not appear on the same screen. The VHX-600 zooms in as you select the measurement points, then returns to the overall view for easier observation.



Normal screen TFT (500x) Enlarged screen

Wide-field automatic distance measurement Industry-first

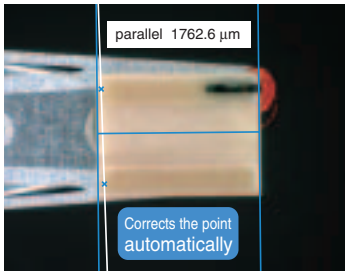
Sub pixel measurement zoom

The VHX-600 automatically zooms into the sub pixel display when a measurement point is selected on the screen. This function enables wide-range, high-precision, automatic 2-point distance measurement.

Auto edge selection Industry-first

Accurate observation by eliminating operator errors

Even when the measurement point specified by clicking the mouse on the screen is deviated, the edge of the target is detected to correct the measurement point automatically. This function realizes accurate and highly reliable dimension measurement by eliminating the reading errors of operators.



Read head of hard disk (70x)

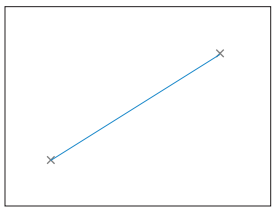
Auto calibration Industry-first

A special glass scale simplifies automatic calibration.

Automated calibration according to the observation magnification can be performed using the special glass scale (OP-51483). Accurate dimension measurements can be performed without significant measurement errors.

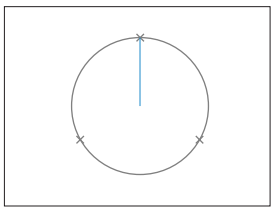
Various measurement modes

Distance



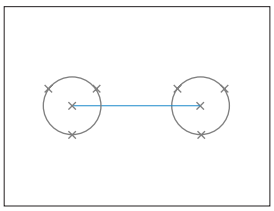
The distance between two points on the screen can be measured by specifying the points with the cursor.

Radius



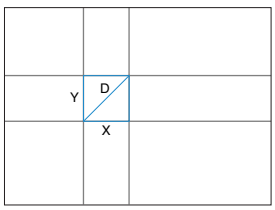
The radius of the circle can be measured by specifying the desired three points on the screen.

Center distance



Specify three points on the circumference to find the coordinate of the circle center. The distance between two circle centers can be measured by specifying two circles sequentially.

X-Y distance



The longitudinal (X-direction), transversal (Y-direction), and diagonal (D-direction) distances of a rectangle formed by four coordinate axes (two in the X-direction and two in the Y-direction) can be measured at one time.

Area/Count/Auto measurement

The target of the measurement can be extracted automatically by differentiating the brightness and colors in the image. The area and the perimeter length are measured. The number of extracted areas can be counted automatically as well.

Distance between parallel lines

The shortest distance between two parallel lines can be measured by specifying two arbitrary points that draw a line and another line parallel to the first line.

Length of perpendicular line

The shortest distance (perpendicular line) between a line specified with two arbitrary points and another arbitrary point can be measured.

Angle

The angle determined by three arbitrary points on the screen can be measured.

Overlay Scales

Bar, mesh, cross and other various shapes can be displayed as a scale. These can be conveniently used as the reference scale for simplified measurement or for printing the images.

Easy data recording & utilization

Recording observed images on the spot

The VHX-600 incorporates a large-capacity (160 GB) HDD. Image files can be easily copied into your PC via LAN. Furthermore, the VHX-600 can be connected to various storage media. Saved images can be loaded instantaneously into your storage media.

Video recording/playback

The VHX-600 features video recording/playback as standard, allowing a maximum recording time of one-hour. Changes in the target over time, or subtle movement can be recorded fully and reliably.

VHX-600 communication software (Free software)

Dedicated software that can be used on your PC. This software enables data transmission/reception between the VHX and PC via LAN. With the newly added high-speed transmission mode for LAN, data communication speed becomes three times higher than conventional models. (Compatible OS: Windows XP/ 2000)*1

VHX-600 3D display software (Free software)

This software reproduces a 3D image captured with the VHX Series, allowing you to observe the 3D image while changing the 3D angle, as well as a still image. It's new report tool software can convey analysis results correctly to associated people by giving impact on the visuals.

*1.Windows XP/2000 are registered trademarks of Microsoft Corporation, U.S.A.

3D profile measurement using a microscope

With the high-precision electric linear stage and the newly-developed profile measurement function, the VHX-600 integrates all steps from zoom observation to 3D profile automatic measurement. The VHX-600 Series enables further advanced analysis over zoom observation.

Profile Measurement Unit

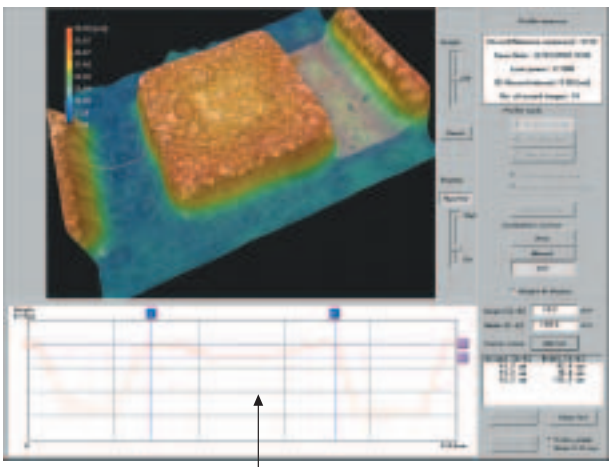
3D Profile measurement unit Option

3D profile measurement software
VHX-H2MK

3D profile measurement

* Function of the VHX-H2MK

The VHX-600 creates a 3D image based on automatically captured images, and it calculates height profile data on a desired measuring line. Height, width and height difference data on the measuring line are plotted on a graph. Since the profile graph is related to the cursor position in the image display area, you can see the current measuring point easily.



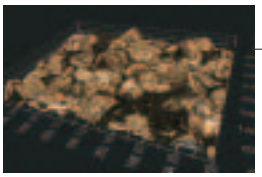
Bump on semiconductor (3000x)

With the horizontal/vertical cursor, the height and width can be measured. The 2-line comparative mode can simultaneously display comparative analysis profile data on two parallel lines.

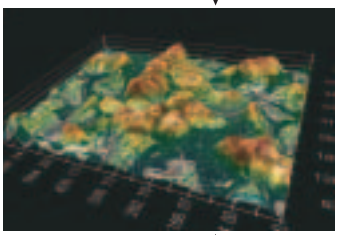
Height color/scale display

* Function of the VHX-H2MK

Color bars that indicate height are displayed on a 3D image. The highest position is displayed in red, and the lowest position is displayed in blue, allowing you to see a height difference at a glance. The height data can be superimposed on a raw image. Furthermore, the X-axis, Y-axis and Z-axis scales are calculated automatically and displayed according to the image size and the 3D rotation angle.

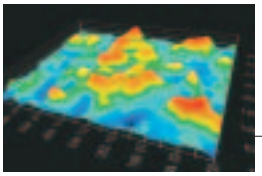


3D raw image



3D raw image + topographic image

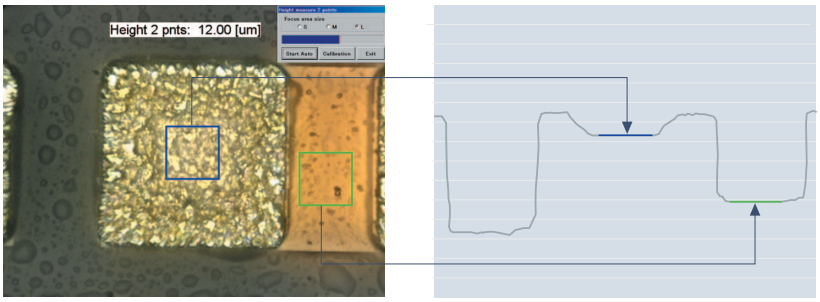
Grind stone (500x)



3D topographic image

2-point height difference measurement

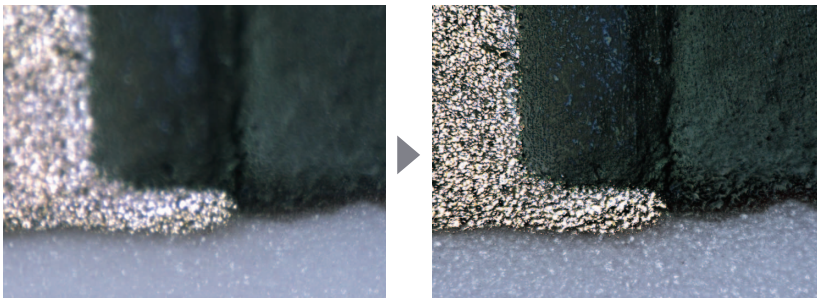
The VHX-600 can quickly and automatically measure a height difference between specified windows in the automatic measurement mode. In the manual measurement mode, you can measure a height difference between two points while monitoring the focus conditions.



Bump (3000x)

Auto focus

This function helps everyone to perform high-magnification focus adjustment quickly and accurately. The auto focus can be applied even to a target with uneven surface conditions, since the focusing area can be specified on the screen.

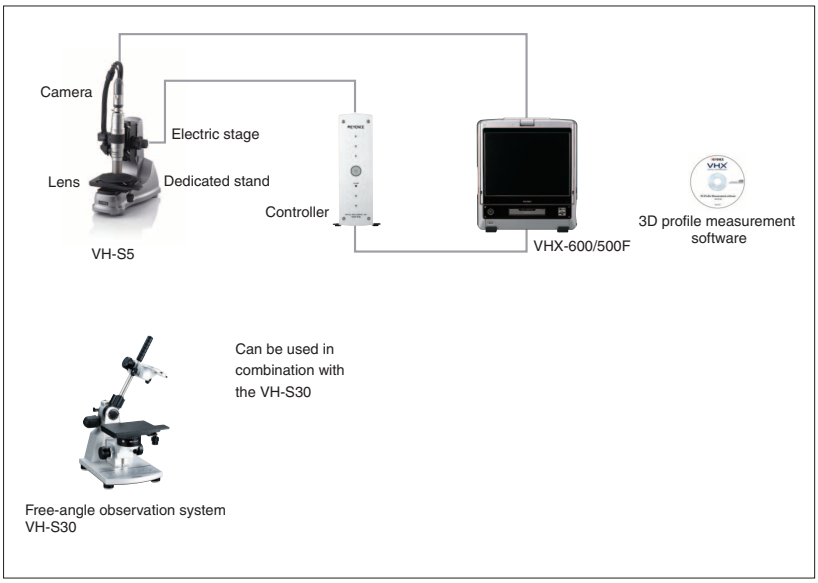


Chip resistor (500x) Before focusing After focusing

All-in-one system

Centralized control of stage operation, observation and analysis

All steps from stage operation, zoom observation and 3D analysis to image-saving and network connection are controlled in the VHX unit. You do not need a device or PC for stage operation or analysis. This system saves space and provides high operating efficiency.



Specifications

Model		VHX-S15C/H (VHX-S15F) [2.]
Applicable lens		VH-Z500R, VH-Z450, VH-Z100R, VH-Z50L
Applicable stand		VH-S5, VH-S30 [2.]
Stage stroke distance		0.59" 15 mm
Motor		5-phase stepping motor
Resolution		0.002 Mil 0.05 µm/pulse
Positioning accuracy [1.]		0.23 Mil 6 µm
Repeatability [1.]		±0.02 Mil ±0.5 µm
Ratings	Power supply voltage	100 to 240 VAC, 50/60 Hz
	Power consumption	70 VA
Ambient temperature		+5 to 40°C (41 to 104°F)
Relative humidity		35 to 80% (No condensation)
Weight		Controller: 3 kg, Electric stage: 1.3 kg
Load capacity		5 kg

1. Typical value of electric stage single unit
2. The electric stage for the VH-S30 is the VHX-S15F.

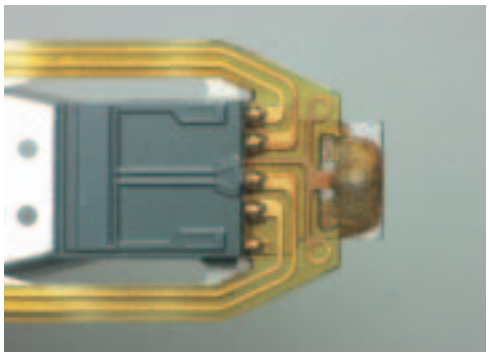
Option

Digital indicator set
OP-51610

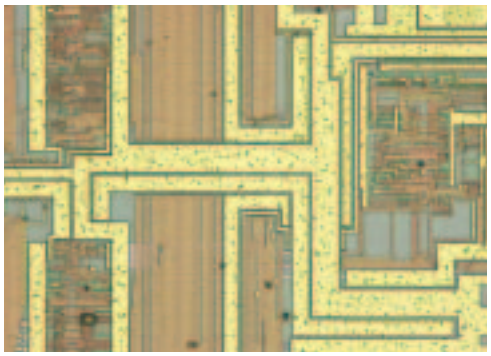
Digital indicator for direct measurement of the lens stroke distance, ensuring easy calibration

Wide range of applications to meet the needs of various industries

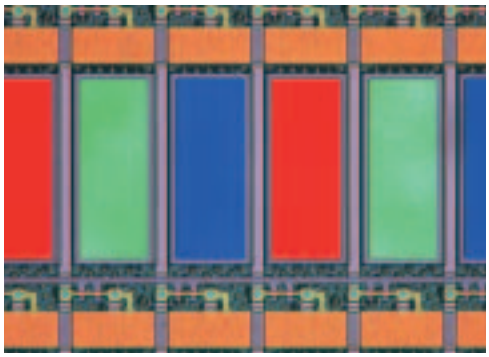
Electric/Electronics



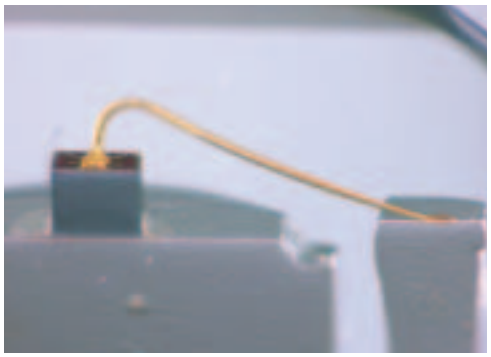
HDD head (100x)



IC pattern (1000x)

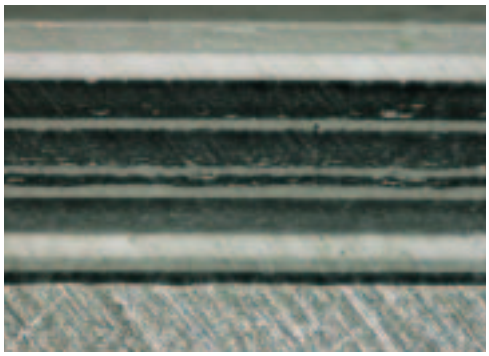


LCD (800x)

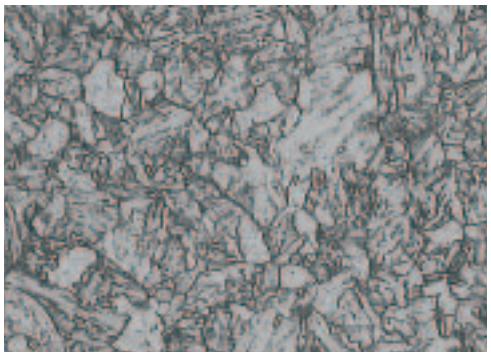


LED (200x)

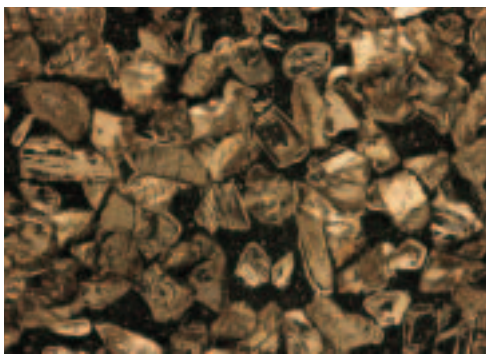
Transportation/Metal industries



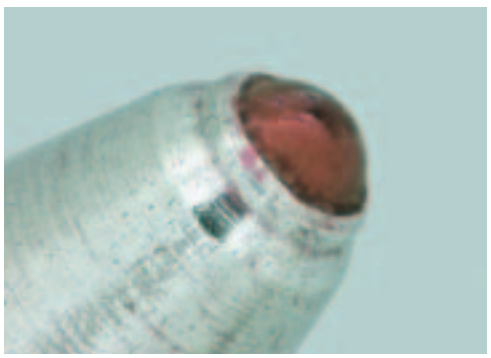
Fracture surface (500x)



Microstructure of metal (400x)

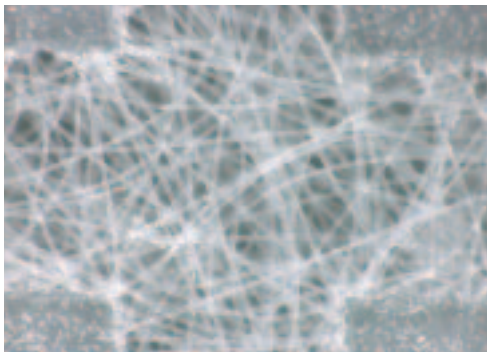


Grind stone (500x)

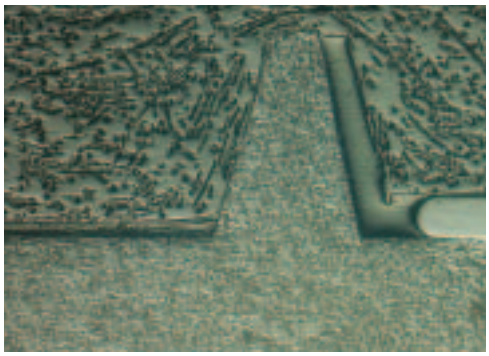


Tip of ballpoint pen (200x)

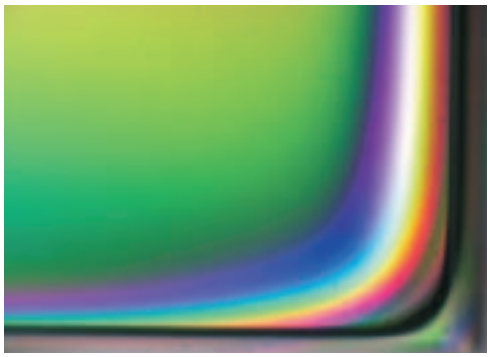
Material/Chemical industries



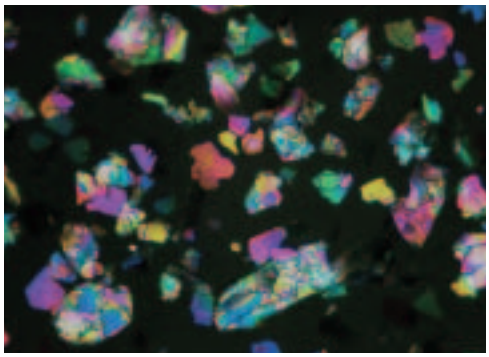
Non-woven fabric (150x)



Glass fiber (200x)

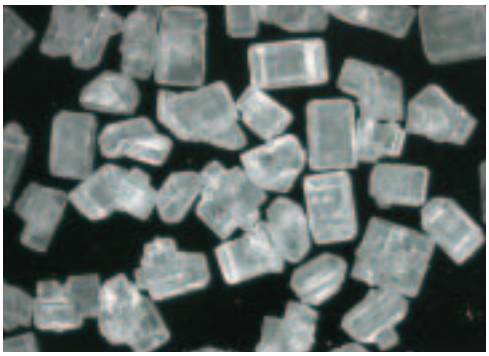


Residual stress on resin (100x)

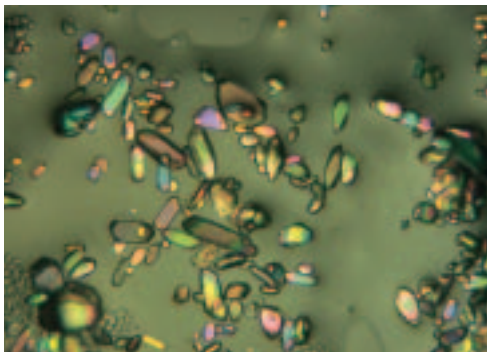


Mica (1000x)

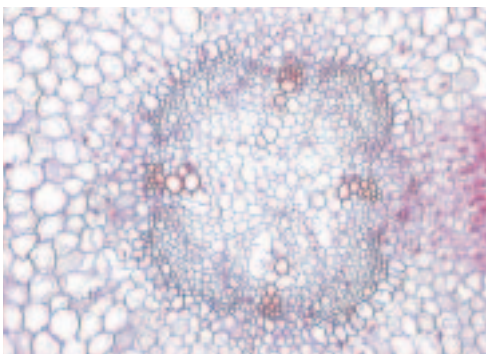
Other industries



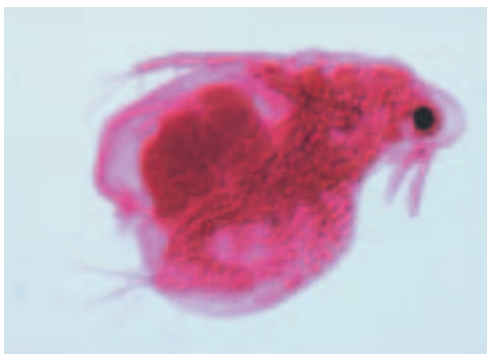
Food (Sugar) (50x)



Chemical (Liquid agent) (500x)



Plant (Broad bean) (300x)



Microorganisms (Water flea) (300x)

RZ LENS Real Zoom Lens

RZ Lenses – Highest Resolution in the Industry

Along with reducing chromatic aberration and distortion to their limits, the RZ lens features a design which also excels in telecentricity. You can obtain a highly complete, exceptionally clear image, even when constructing a depth composition or 3D image.

High-performance low-range zoom lens | VH-Z00R | 0 ▸ 50

From the Whole Target to a Magnified image

In a range from 0-50x, the target can be viewed from its entirety down to a magnification. This macro lens excels in workability and high performance with click-style magnification, an aperture mechanism and a viewing distance of 3.74" (95 mm) or more.

Model		VH-Z00R						
Magnification [1]		0.1x	0.5x	1x	5x	10x	30x	50x
Monitoring range (inch/mm)	Horizontal	126" 3200	25.2" 640	12.6" 320	2.40" 61	1.20" 30.5	0.40" 10.2	0.24" 6.1
	Vertical	94.49" 2400	18.9" 480	9.45" 240	1.79" 45.5	0.80" 22.8	0.30" 7.6	0.18" 4.6
	Diagonal	157.5" 4000	31.5" 800	15.75" 400	3" 76.2	1.5" 38.1	0.5" 12.7	0.30" 7.6
Monitoring distance (inch/mm)		303.1" Approx. 7700	59.08" Approx. 1500	28.35" Approx. 720	3.74" 95			

1. Magnification on a 15-inch monitor

Ultra-small, high-performance zoom lens | VH-Z20R | 20 ▸ 200

High resolution, Ultra-small High-performance zoom lens

The VH-Z20R offers high-resolution observation at general purpose magnifications of 20x to 200x. Furthermore, the large depth of field, that is a feature of the conventional VHX Series, has been further enhanced.

Model		VH-Z20R					
Magnification [1]		20x	30x	50x	100x	150x	200x
Monitoring range (inch/mm)	Horizontal	0.60" 15.24	0.40" 10.16	0.24" 6.10	0.12" 3.05	0.08" 2.03	0.06" 1.52
	Vertical	0.45" 11.40	0.30" 7.60	0.18" 4.56	0.09" 2.28	0.06" 1.52	0.04" 1.14
	Diagonal	0.75" 19.05	0.50" 12.70	0.30" 7.62	0.15" 3.81	0.10" 2.54	0.08" 1.91
Depth of field (inch/mm) [2]		1.34" 34	0.61" 15.5	0.24" 6.0	0.06" 1.6	0.03" 0.74	0.02" 0.44
Monitoring distance (inch/mm)		1" 25.5					

1. Magnification on a 15-inch monitor
2. When the ring illumination adapter is attached

Wide-range zoom lens | VH-Z100R | 100 ▸ 1000

Wide-range zoom lens offers high resolution and large depth of field

This innovative lens was developed to satisfy the contradictory needs of high resolution and high depth of field for magnified observation.

Model		VH-Z100R					
Magnification [1]		100x	200x	300x	500x	700x	1000x
Monitoring range (inch/mm)	Horizontal	0.12" 3.05	0.06" 1.53	0.04" 1.02	0.02" 0.61	0.02" 0.44	0.01" 0.30
	Vertical	0.09" 2.28	0.04" 1.14	0.03" 0.76	0.02" 0.46	0.01" 0.33	0.01" 0.23
	Diagonal	0.15" 3.81	0.07" 1.90	0.05" 1.27	0.03" 0.76	0.02" 0.54	0.01" 0.38
Monitoring distance (inch/mm)		0.98" (0.79 [2]) 25 (20 [2])					

1. Magnification on a 15-inch monitor
2. When the ring illumination adapter is attached

High-resolution zoom lens | VH-Z500R | 500 ▸ 5000

This zoom lens is the pinnacle of optical lenses

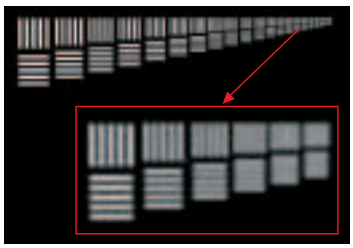
This zoom lens incorporates high-quality fluorite optics to provide the highest resolution in its class. The advanced 3D display function precisely reproduces images.

Model		VH-Z500R				
Magnification [1]		500x	1000x	2000x	3000x	5000x
Monitoring range (inch/mm)	Horizontal	24.02 610	12.01 305	5.98 152	4.02 102	2.4 61
	Vertical	17.99 457	9.02 229	4.49 114	2.99 76	1.81 46
	Diagonal	30 762	15 381	7.52 191	5 127	2.99 76
Monitoring distance (inch/mm)		0.17" 4.4				

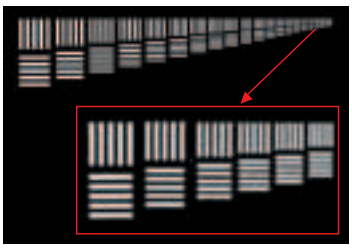
1. Magnification on a 15-inch monitor

Highest Resolution in the Industry/ Approx. 2x Conventional Lenses

These lenses have achieved the highest resolution in their class by bringing together the know-how acquired during long-term microscope development and the essence of KEYENCE's optical technology. They complement the abilities of the microscope offering higher-quality CCD images.



Conventional lens

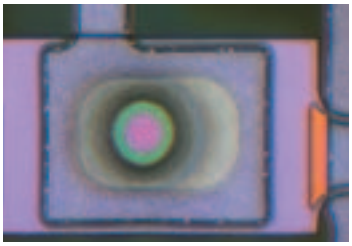


RZ lens

Wide Range Zoom 10x Optical Zoom

The RZ lens is designed for a wide zoom range, seamlessly covering from the whole image to an enlarged view of a target. Since the RZ lens retains a constant observation distance throughout the zoom range, it can improve operating efficiency. It is an all-around zoom lens applicable to any target.

TFT (500x)

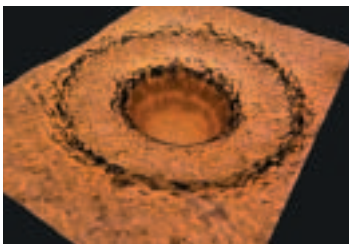


TFT (5000x)

Highly-telecentric zoom lens

With the highly-telecentric lens design, the RZ lens can create extremely clear and perfect depth composition images and 3D images. The RZ lens can make the best use of the digital focus functions that are an essential feature of the VHX Series.

Battery safety valve (700x)



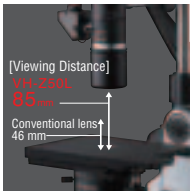
Electrode hole (1000x)

Long Working Distance LW Lenses

LW Lens – View clearly at high magnification, even from long range.
Like the RZ Lenses, this lens also excels in telecentricity and
allows the digital focus function to be used to its fullest extent.

Maximum Magnification of 500x

But a Viewing Distance 3.35" (85 mm)



Long-focal-distance, high-performance zoom lens | VH-Z50L 50 ▸ 500

Long Range Lens with a 3.35" (85 mm) Viewing Distance

When you want to view the target at high magnification from a distance. Presenting a long range lens which defies optical microscope conventions. Targets can be viewed that couldn't until now.

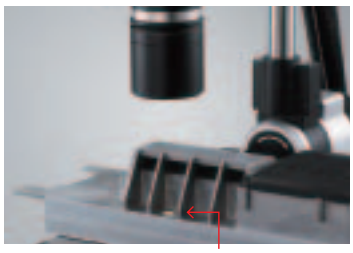
Model		VH-Z50L					
Magnification [1.]		50x	100x	200x	300x	400x	500x
Monitoring range (inch mm)	Horizontal	0.24" 6.09	0.12" 3.05	0.06" 1.53	0.04" 1.02	0.03" 0.76	0.02" 0.61
	Vertical	0.18" 4.57	0.09" 2.28	0.04" 1.14	0.03" 0.76	0.02" 0.57	0.02" 0.46
	Diagonal	0.30" 7.62	0.15" 3.81	0.07" 1.90	0.05" 1.27	0.04" 0.95	0.03" 0.76
Monitoring distance (inch mm)		3.35" 85.0					

1. Magnification on a 15-inch monitor

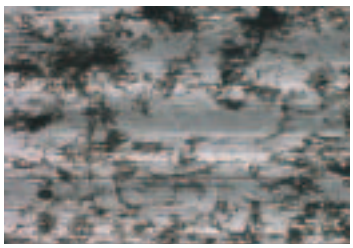
[LW Lens Features]

Long Working Device
3.35"(85 mm) Viewing Distance

With cutting-edge optical design and advanced illumination technology, the LW lens has achieved a 3.35" (85 mm) viewing distance at a maximum 500x magnification. The recesses of the target can be clearly captured. Since you can also ensure working space, observation efficiency is dramatically improved.



Easily View the Target's Recesses



Aluminum Surface (500x)

Wide Range Zoom
10x Optical Zoom

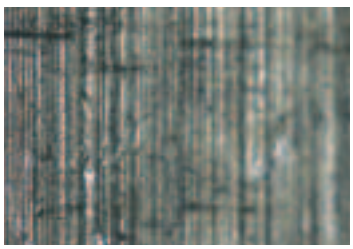
Wide range design can be used to seamless view the target from its entirety to a magnification. Since the magnification can be changed while maintaining an 3.35" (85 mm) viewing distance, work efficiency is greatly improved.

Solder Cross-Section (50x)

(500x)

Deep Depth of Field
Approx. 3x Conventional Lenses

Deep depth of field, the microscope's greatest feature, is further improved. With a depth of field 3x or greater than conventional lenses, you can clearly view irregular targets.



Screw Surface (200x)

Conventional Lens VH-Z75 VH-Z50

Zoom lens | VH-Z25

25 ▸ 175

A single lens unit covers 25x to 175x magnification.

The VH-Z25 can continuously change magnification from 25x to 175x without the need for lens replacement. You can quickly find an observation point at low magnification and then directly zoom in on the observation point. The VH-Z25 provides two types of illumination heads (contact type and non-contact type) as standard equipment. The non-contact type illumination head provides an observation distance of 1.00" (25.5 mm), improving your operating efficiency.

When many illumination adapters are attached, the zoom lens is applicable to various observation purposes.

Model		VH-Z25			
Magnification [1]		25x	50x	100x	175x
Monitoring range (inch/mm)	Horizontal	0.48" 12.20	0.24" 6.10	0.12" 3.05	0.07" 1.74
	Vertical	0.36" 9.10	0.18" 4.55	0.09" 2.28	0.05" 1.30
	Diagonal	0.60" 15.24	0.30" 7.62	0.15" 3.81	0.09" 2.18
Depth of field (inch/mm)		0.51" 13.0	0.12" 3.0	0.03" 0.7	0.01" 0.3
Monitoring distance of the non-contact type illumination head (inch/mm)		1" 25.5			

1. Magnification on a 15-inch monitor

Low-range zoom lens | VH-Z05

0 ▸ 40

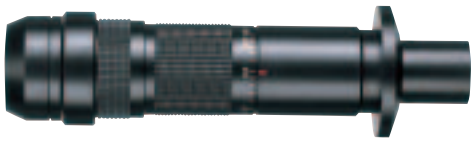
0x to 40x magnification for viewing the entire target

This low-range zoom lens provides a magnification of between 0x and 40x, allowing the entire target to be monitored as well as providing a magnified view. You can easily capture an image of the whole target without using an external camera, perfect for inserting into your report or reference document. The monitoring distance is 3.74" (95 mm) or more, ensuring improved workability.

Non-reflective illumination ring (Optional)
OP-32009

Model		VH-Z05						
Magnification [1]		0.1x	0.5x	1x	5x	10x	20x	40x
Monitoring range (inch/mm)	Horizontal	125.98" 3200	25.20" 640	12.60" 320	2.40" 61.0	1.20" 30.5	0.60" 15.3	0.30" 7.6
	Vertical	94.49" 2400	18.90" 480	9.45" 240	1.79" 45.5	0.90" 22.8	0.45" 11.4	0.22" 5.7
	Diagonal	157.48" 4000	31.50" 800	15.75" 400	3.00" 76.2	1.50" 38.1	0.75" 19.0	0.37" 9.5
Monitoring distance (inch/mm)		Approx. 25.3' 7.7m	Approx. 4.9' 1.5m	Approx. 28.35' 720	3.74" 95			

1. Magnification on a 15-inch monitor



Long-focal-distance zoom lens | VH-Z35

35 ▸ 245

35x to 245x magnification at a distance of 2.13" (54 mm)

With a monitoring distance of 2.13" (54 mm) and extremely high depth-of-field, this lens provides a convenient way to monitor a target with height differences on the surface. This wide working space greatly increases monitoring efficiency. With a single lens, you can monitor from a low magnification (35x) to a high magnification (245x), allowing the desired point to be quickly enlarged.

Coaxial vertical illumination adapter (Optional)
OP-35416

Model		VH-Z35					
Magnification [1]		35x	50x	100x	150x	200x	245x
Monitoring range (inch/mm)	Horizontal	0.34" 8.71	0.24" 6.10	0.12" 3.05	0.08" 2.03	0.06" 1.53	0.05" 1.24
	Vertical	0.26" 6.5	0.18" 4.55	0.09" 2.28	0.06" 1.52	0.04" 1.14	0.04" 0.93
	Diagonal	0.43" 10.89	0.30" 7.62	0.15" 3.81	0.10" 2.54	0.07" 1.90	0.06" 1.56
Depth of field (inch/mm)		0.33" 8.3	0.20" 5.0	0.04" 1.0	0.20" 0.5	0.02" 0.4	0.01" 0.3
Monitoring distance (inch/mm)		2.13" 54.0					

1. Magnification on a 15-inch monitor

Middle-range zoom lens | VH-Z150

150 ▸ 800

150x to 800x magnification, ideal for monitoring bright images.

This middle-range zoom lens allows continuous changes in magnification of between 150x and 800x. It can be used to monitor at a distance 0.47" (12 mm) at 800x magnification. The illumination head can be switched to a coaxial vertical illumination type to enable detailed observation of microstructure of metal or a semiconductor surface.

Adjustable illumination adapter (Optional)
VH-K150

Model		VH-Z150			
Magnification [1]		150x	200x	500x	800x
Monitoring range (inch/mm)	Horizontal	0.08" 2.03	0.06" 1.53	0.02" 0.61	0.02" 0.38
	Vertical	0.06" 1.52	0.05" 1.14	0.02" 0.46	0.01" 0.28
	Diagonal	0.10" 2.54	0.08" 1.90	0.03" 0.76	0.02" 0.48
Monitoring distance (inch/mm)		0.47" 12.0 [2]			

1. Magnification on a 15-inch monitor
2. 0.25" (6.5 mm) when the coaxial vertical illumination ring is attached.

High-range zoom lens | VH-Z450

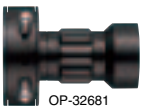
450 ▸ 3000

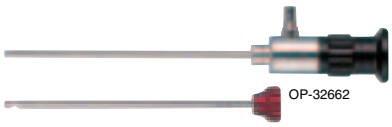
450x to 3000x magnification with vertical/penetration illumination.

This high-range zoom lens allows continuous changes in magnification between 450x and 3000x. The high-resolution lens and optical edge enhancement function ensure higher reproduction than a conventional microscope. The lens provides a magnification of 3000x at a monitoring distance of 0.29" (7.3 mm), ensuring improved workability. A special stand with penetration illumination is also available, further expanding the applications of this lens.

Model		VH-Z450						
Magnification [1]		450x	500x	1,000x	1500x	2000x	2500x	3000x
Monitoring range (inch/mm)	Horizontal	0.03" 0.68	0.03" 0.61	0.01" 0.31	0.01" 0.20	0.01" 0.15	0.004" 0.12	0.003" 0.10
	Vertical	0.02" 0.51	0.02" 0.46	0.009" 0.23	0.006" 0.15	0.004" 0.11	0.004" 0.09	0.003" 0.08
	Diagonal	0.03" 0.85	0.03" 0.76	0.01" 0.38	0.01" 0.25	0.007" 0.19	0.006" 0.15	0.005" 0.13
Monitoring distance (inch/mm)		0.29" 7.3						

1. Magnification on a 15-inch monitor





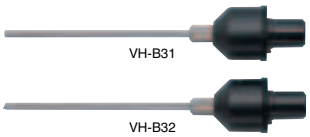
Borescope lens | OP-32662/32663/32664/32665/32666

Two observation directions (direct view and lateral view) with a single unit.

The borescope unit provides a 90° lateral view attachment as standard equipment, enabling observation directions to be switched between direct view and lateral view. Five types of bore diameters are available, allowing you to select an appropriate diameter according to your observation purpose. The monitoring magnification is 80x to 360x, 1.2 to 5 times larger than conventional models. You can clearly observe even minute targets that cannot be observed with conventional models.

Model	Borescope	OP-32662	OP-32663	OP-32664	OP-32665	OP-32666
	Lens attachment	OP-32681				
Outer diameter (inch mm)		ø0.16" ø4.0 / ø0.17" ø4.4	ø0.22" ø5.5 / ø0.23" ø5.9	ø0.31" ø8.0 / ø0.33" ø8.5	ø0.39" ø10 / ø0.42" ø10.5	ø0.55" ø14 / ø0.59" ø15
Effective length (inch mm)		5.31" 135	9.84" 250	9.84" 250	9.84" 250	16.53" 420
View direction	direct view	0°	0°	0°	0°	0°
	Lateral view	90°	90°	90°	90°	90°
View angle		35°	40°			
Observation distance (inch mm)		0.10" to ∞ 2.5 to ∞	0.11" to ∞ 2.7 to ∞	0.14" to ∞ 3.5 to ∞	0.11" to ∞ 2.7 to ∞	0.39" to ∞ 10 to ∞
Maximum observation magnification		230x	360x	175x	190x	80x
Minimum view range		0.04" 1.1	0.03" 0.7	0.06" 1.5	0.06" 1.4	0.13" 3.3
Ambient temperature		Sleeve: 0 to 80°C (32 to 176°F) except for sleeve: 0 to 40°C (32 to 104°F)				

1. 0°: When the direct-view standard lens is attached. 90°: When the lateral-view attachment is attached
2. Magnification around the center of the 15-inch monitor screen
3. Horizontal view range



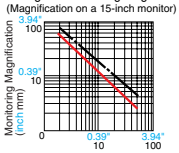
Borescope lens | VH-B31/B32/B61/B64

ø0.12"(ø3-mm) sleeve for viewing inside a narrow gap

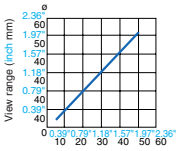
The ø0.12"(ø3-mm) sleeve diameter enables you to easily monitor inside a narrow gap or complicated shape. Select from two types of end shapes: Direct-view and oblique-view. Only the lens is contained in the sleeve, enabling excellent resolution. The borescope lens is completely waterproof for underwater observation.

*In addition to the above, many size variations are available. For more information, contact the nearest KEYENCE sales office.

Change of monitoring magnification
(Magnification on a 15-inch monitor)

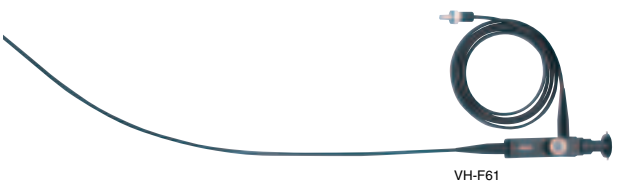


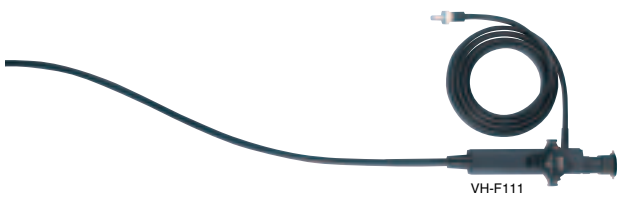
Change of view range



Model	Borescope	VH-B31	VH-B32	VH-B61	VH-B64
	Lens attachment	VH-B			
Outer diameter (inch mm)		ø0.12" ø3 (Protective tube: ø0.16" ø4)		ø0.24" ø6	
Effective length (inch mm)		4.13" 105	4.21" 107	11.81" 300	11.97" 304
View direction		0° (direct view)	30° (oblique view)	0° (direct view)	70° (oblique view)
View angle		55°			
Observation depth (inch mm)		0.08" to 1.97" 2 to 50			
View range (inch mm)		ø0.08" to ø2.05" ø2 to ø52			
Protection		Sleeve: Waterproof			
Ambient temperature		0 to +40°C (32 to 104°F) (in air/water)			

VH-B31/B32
VH-B61/B64

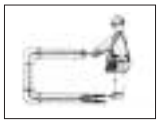




Fiberscope | VH-F61/F111

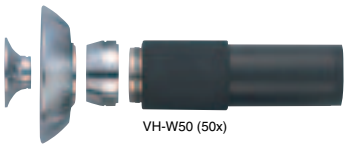
Monitoring a complicated shape

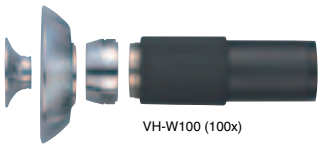
The fiberscope allows you to monitor places where conventional lenses cannot be used, such as the inside of a complicated machine or a narrow, bending pipe. You can even monitor blind spots by changing the angle of the top of the fiberscope remotely.


Inspecting pipes


Inspecting the inside of a photocopier

Model	Fiberscope	VH-F61	VH-F111
	Lens attachment	VH-F	
Outer diameter (inch mm)		ø0.24" ø6.1	ø0.43" ø11
Effective length (inch mm)		39.37" 1000	59.06" 1500
View direction		Direct view	
View angle		65°	55°
Observation depth (inch mm)		0.39" to ∞ 10 to ∞	0.79" to ∞ 20 to ∞
Bendable sleeve angle		120° up/down	120° up/down, 100° right/left
Ambient temperature		+10 to +80°C (+50 to +176°F)	
Operating atmospheric pressure		1 atm	
Oil & waterproof		Machine oil and light oil	


VH-W50 (50x)


VH-W100 (100x)


VH-W200 (200x)


Lateral illumination adapter
OP-98535

Long-focal-distance lens | VH-W50/W100/W200

Working while monitoring the target

The long-focal-distance lens provides a long monitoring distance of 2.36" to 3.07" (60 to 78 mm), allowing you to continue working while monitoring a target. You can view clear images even when close monitoring is impossible, such as a target in a recess or the presence of a glass plate between the lens and target.

Model		VH-W50	VH-W100	VH-W200
Magnification [1]		50x	100x	200x
Monitoring range (inch mm)	Horizontal	0.24" 6.10	0.12" 3.05	0.06" 1.53
	Vertical	0.18" 4.55	0.09" 2.28	0.04" 1.14
	Diagonal	0.30" 7.62	0.15" 3.81	0.07" 1.90
Depth of field (inch mm)		0.12" 3.1	0.02" 0.6	0.01" 0.3
Monitoring distance (inch mm) [2]		3.07"(3.03") 78(77)	2.36" (2.32") 60(59)	2.36" (2.32") 60(59)

1. Magnification on a 15-inch monitor
2. Figures in parentheses are applicable when a non-reflective illumination head is used.


VH-V100(100x)


VH-V200(200x)

Hyper-view lens | VH-V100/V200

Easy monitoring of a glossy target with minimum halation

The hyper-view lens suppresses halation (reflection) from a glossy surface, enabling detailed monitoring. You can easily detect a flaw, stain or crack on metal, glass or ceramic surfaces that are difficult to detect using conventional microscopes.

Model		VH-V100	VH-V200
Magnification [1]		100x	200x
Monitoring range (inch mm)	Horizontal	0.12" 3.05	0.06" 1.53
	Vertical	0.09" 2.28	0.04" 1.14
	Diagonal	0.15" 3.81	0.07" 1.90
Depth of field (inch mm)		0.04" 1.0	0.02" 0.4

1. Magnification on a 15-inch monitor


VH-C501


VH-C1001

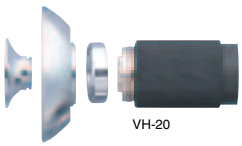
Vertical-illumination lens | VH-C501/C1001

Monitoring metal surfaces

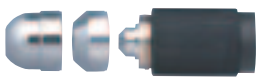
The vertical-illumination lens utilizes our original optical system to give it a thin body. You can clearly monitor microstructure of metal or a semiconductor surface, which are hard to see using conventional lateral illumination. Two models are available with magnification factors 500x and 1000x.

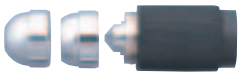
Model		VH-C501	VH-C1001
Magnification [1]		500x	1000x
Monitoring range (inch mm)	Horizontal	0.02" 0.61	0.01" 0.31
	Vertical	0.02" 0.46	0.01" 0.23
	Diagonal	0.03" 0.76	0.01" 0.38
Depth of field (inch mm)		0.002" 0.06	0.001" 0.03
Monitoring distance (inch mm)		0" to 0.08" 0 to 2.0	0" to 0.08" 0 to 2.0

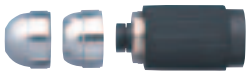
1. Magnification on a 15-inch monitor


VH-20


VH-50


VH-100


VH-200


VH-501


VH-1001

Fixed-magnification lens | VH-20/50/100/200/501/1001

Lens selection based on desired magnification

Select your desired magnification between 20x and 1000x. These fixed-magnification lenses provide a larger depth-of-field than conventional microscopes, enabling you to obtain a sharp 3D image. Two types of illumination heads are included: Contact and non-contact (except for VH-20).

Model		VH-20	VH-50	VH-100	VH-200	VH-501	VH-1001
Magnification [1]		20x	50x	100x	200x	500x	1000x
Monitoring range (inch mm)	Horizontal	0.60" 15.25	0.24" 6.10	0.12" 3.05	0.06" 1.53	0.02" 0.61	0.01" 0.31
	Vertical	0.45" 11.38	0.18" 4.55	0.09" 2.28	0.04" 1.14	0.02" 0.46	0.01" 0.23
	Diagonal	0.75" 19.05	0.30" 7.62	0.15" 3.81	0.07" 1.90	0.03" 0.76	0.01" 0.38
Depth of field (mm)		0.47" 12.0	0.26" 6.5	0.04" 1.0	0.02" 0.4	0.002" 0.06	0.001" 0.03
Monitoring distance (inch mm)		2.76"(2.44") 70(62) [2]	0.50" 12.5	0.43" 11.0	0.14" 3.5	0.14" 3.5	0.14" 3.5

1. Magnification on a 15-inch monitor
2. The figure in parentheses is applicable when a non-reflective illumination head is used.

Peripheral equipment

Keyboard

Useful for entry of detailed observation data for recording files

Comments and observation conditions (lens and magnification data used for recording files) can be entered with the onscreen keyboard. A DOS/V PS2 type keyboard can also be connected.

Footswitch

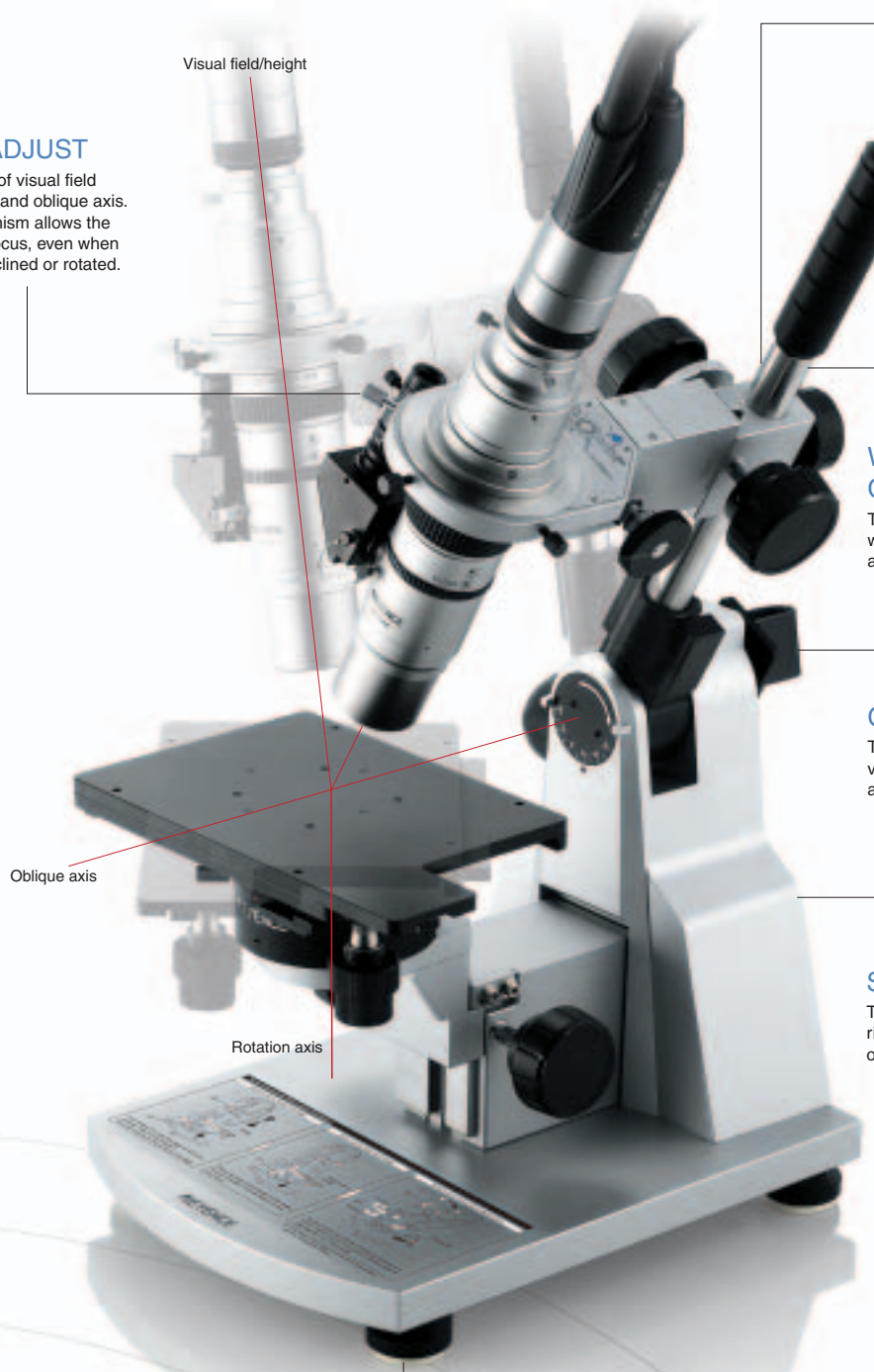
Foot operation is enabled even if your hands are full.

During handheld operation, you can stop and record an image with the foot switch, even if both hands are full or you cannot reach the operation panel. (Commercially available)

Free angle System

NEW Free-angle observation system VH-S30

Vibration Proof / Super High-accuracy



QUICK SETUP MARKS

The ideal setting position for different lenses is indicated on the arm.

EASY-TO-ADJUST

Easy adjustment of visual field (height), rotation, and oblique axis. A custom mechanism allows the target to stay in focus, even when the lens unit is inclined or rotated.

WEDGE-SHAPED CHANNEL

The mounting arm is held in place with a wedge-shaped channel. This prevents the arm from moving during observations.

CABLE HOLDER

The cable is held in place, preventing vibration. The cable is also protected against abrasions and deterioration.

STABILITY

The die-cast main body provides a highly rigid structure that allows for more stable observations.

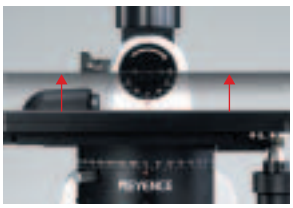
VIBRATION-PROOF RUBBER

Absorbs low to high frequency vibration, allowing for observation of specimens without interference.

Easy to operate

1 SIMPLE ADJUSTMENT

It is easy to adjust the optical axes by simply positioning the stage at the indicated height. The instructions are provided on the base of the stage, allowing new users to immediately begin using the VH-S30. (Patent pending)



Easy adjustment of axes by fixing the stage at the upper limit.

Instructions printed on the stage.

2 FLEXIBLE OPERATION

Observation can be performed from any angle without moving the lens. You can instantly find the best position to observe an object. Since the VH-S30 does not use a mirror, it enables the user to observe objects as they normally appear. (Patent pending)

Observation from various angles by moving the pole.

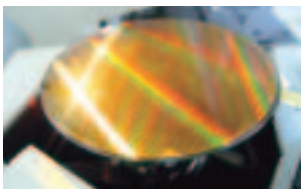
360° observation

Excellent vibration protection

A special vibration proof material has been selected to insulate the VH-S30. It is designed to absorb a broad range of vibrations in order to provide stable images of highly magnified objects.

Vibration-proof rubber

The vibration protective rubber is the same material used for vision inspection systems and high-accuracy measurement devices in the semiconductor, R&D, and automotive industries.



Ultra precise mechanism

The stage combines the flexibility and ultra precision that are critical to a wide range of applications.
(Patent pending)

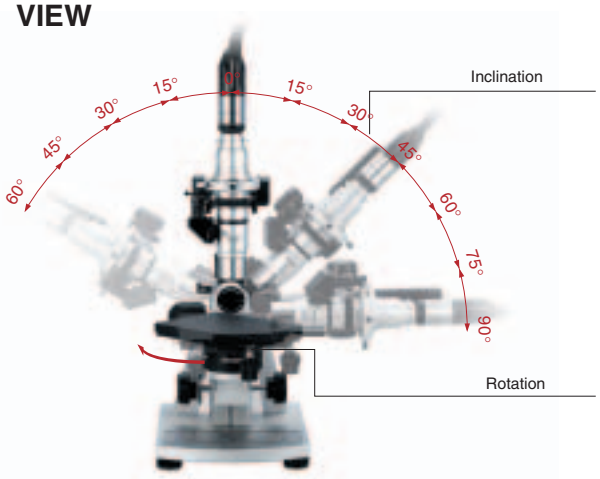
Super fine adjustment dial

In addition to the course adjustment dial, the super fine adjustment dial can be adjusted in 0.2 Mil (5 µm) steps.

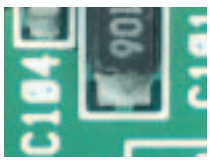
Ultra precise bearing

The oblique axis uses an ultra precise bearing to accurately position the central axis.

VIEW

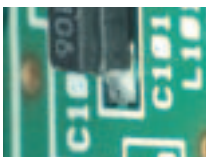


Mounting components/solder (50x)



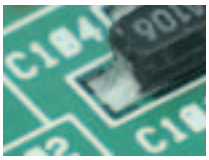
Right above

30°

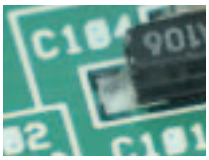


60°

20°



60°



80°

Peripheral equipment

High stability through a low center of gravity

NEW Vibration-proof, high-magnification observation system VH-S5

ANTI-VIBRATION SYSTEM

The cable is tightly held in place, completely eliminating subtle vibrations in a high-magnification observation.

STABILITY

The die-cast main body provides a highly rigid structure that allows for more stable observations.

3-AXIS (X/Y/Z) ROTATION MECHANISM

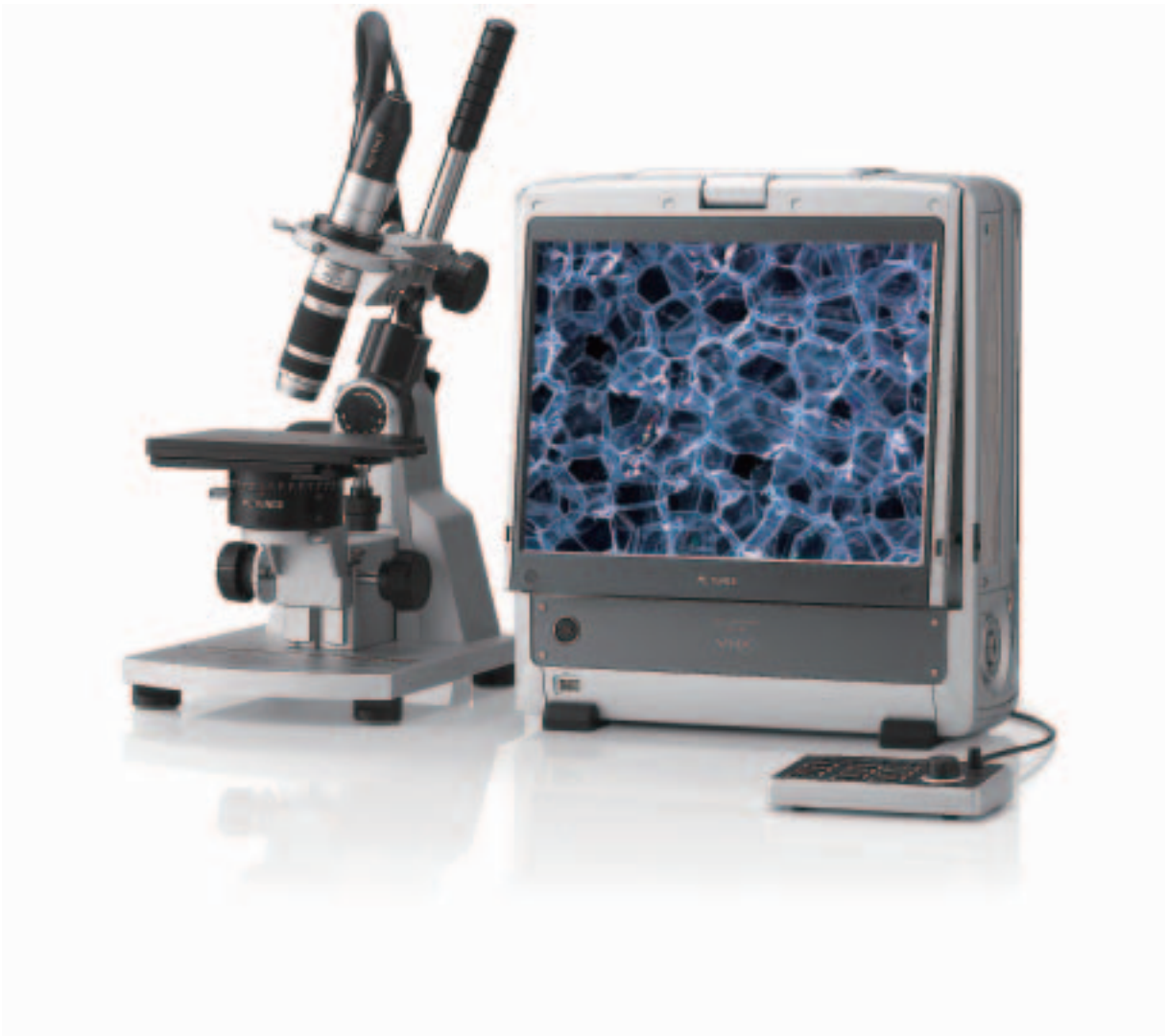
This mechanism helps everyone to perform fine position adjustments in high-magnification observations. Furthermore, removing the stage enables penetration observation.

VIBRATION-PROOF RUBBER

Absorbs low to high frequency vibration, allowing for observation of specimens without interference.

Standard Model | VHX-500F NEW

All-in-one design allows observation, recording, and measurement



2.11 million pixel handheld camera

With 2.11 million pixels, this compact camera enables you to make crisp and clear observations. You can easily make observations without having to destroy or detach the object of observation.

All-in-one design

All the functions you need have been loaded into the compact VHX-500F. You can perform observation, recording, and measurement with this single instrument.

Depth composition

Simply by turning the focus adjusting dial, you can bring the entire field into sharp focus for observation, even for targets having uneven surfaces.

Diverse and versatile range of imaging functionality

With our proprietary Accurate D.F.D. method, you can take images that have a different focus and construct 3D images. This enables you to readily grasp phenomenon that are difficult to observe in two dimensional images.

On-board 80 GB HDD

The unit is equipped with an 80 GB hard disk drive, capable of storing approximately 400000 images (when using image compression). You can easily upload files to a computer over a LAN.

Optimal contrast

With the contrast algorithm, the VHX-500F automatically adjusts the contrast in accordance with the sensitivity of the human eye, adjusting areas of an image that are too bright or dark, while leaving areas that already have the proper contrast as is.

VHX Series System Line Up

System configuration

Polarization illumination adapter OP-51649

Contact adapter OP-81880

Darkfield illumination adapter OP-72402

Diffuse illumination adapter OP-72403

Ring illumination base unit OP-72400

Adjustable illumination adapter OP-72404

Head OP-72407

Fiber OP-72406

Polarization illumination adapter [4] OP-72405

Adjustable illumination adapter VH-K20

Super-diffuse Illumination adapter OP-42305

Polarization illumination adapter OP-35415

Diffuse illumination adapter OP-35324

Non-contact diffusion adapter OP-35414

Multi-diffuse adapter OP-35469

Free head [6] OP-32348

Coaxial vertical illumination adapter OP-35416

Adjustable illumination adapter VH-K150

Non-reflective illumination ring OP-32009

RZ LENS

High-resolution zoom lens — VH-Z500R [1] — 500x to 5000x

Wide-range zoom lens — VH-Z100R [1] — 100x to 1000x

Ultra-small, high-performance zoom lens — VH-Z20R — 20x to 200x

High-performance low-range zoom lens — VH-Z00R — 0x to 50x

Long-focal-distance, high-performance zoom lens — VH-Z50L — 50x to 500x

ZOOM LENS

Zoom Lens — VH-Z25 — 25x to 175x

Long-focal-distance zoom lens — VH-Z35 — 35x to 245x

Middle-range zoom lens — VH-Z150 — 150x to 800x

Low-range zoom lens — VH-Z05 — 0x to 40x

High-range zoom lens — VH-Z450 [1] — 450x to 3000x

HYPER-VIEW LENS

VH-V100 (100x)

VH-V200 (200x)

VERTICAL-ILLUMINATION LENS

VH-C501 (500x)

VH-C1001 (1000x)

LONG-FOCAL-DISTANCE LENS

VH-W50 (50x)

VH-W100 (100x)

VH-W200 (200x)

Lateral view adapter OP-98535

BORESCOPE LENS

VH-B31

VH-B32

VH-B61

VH-B64

VH-B

BORESCOPE LENS

OP-32666

OP-32662

OP-32665

OP-32663

OP-32664

OP-32681

FIXED-MAGNIFICATION LENS

VH-20 (20x)

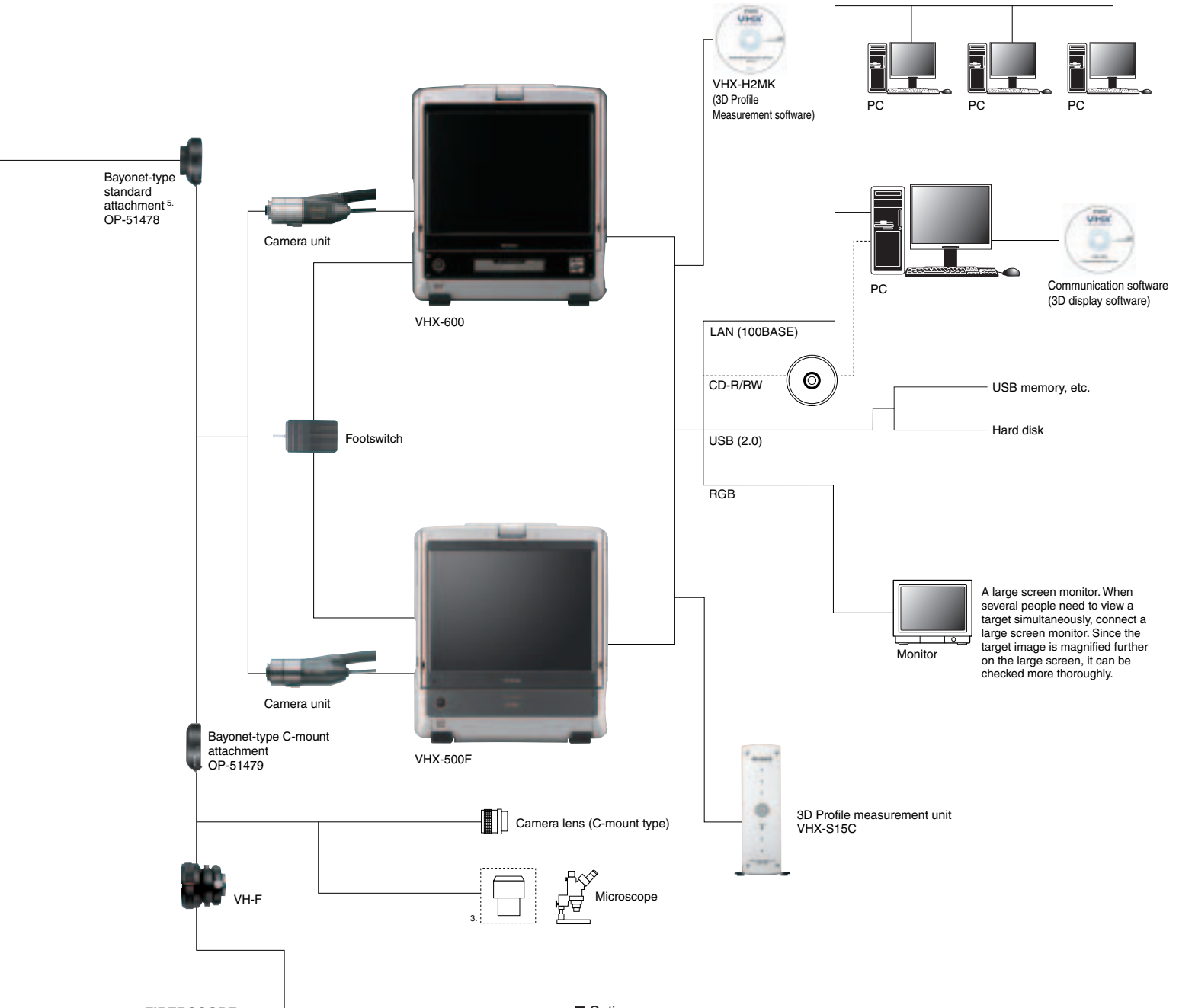
VH-200 (200x)

VH-50 (50x)

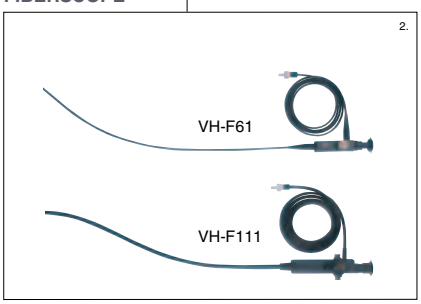
VH-501 (500x)

VH-100 (100x)

VH-1001 (1000x)



FIBERSCOPE



■ Option

Free-angle observation system
VH-S30

VH lens mounting stand
OP-25539

VH lens mounting stand
(with XY stage)
OP-25539 + OP-22124

VH-S5
High-precision
VH mounting stand
(with X-Y stage and
penetration illumination)

Vertical illumination head
(for VH-200)
OP-96907

Side-view adapter
(for VH-W100/W200)
OP-98535

Variable illumination
adjustor (for VH-Z25/Z05)
OP-27304

VHX lens mount X
(for VH-S30)
OP-66871

1. The optional light guide dedicated to the VHX Series is required.
   OP-51480: VH-Z100/Z450/Z500/Z50
2. The optional light guide attachment (OP-51482) dedicated to the VHX Series is required.
3. A C-mount adapter suitable for the microscope is required.
4. For coaxial illumination, OP-72407 and OP-72406 are required.
5. For the VH-Z100/Z450/Z500/Z50, OP-51647 is required.
6. OP-32348 is the special adapter for the VH-Z25.

Specifications (Basic functions)

Model			VHX-600	VHX-500F
Camera	Image receiving element		1/1.8-inch, 2.11 million-pixel CCD image sensor	
			Total pixels: 1688 (H) x 1248 (V)	
			Effective pixels: 1628 (H) x 1236 (V)	
			Virtual pixels: 1600 (H) x 1200 (V)	
	Scan method		Progressive	
	Frame rate		15 frames/sec. and 28 frames/sec. selectable	
	Resolution	2 million pixels	1600 (H) x 1200 (V) Approx. 1000 TV lines	
		4 million pixel equivalent	1600 (H) x 1200 (V) Approx. 1200 TV lines	–
		6 million pixels [1.]	1600 (H) x 1200 (V) Approx. 1200 TV lines (Excellent color reproducibility)	
		8 million pixels	3200 (H) x 2400 (V) Approx. 1600 TV lines	
		18 million pixels	4800 (H) x 3600 (V) Approx. 2000 TV lines or more	
		54 million pixels [2.]	4800 (H) x 3600 (V) Approx. 2000 TV lines or more (Excellent color reproducibility)	
	Gain		AUTO, NORMAL, PRESET	
	Electronic shutter		AUTO, MANU, OFF, 1/15, 1/30, 1/60, 1/120, 1/250, 1/500, 1/1000, 1/2000, 1/5000	
	Supercharge shutter		0.2 sec. to 17 sec. Can be set in increments of 0.1 sec.	
	White balance		Auto, Manual, One-push set, Preset (2700K, 3200K, 5600K, 9000K)	
	Back-focus adjustment		Not required	
LCD monitor [4.]	Size		Color LCD (TFT) 15"	
	Panel size		11.99" (H) x 8.99" (V) 304.5 (H) x 228.4 (V) mm	
	Pixel pitch		0.008" (H) x 0.008" (V) 0.1905 (H) x 0.1905 (V) mm	
	Number of pixels		1600 (H) x 1200 (V) (UXGA)	
	Display color		Approx. 16,770,000 colors [3.]	
	Brightness		200 cd/m^2 (typical)	
	Contrast ratio		500 : 1 (typ)	
	Viewing angle		±85° (typical, horizontal), ±85° (typical, vertical)	
CD-R/CD-RW drive unit	Speed		24x Write, 10x Re-write, 24x Read	
	Used disk		CD-R/CD-RW	
	Storage capacity		700 MB, approx. 3500 images (When a 2 million-pixel image is compressed) to approx. 117 images (When a 2 million-pixel image is not compressed)	
Hard disk drive unit	Storage capacity		160 GB (including 45 GB reservation area), approx. 575,000 images (When a 2 million-pixel image is compressed) to approx. 19,000 images (When a 2 million-pixel image is not compressed)	80 GB, approx. 400,000 images (When a 2 million-pixel image is compressed) to approx. 13334 images (When a 2 million-pixel image is not compressed)
Image format			JPEG (With compression), TIFF (No compression)	
Light source	Lamp		12 V, 100 W, Halogen lamp	
	Lamp life		1000 hours (average)	
	Color temperature		3100 K (at maximum light intensity)	
Output	Video output		Analog RGB (1600 x 1200 pixels)	
	Scanning frequency	Special LCD monitor	75 kHz (H), 60 Hz (V)	
		External monitor	75 kHz (H), 60 Hz (V)	
Input	Mouse input		MINI-DIN 6-pin connector (DOS/V-compatible PS/2 mouse)	
	Keyboard input		MINI-DIN 6-pin connector (DOS/V PS/2)	
	External remote input		Pause/ Recording, Non-voltage input (Contact/Noncontact)	
Interface	LAN		RJ-45 (10BASE-T / 100BASE-TX / 1000BASE-T)	
	USB2.0 Series A		4 types: Special printer port x 1, External storage connection port x 3	
Power supply	Power-supply voltage		100 to 240 VAC, 50/60 Hz	
	Current consumption		310 VA	
Environmental resistance	Ambient temperature		+5 to 40°C (41 to 104°F), No condensation	
	Relative humidity		35 to 80%, No condensation	
Weight	Controller		Approx. 12.6 kg	Approx. 12.5 kg
	Camera unit		Approx. 1.05 kg	Approx. 0.88 kg
	Console		Approx. 0.25 kg	
Dimensions (Excluding the projected areas)			15.04" (W) x 16.73" (H) x 6.38" (D) 382 x 425 x 162 mm	

1. 2 million pixels x 3 CCD mode
2. 18 million pixels x 3 CCD mode
3. Approximately 16,770,000 pixels are realized with the dithering processing of the display controller.
4. The LCD monitor provided in the VHX Series is based on extremely advanced technology. Rarely, an unlit part (black spot) or lit part (bright spot) may exist on the monitor screen. However, this is not an indication of the LCD monitor being defective.

Specifications (Various functions)

Model		VHX-600	Console compatible*	VHX-500F	Console compatible*
Various controller functions	Depth composition function	Real-time depth composition	○	Real-time depth composition	○
		High-quality depth composition		High-quality depth composition	
	Accurate D.F.D. method 3D display function	Provided (Quick)	○	Provided (Quick)	○
	3D illumination simulation function	Provided		Provided	
	3D two-screen simultaneous comparison function	Provided (Combination/Comparison/Difference display mode)		Provided (Combination/Comparison/Difference display mode)	
	Real-time digital zoom	1.0x to 10.0x (100 steps)	○	1.0x to 10.0x (100 steps)	○
	Lighting shift function (Height difference enhancement)	Provided (Full, Partial, and Flanking illumination modes)	○	Provided (Full, Partial, and Flanking illumination modes)	○
	e-Preview mode	Provided (Automatically lists of four types of image modes, allowing selection of the optimal image)	○	Provided (Automatically lists of four types of image modes, allowing selection of the optimal image)	○
	Optimal contrast function	Provided		Provided	○
	Halation eliminating function	Provided	○	Provided	○
	Vivid & sharp image mode	Provided		Provided	
	Supercharge shutter function	Provided	○	Provided	○
	Edge enhancement function	Provided (200 steps) For a moving image		Provided (200 steps) For a moving image	
	Gamma correcting function	Provided		Provided	
	Noise eliminating function	Provided		Provided	
	Camera-shake correcting function	Provided (For a moving image)	○	Provided (For a moving image)	○
	Split function	Vertical split, Horizontal split, 4-part split		Vertical split, Horizontal split, 4-part split	
	Moving image recording/reproducing function	28 frames/sec. max. Moving image size (800 x 600), Actual moving image size (800 x 480)		–	
	Timer recording function	Provided		Provided	
	Automatic unit VHX-S15 control function	Provided		Provided	
	Sensitivity quick adjusting dial	Shutter speed and camera gain can be adjusted with one trimmer		Shutter speed and camera gain can be adjusted with one trimmer	
Measuring function	High-resolution dimensional measurement function	Provided		–	
	Wide-visual-field automatic 2-point measurement	Provided		Provided	
	Distance, angle, radius, area, etc.	Various functions are provided		Various functions are provided	
	Automatic count/measurement function	Provided (Enables distance/area measurement through brightness/color extraction)		Provided (Enables distance/area measurement through brightness/color extraction)	
	Scale display	Various functions are provided		Various functions are provided	
	Automatic edge detection	Provided		Provided	
	Auto calibration	Full-auto (Numerical input is not required)		Full-auto (Numerical input is not required)	
	CSV storage	Provided		Provided	
Measuring function (Optional function)	3D profile measurement	Provided (Enables height profile display along an arbitrary line on the 3D screen)		Provided (Enables height profile display along an arbitrary line on the 3D screen)	
	3D height color/scale display function	Provided (Enables X/Y/Z-axis height scale display and color bar display related to height)		Provided (Enables X/Y/Z-axis height scale display and color bar display related to height)	
	2-point height difference measurement function	Provided		Provided	
	Auto-focus function	Provided		Provided	
	Cross-section profile measurement	Provided		Provided	
	3D volume measurement	Provided		Provided	
	3D plane distance measurement	Provided		Provided	
	3D plane angle measurement	Provided		Provided	
Utility	Complete style covering Observation, Recording and Measurement	All-in-one system that enables all operations for Observation, Recording and Measurement without using a PC		All-in-one system that enables all operations for Observation, Recording and Measurement without using a PC	
	Mail transmission function	Provided		Provided	
	Pop-up guide	Provided		Provided	
	Bayonet-type attachment	Provided		Provided	
	Keyboard entry	Enabled		Enabled	
	Compatible with a foot switch	Enabled		Enabled	
	User settings	Provided		Provided	
	Function guide	Provided		Provided	
Accompanying software	PC communication software	Image data transfer between the VHX and PC can be performed easily. (LAN)		Image data transfer between the VHX and PC can be performed easily. (LAN)	
	3D reproduction software for the PC (Available free of charge)	–		The PC can reproduce a 3D image saved in VHX. (Copy free)	

*Function can be used simply by pressing a button on the console.

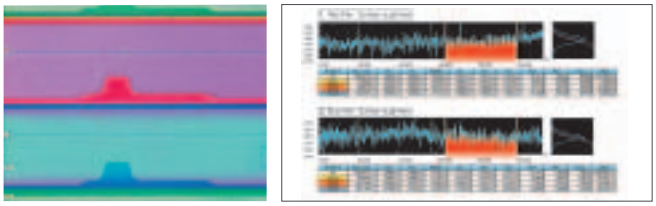
Specifications (Details for each module)

Accompanying software	Moving images recording software	Functions for recording/reproducing moving images
	Main measurements and area calculation software	Functions for measuring the dimensions and area of two-dimensional images
	High-quality depth composition software	Functions for composing a single image from a plurality of images obtained by focusing on and capturing an image of each portion of the target that is of a different height
	Image splitting software	Function for splitting an image vertically, horizontally, or into four parts, and displaying the image
	Comment input software	Function for inputting and displaying comments such as letters, marks, or the like in an observation image
	Camera settings and image improvement software	Image processing functions for correcting images to make observation easier

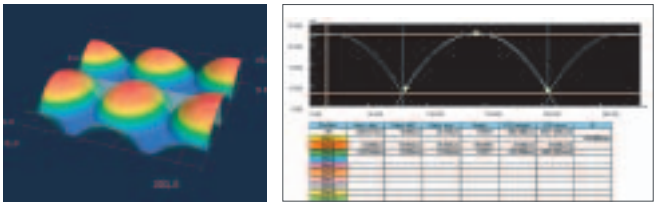
Analysis of capacities of SEMs and roughness meters are easily produced, as if you were using an optical microscope.

Ultra-deep color 3D profile measurement microscope VK-9700

- Observation magnification: 200x to 18000x
- High resolution and large depth of field comparable to SEMs
- Z-axis measurement resolution: 1 nm
- Abundant analyzing functions, including profile and roughness
- Applicable to large-size samples
- Provides an image combination function that enables wide-visual-field analysis



Color filter roughness measurement (1000x)



Microlens R measurement (1000x)

Specifications are subject to change without notice.

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