



Using the VK-X3000 Series for the First Time

3D Surface Profiler

Quick Start Guide

- Gathering New Data using Laser Confocal -

Introduction

Thank you for your purchase of the VK-X3000 Series 3D Surface Profiler. First, we will introduce basic operation. You can understand basic operation using a common object such as a coin. This manual describes methods using the laser confocal measurement principle.

Contents


| | |
|---|-----------|
| Chapter 1 Before Starting Operation | 3 |
| 1-1 Understanding the Operation Flow | 4 |
| Chapter 2 Preparation for Measurement | 5 |
| 2-1 Starting the Viewer Application | 6 |
| 2-2 Adjusting the Magnification and Focus | 7 |
| 2-3 Adjusting the Brightness | 8 |
| 2-4 Creating a Navigation Image | 9 |
| Chapter 3 Automatic Measurement | 11 |
| 3-1 Setting for Measurement | 12 |
| 3-2 Performing Automatic Measurement Using Laser Confocal | 13 |
| Chapter 4 Advanced Settings | 15 |
| 4-1 Performing Advanced Settings | 16 |
| 4-2 Setting the Moving Range of the Objective Lens | 18 |
| 4-3 Setting the Measurement Conditions | 19 |
| 4-4 Measuring | 20 |
| 4-5 Saving the Measurement Result | 21 |
| Chapter 5 Gathering New Data Using Image Stitching | 23 |
| 5-1 Understanding the Operation Flow | 24 |
| 5-2 Measuring with Image Stitching | 25 |
| 5-3 Specifying the Exclusion Area | 27 |
| 5-4 Executing Image Stitching (Laser Confocal) | 28 |

● Laser confocal

This method utilizes reflected laser intensity and the focal point of the objective lens to detect height information. The lens is moved from the upper to lower limit of the scan range to gather information across the entire field-of-view.

Since a laser is used to acquire the data, the material of the object doesn't matter. When using laser confocal mode however, there are some disadvantages including reduced data quality and angular resolution at low magnification.

● Focus variation or white light interference

To use focus variation or white light interference, see  "Quick Start

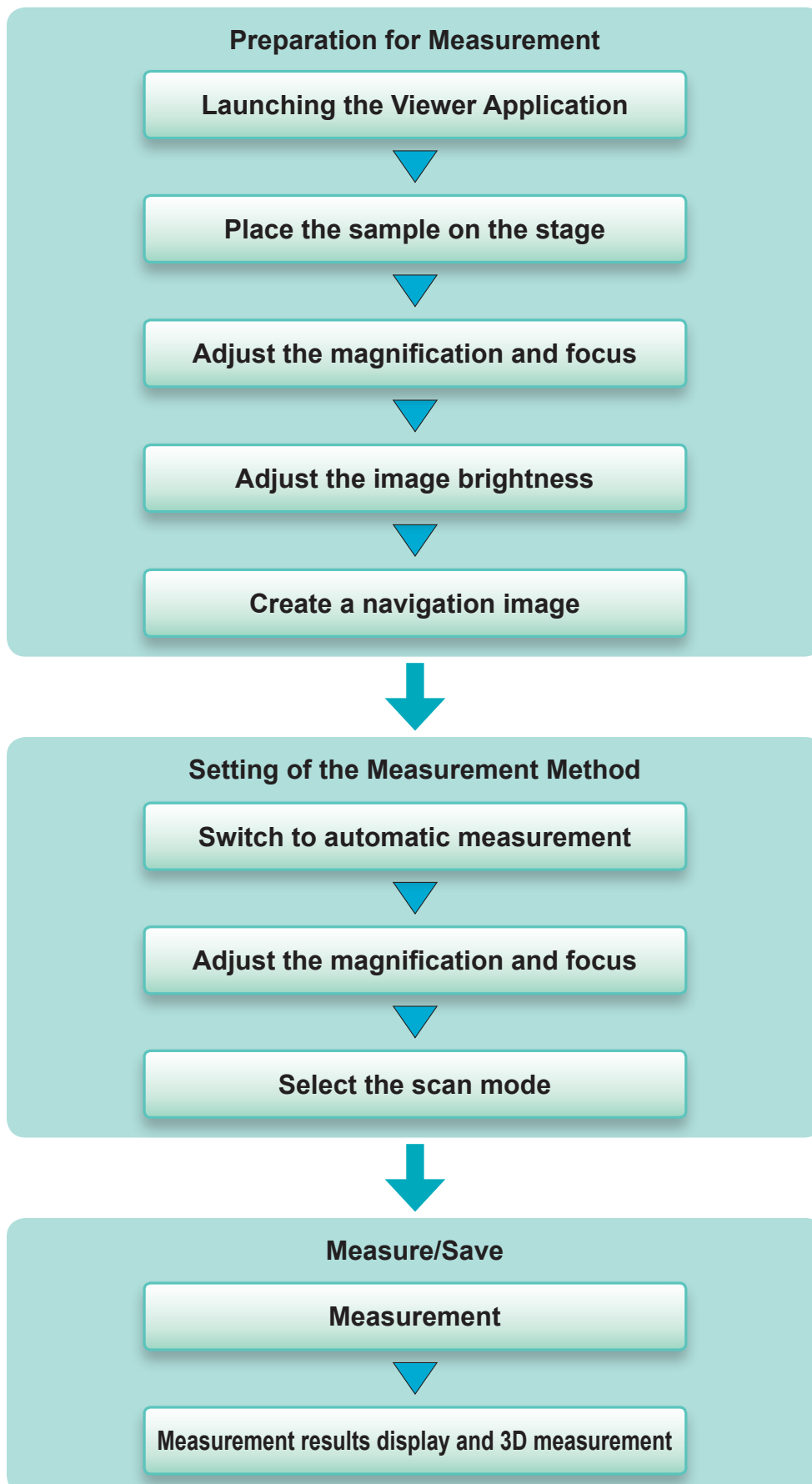
Guide: Gathering New Data by Focus Variation/White Light Interferometer"

Chapter 1

Before Starting Operation



See the general flow for shape measurement below.



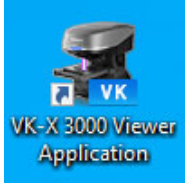
Chapter 2

Preparation for Measurement



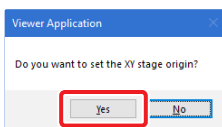
To obtain new data, click the icon on the desk top to start [VK-X 3000 Viewer Application].

1. Double-click the [VK-X 3000 Viewer Application] icon on the desktop.

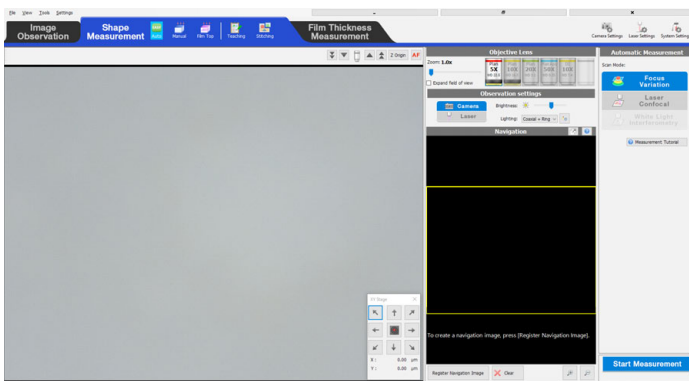


A dialog box confirming movement of the revolver and stage will appear.

2. Click the [Yes] button.



3. The stage will return to origin, and the Viewer Application starts.

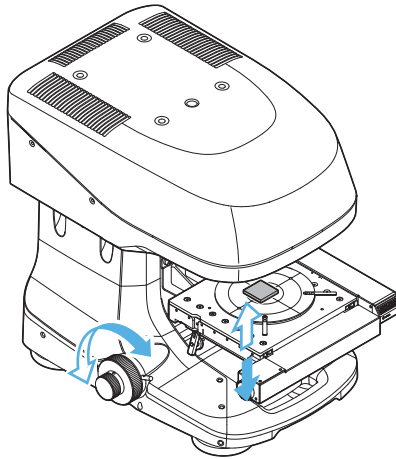


- The motorized XY stage can accommodate samples up to 70 mm in height and 3.0 kg in weight.
- The standard XY stage can accommodate samples up to 70 mm in height and 5.0 kg in weight.

Adjust the magnification and focus so that the image of the sample appears properly in the viewing window.

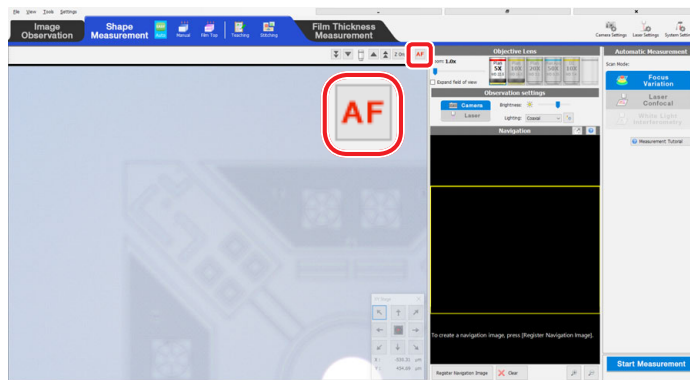
- 1. Place the sample on the XY stage.**
- 2. Adjust the height of the XY stage to bring the sample roughly in focus.**

Turn the focusing handle (Coarse/Fine) to adjust the focus.



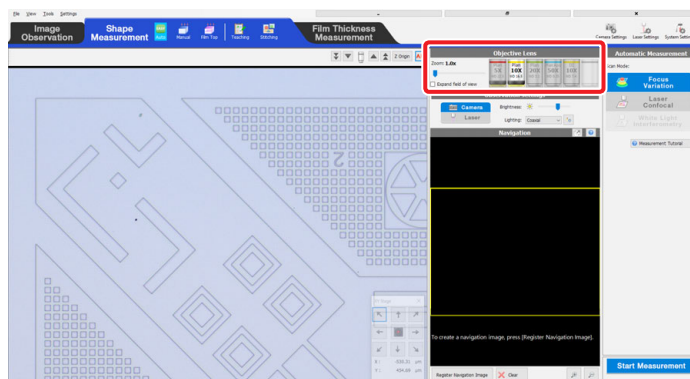
- 3. Focus the objective lens.**

On the operation panel, click the [AF] button.



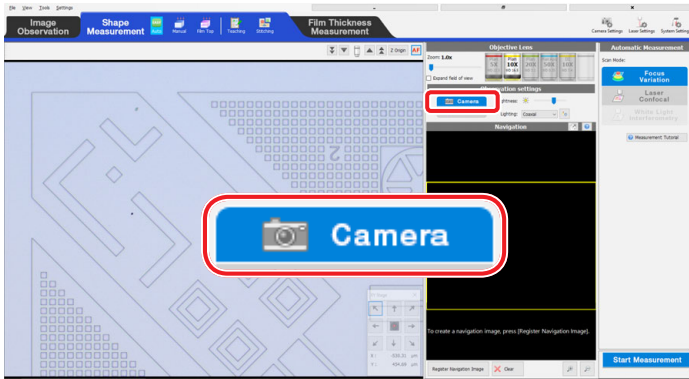
- 4. Select the objective lens.**

Adjust the focus with a desirable lens magnification by repeating Steps 2 to 3.



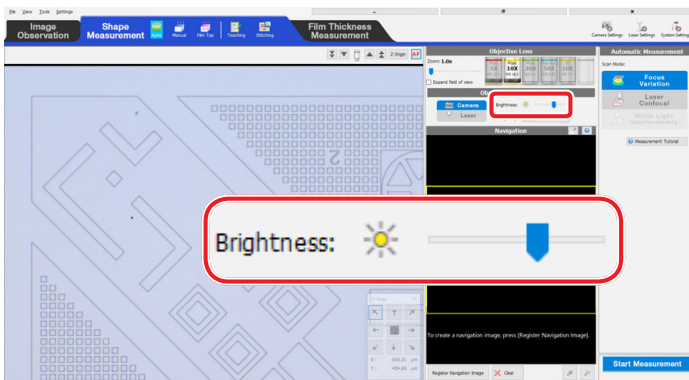
This section describes setting the screen brightness.

1. Set the displayed live image to [Camera].



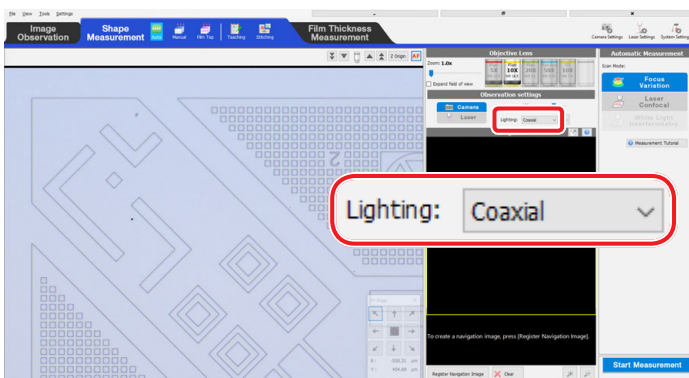
2. Adjust the brightness of the lighting.

Adjust the brightness with the [Brightness] slide bar.



3. Select the lighting to be used.

Click the [Lighting] box to select a desired lighting.

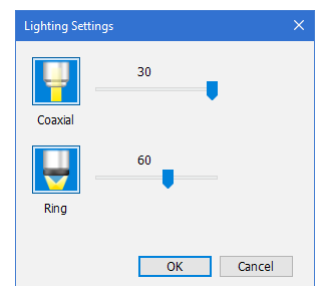


● Ring

Ring lighting can only be selected when the ring light adapter is attached to the objective lens.

● Advanced settings

Click the [Advanced] button to adjust the brightness of each lighting.



- **Obtaining a navigation image with a wider area**

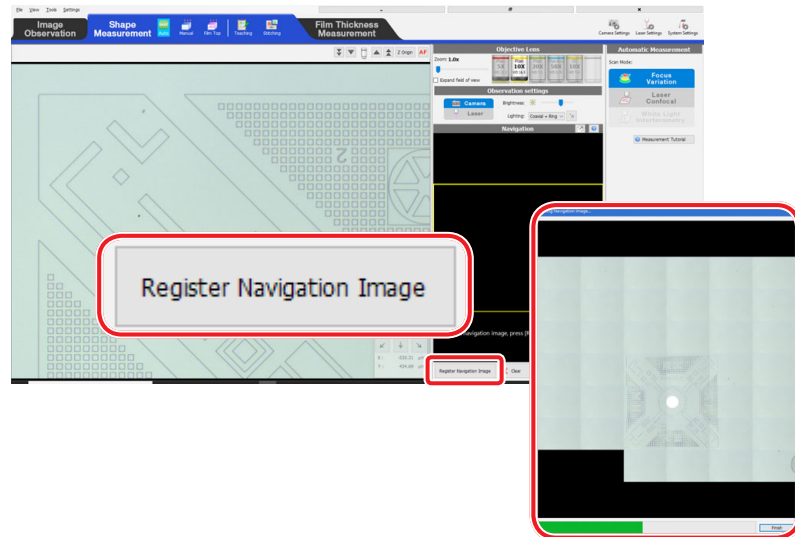
To obtain a navigation image with a wider area, click the [Capture a Wider Field of View] button.

Capture a Wider Field of View

Create a navigation image to get an overall view of the sample.

- 1. Move the XY stage to the position where the center of the map image of the navigation function is seen, and click the [Register Navigation Image] button on the navigation view.**

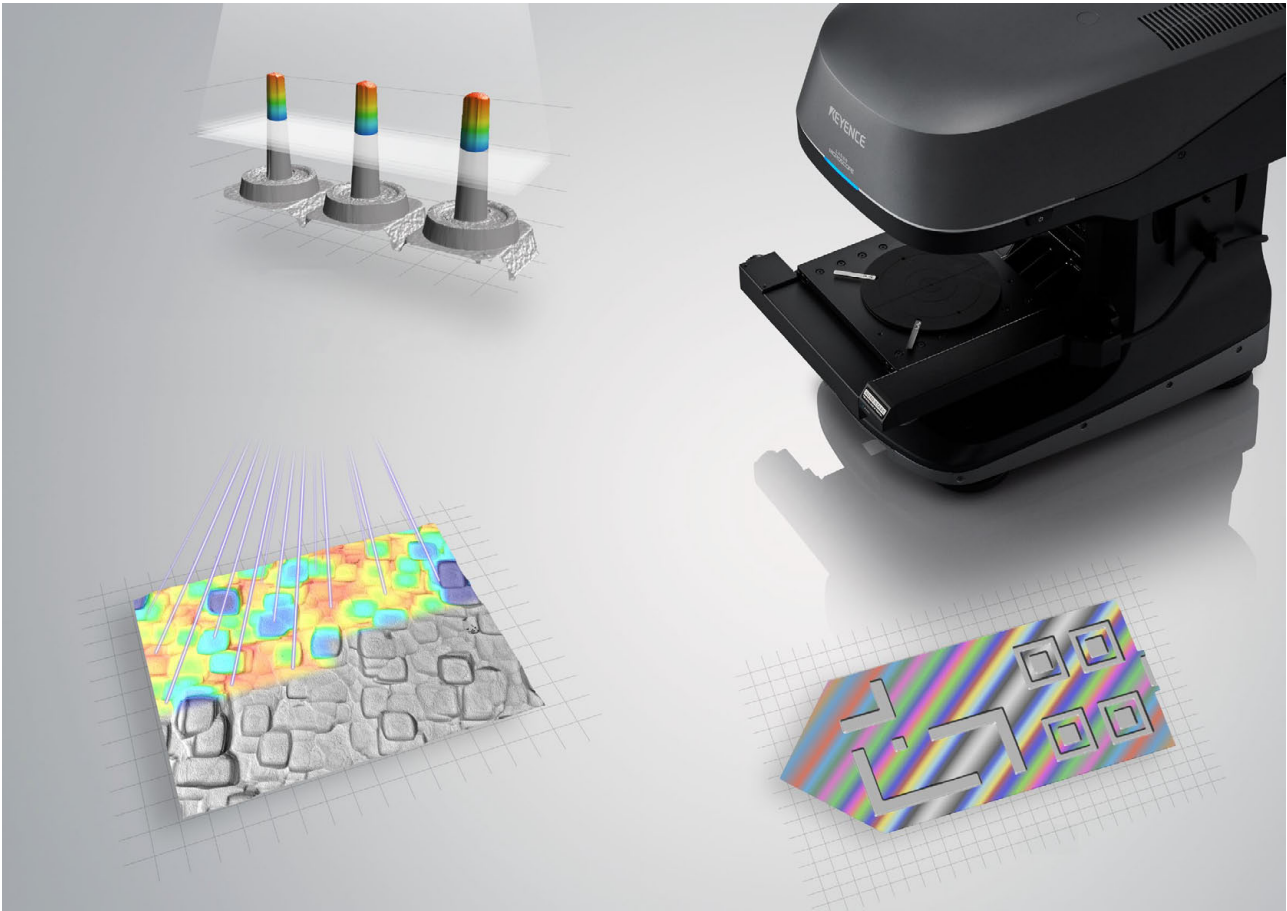
The creation of the navigation image will start, and the [Creating Navigation Image] screen will appear. It is recommended to do this step at low magnification.



MEMO

Chapter 3

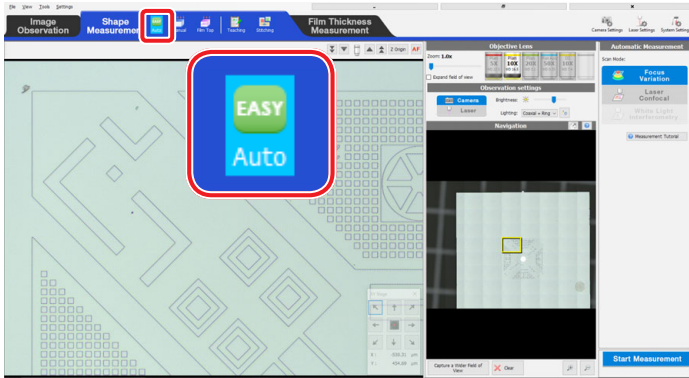
Automatic Measurement



New data is acquired through the “Shape Measurement” tab.

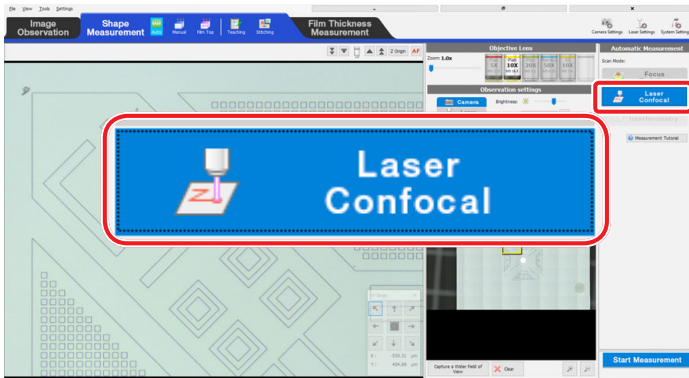
This section describes the procedure for measurement using “Automatic measurement”.

1. Click the [Auto] button from [Shape Measurement] on the toolbar.

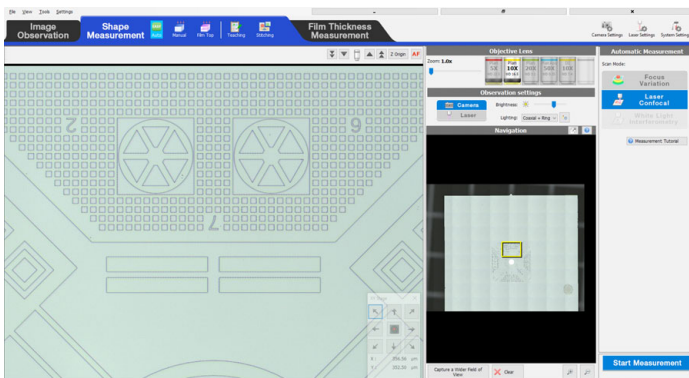


2. Select the scan mode.

Click [Laser Confocal].

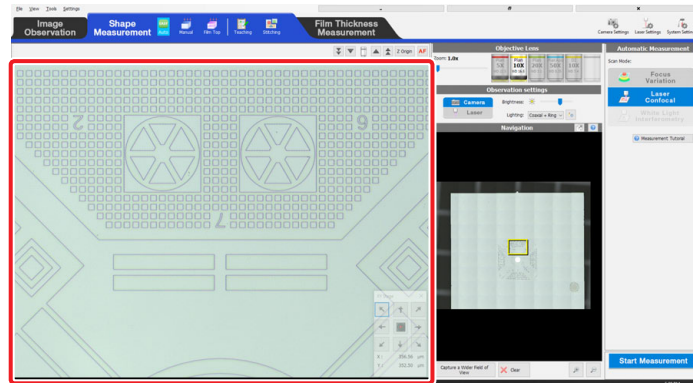


3. Move the XY stage so that the area of interest appears within the screen.

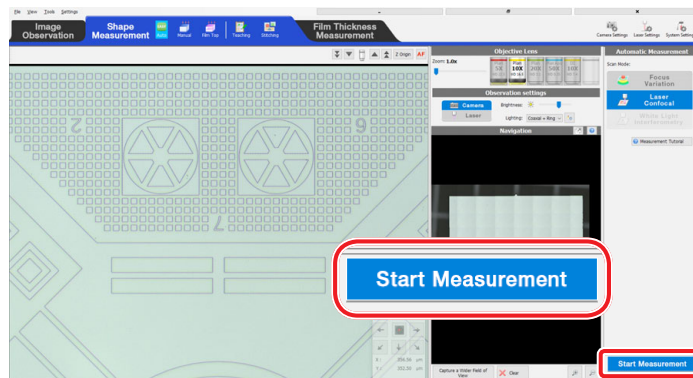


This section describes the procedure for the measurement using the scan mode, [Laser Confocal].

1. Move the focusing handle and objective lens so that the optical image is brought into focus.



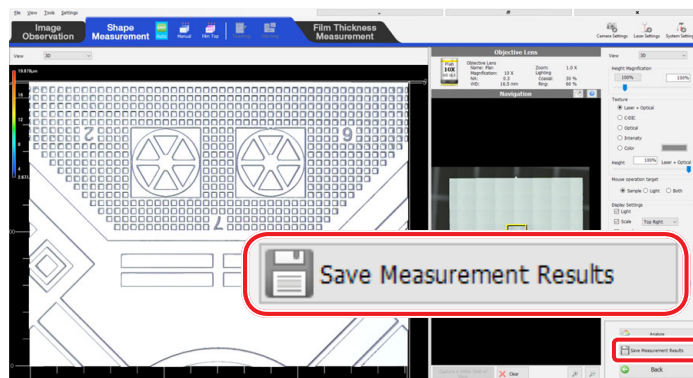
2. Click the [Start Measurement] button.



The measurement is executed.

After the measurement is completed, the result is displayed.

3. Click the [Save Measurement Results] button.



MEMO

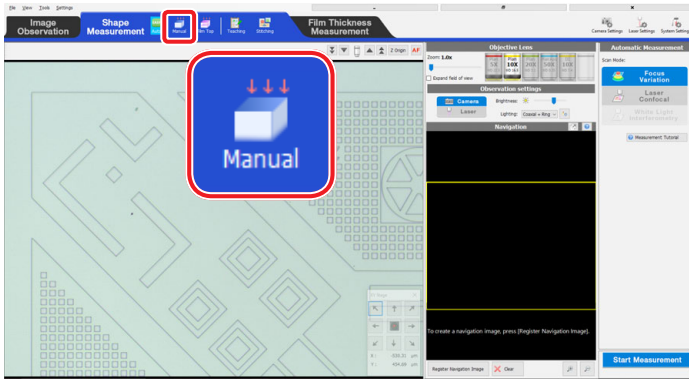
Chapter 4

Advanced Settings



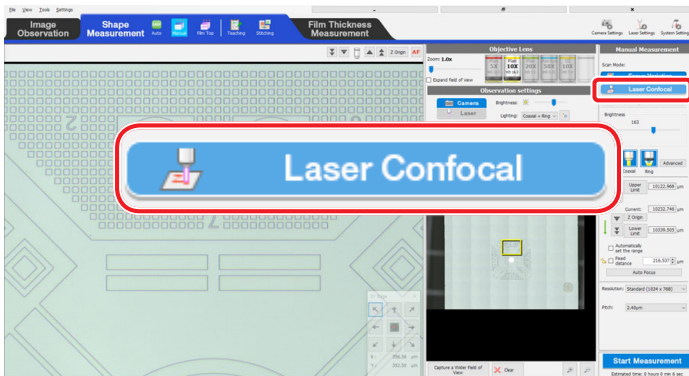
This section describes the procedure for measurement using “Manual measurement”.

1. Click the [Manual] button from [Shape Measurement] on the toolbar.



2. Move the XY stage so that the area of interest appears within the screen.
3. Select the scan mode.

Click [Laser Confocal].



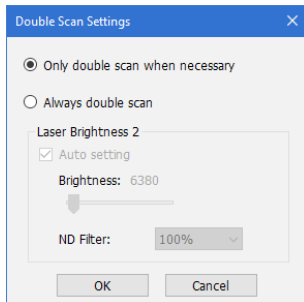
The displayed image switches automatically from the camera to laser.

- ! Point** Make sure to switch to the laser from the status where the optical image is focused.
- For the live image with the laser confocal, only the focused part is brightly displayed, so if the image includes a part that is out of focus, the screen can be completely dark.

- **Double scan**

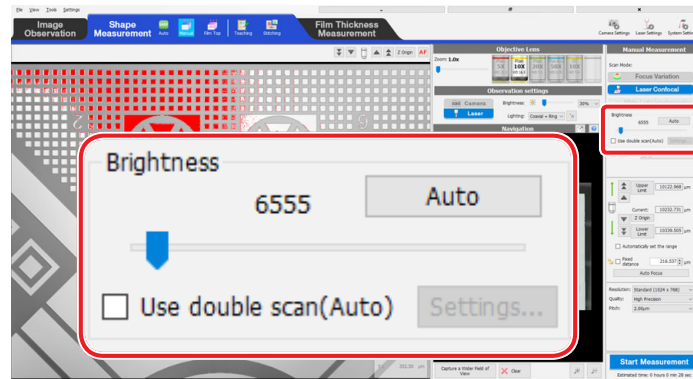
When the [Use double scan(Auto)] check box is selected, the measurement can be done using the double scan function. Double scan is helpful for parts with complex geometry or multiple materials with different reflectivity.

Click the [Settings] button to set the unit for double scan.



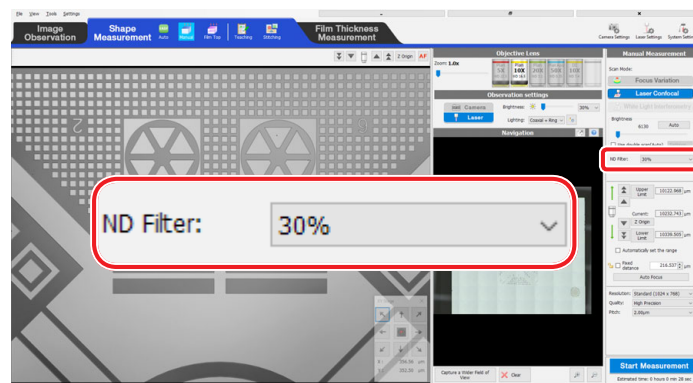
4. Adjust the brightness of the lighting.

Adjust the brightness with the [Brightness] slide bar.

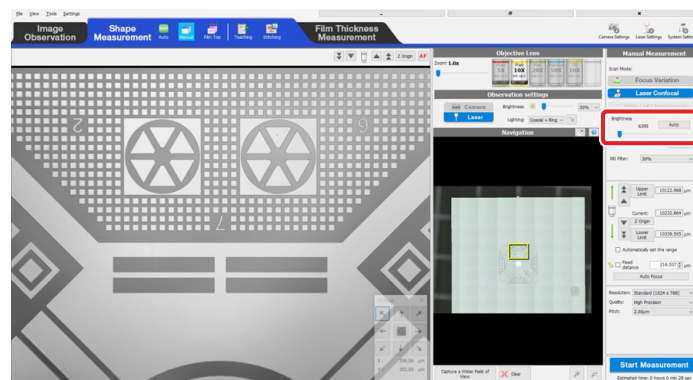


Lower the brightness slide bar until the red saturation overlay is minimized.

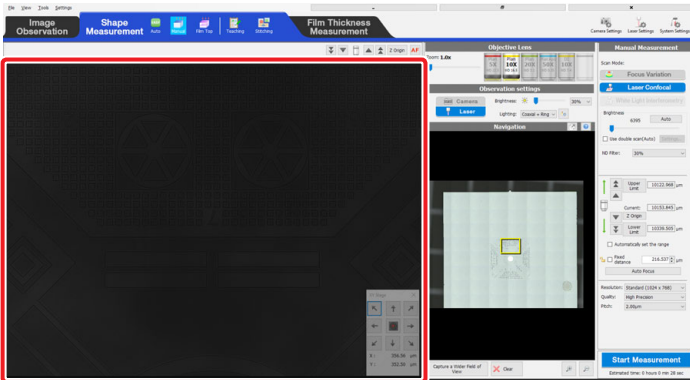
5. If the red saturation overlay continues to appear even after lowering the brightness slider, change the [ND filter] setting.



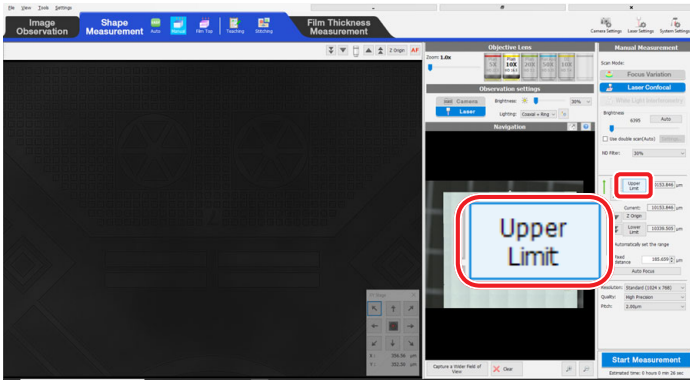
6. When reducing the transparency of the illumination filter, raise the slide bar again and adjust the brightness until just before the red saturation overlay appears.



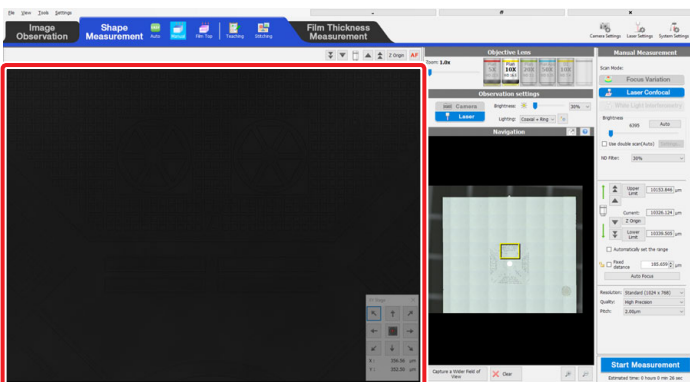
1. Move the objective lens upward past the highest point of the sample until the optical image becomes out of focus.



2. Click the [Upper Limit] button.



3. Move the objective lens downward past the lowest point of the sample until the optical image becomes out of focus.



- [Z Origin] button

Clicking returns the objective lens to the original position (origin).

Z Origin

- [Automatically set the range] check box

Selecting this check box automatically sets the measurement range.

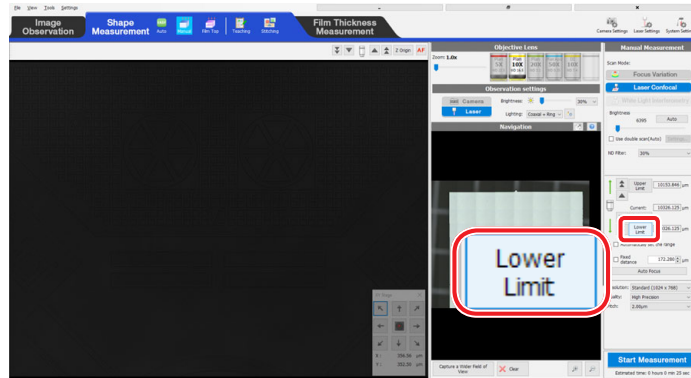
Automatically set the range

- [Fixed distance] check box

Selecting this check box selects the measurement range by starting position and scan range amount.

Fixed distance

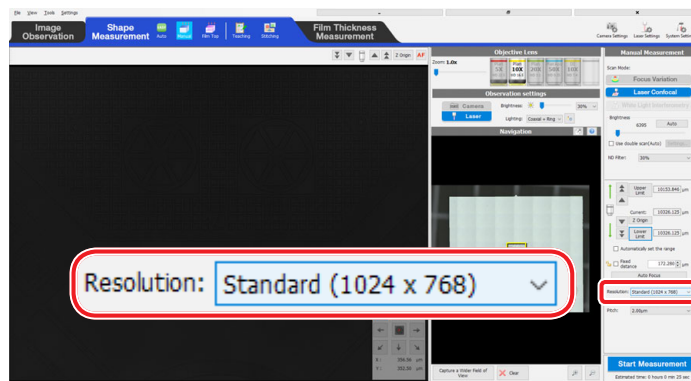
4. Click the [Lower Limit] button.



Set "Resolution size" or "Pitch".

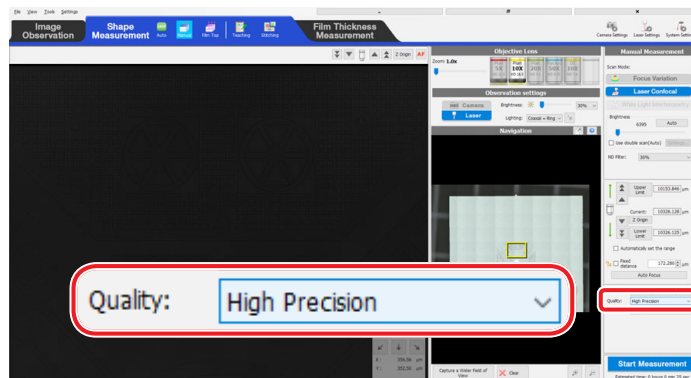
1. Set the measurement size.

Select the measurement size from the [Resolution] dropdown list.



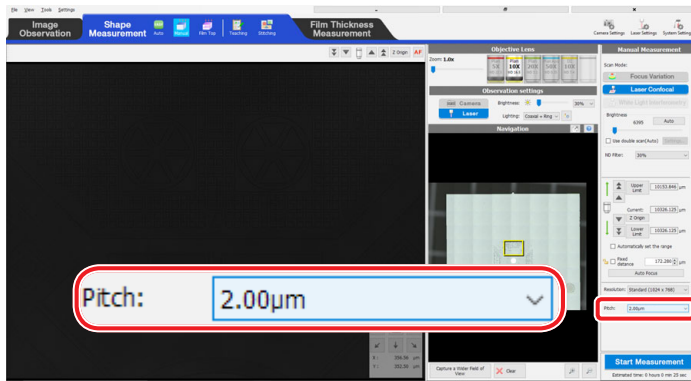
2. Set the measurement quality.

Select the measurement quality from the [Quality] dropdown list.

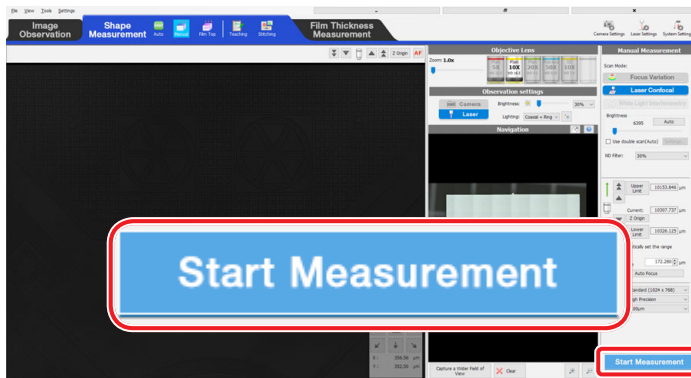


3. Set the pitch (movement distance for the objective lens).

Select the pitch from the [Pitch] dropdown list.

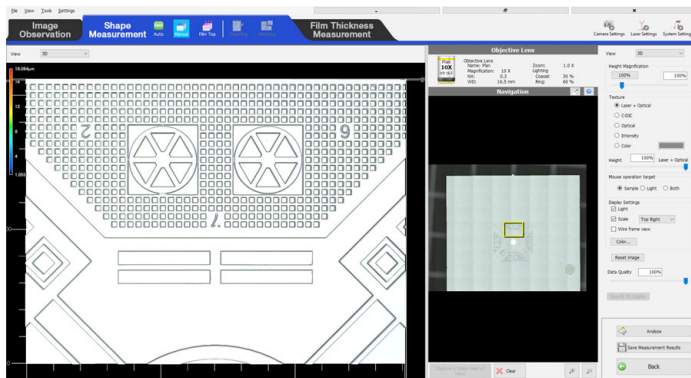


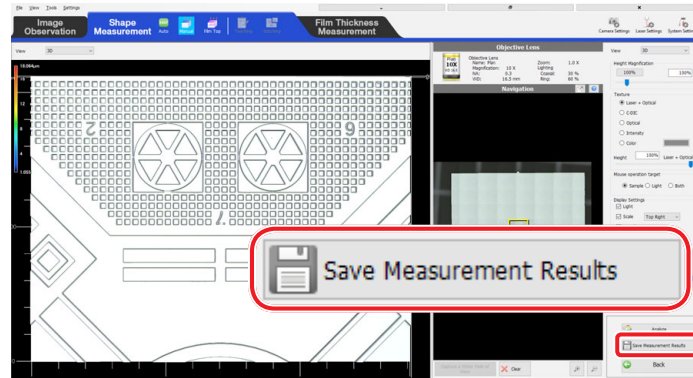
1. Click the [Start Measurement] button.



The measurement is executed.

After the measurement is completed, the result is displayed.

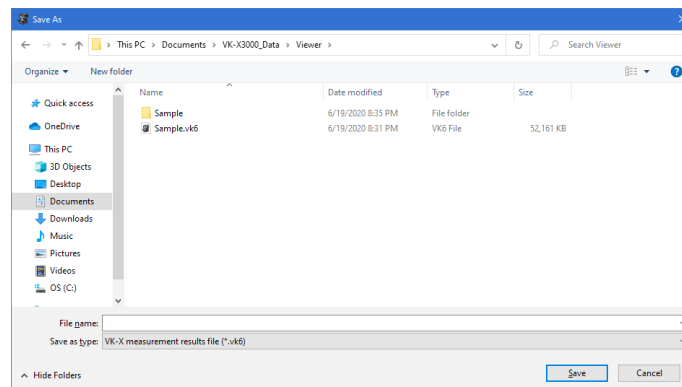


1. Click the [Save Measurement Results] button.

The [Save as] dialog box appears on the screen.

2. Save the data.

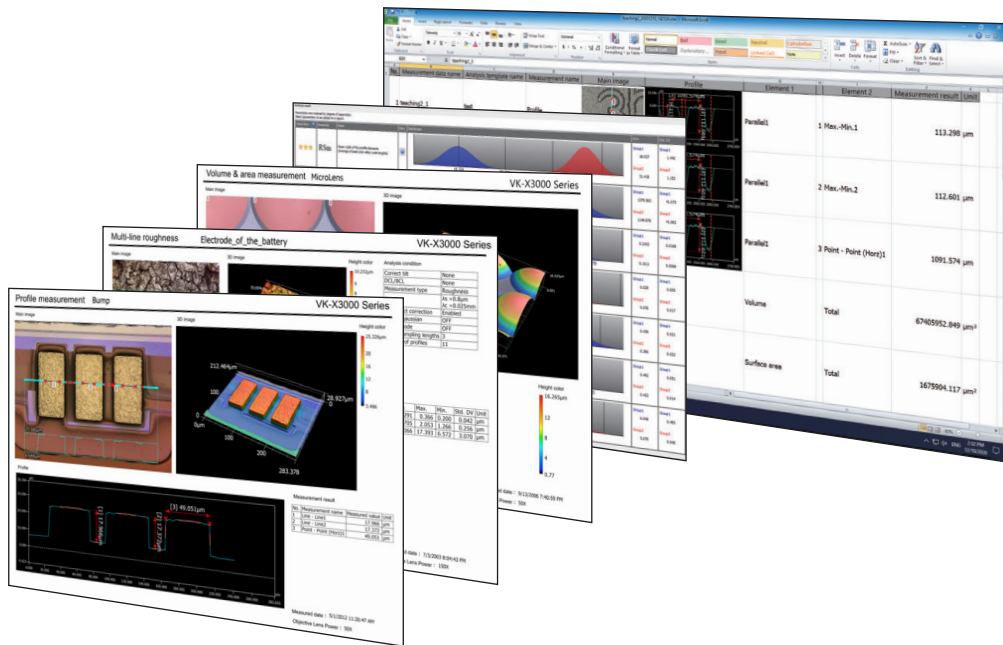
Set "Save to" and "File name" of the data, and click the [Save] button.



MEMO

Chapter 5

Gathering New Data Using Image Stitching

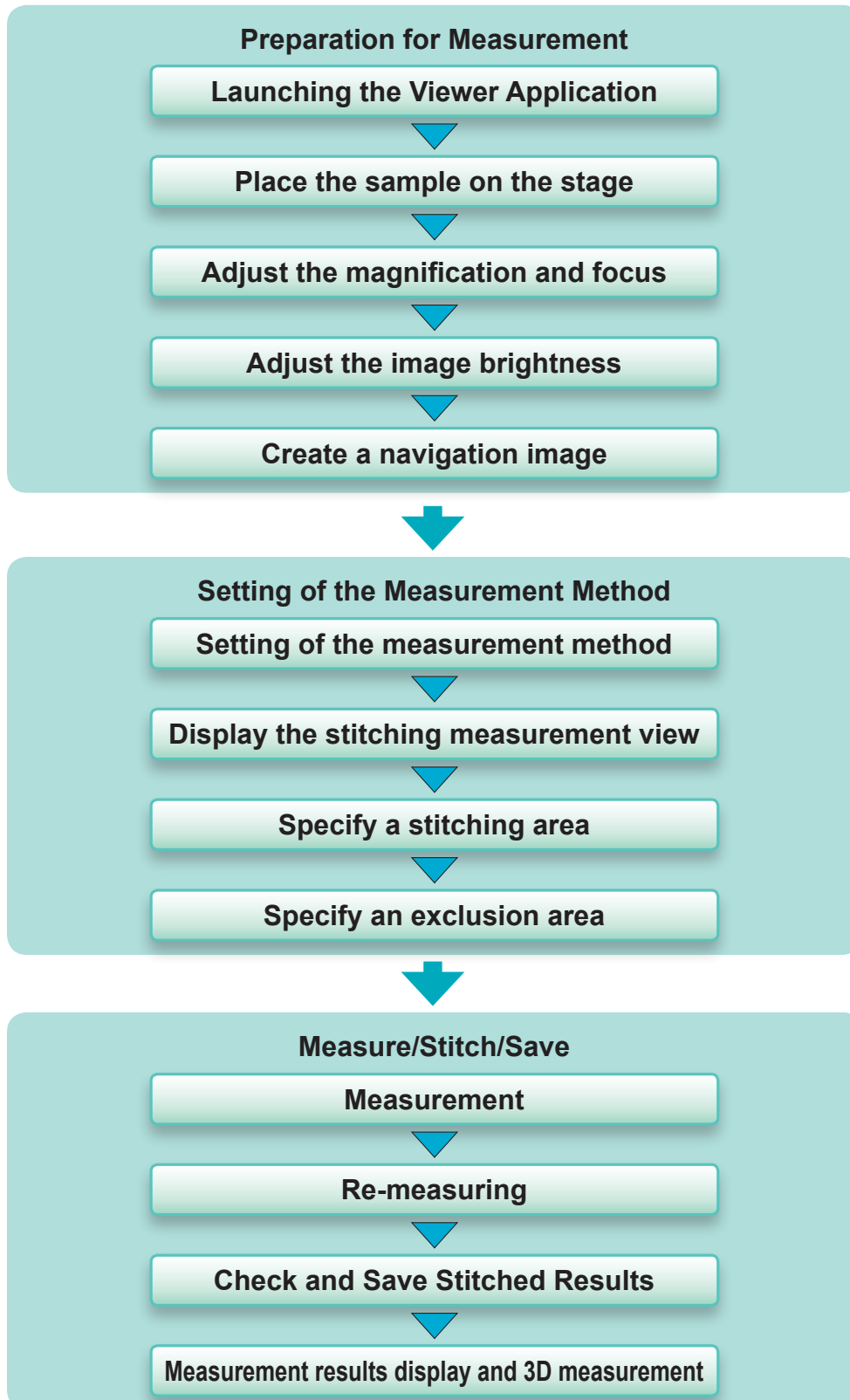


Stitching measurement is a function to stitch multiple images measured by the Viewer Application into one image with the use of the Stitching Module.

The operation of the stitching measurement depends on the type of the XY stage (motorized XY stage or standard XY stage).

This section describes the stitching measurement using the motorized XY stage.

The flow of the stitching measurement is as follows.



- **Requirements for operating stitching measurement**

To execute the stitching measurement, "Image stitching module (VK-H3J)" is required.

- **Stitching method with the standard XY stage**

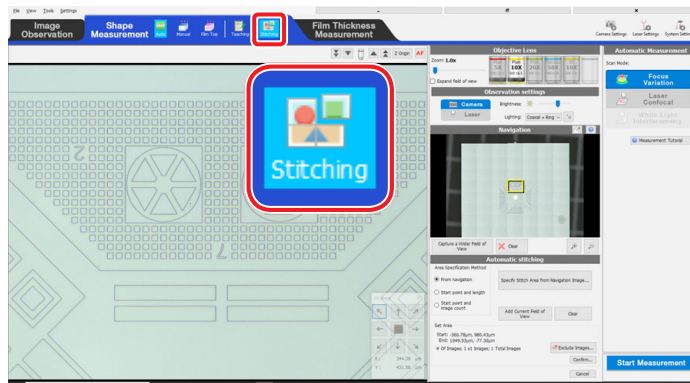
For the stitching method with the standard XY stage, see "VK-X3000 Series Viewer Application Reference Manual, Chapter 8 Stitching Measurement".

For stitching measurement, specify an area to be measured in advance.

The VK-X3000 Series can select the stitching method from “From navigation”, “Start point and length”, or “Start point and image count”.

This section provides description using “From navigation”.

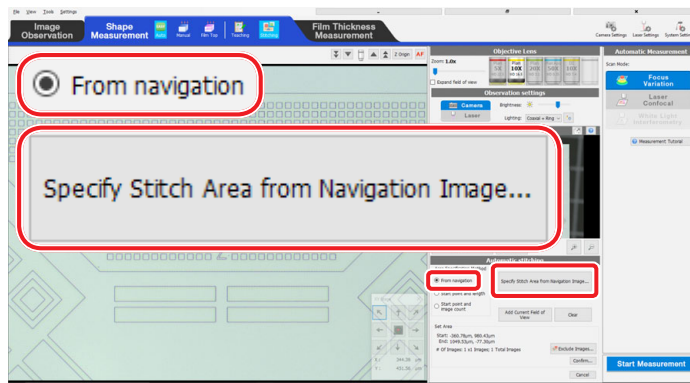
1. Click the [Stitching] button on the toolbar.



The stitching measurement view appears.

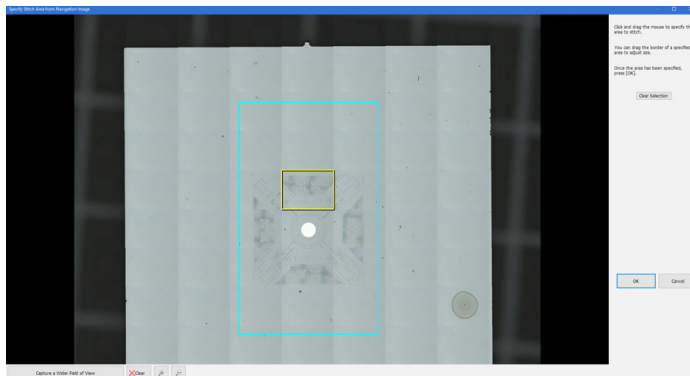
2. Select the stitching method.

Click the [From navigation] radio button, then click the [Specify Stitch Area from Navigation Image] button.



3. Specify the stitching area.

Specify the stitching area by dragging the image area and holding down the left mouse, then click the [OK] button.



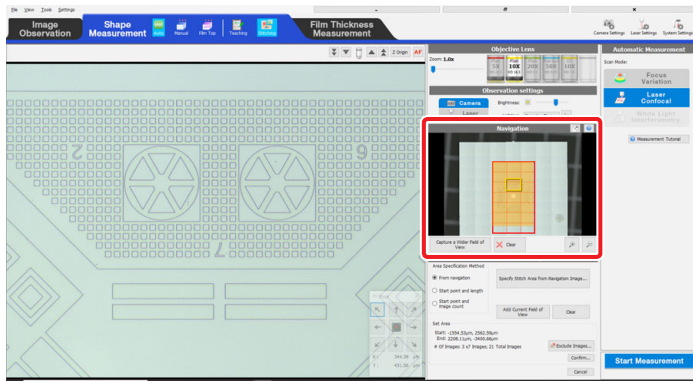
● Other specification method

For the usage method of “Start point and length” and “Start point and image count”, see "VK-X3000 Series Viewer Application Reference Manual, Chapter 8 Stitching Measurement".

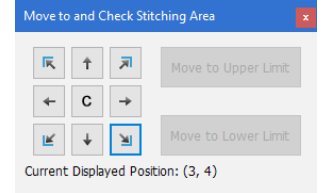
● Clearing the specified area

Clicking the [Clear Selection] button can clear a specified stitching area.

The navigation image will be updated.



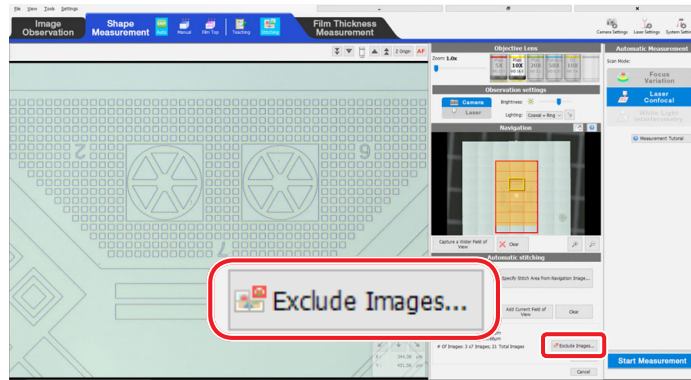
- **To check the stitching area**
Click the [Confirm] button to check the area, use the buttons in the dialog box to verify.



- **To exclude an area**
Clicking the [Exclude Images] button can specify an exclusion area from a stitching area.
For more information, see [5-3 Specifying the Exclusion Area](#).

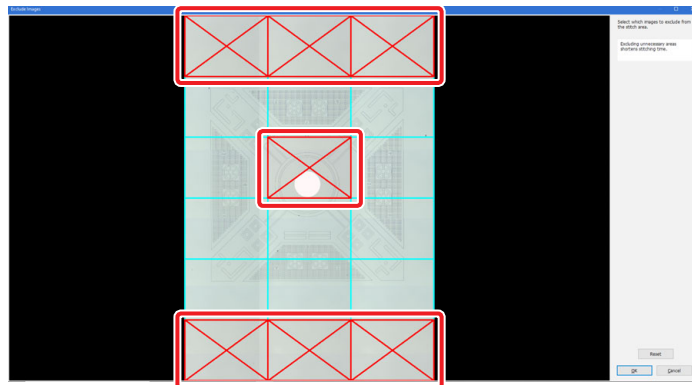
When there is an area to be excluded in the stitching area (blank area etc.), it can be removed from the stitching area.

1. Click the [Exclude Images] button.



2. Specify an exclusion area.

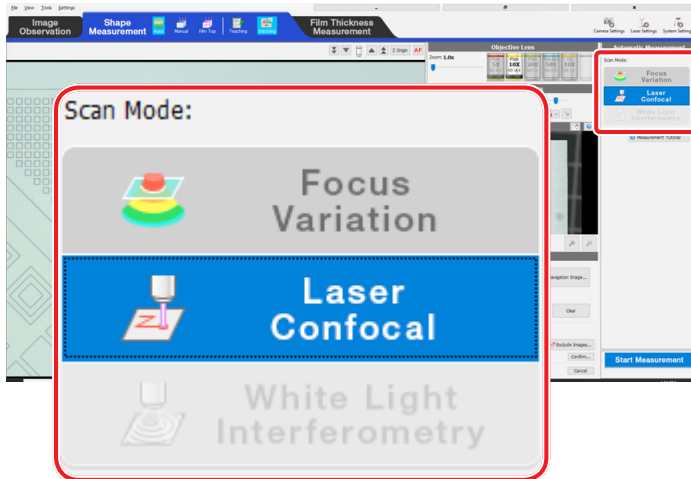
Select the area to be excluded from the stitching image area on the left side.



3. Click the [OK] button.

Check the obtained images, and execute the stitching.

1. Select the scan mode.

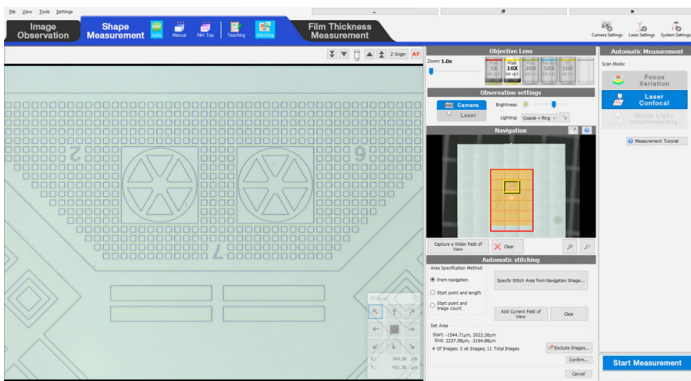


- **Measurement methods other than the automatic measurement**

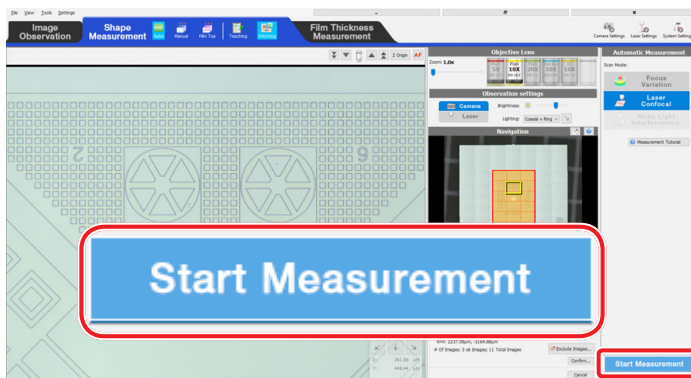
The settings depend on the measurement method.

For more information, see [4-2](#) Setting the Moving Range of the Objective Lens”, and [4-3](#) Setting the Measurement Conditions”.

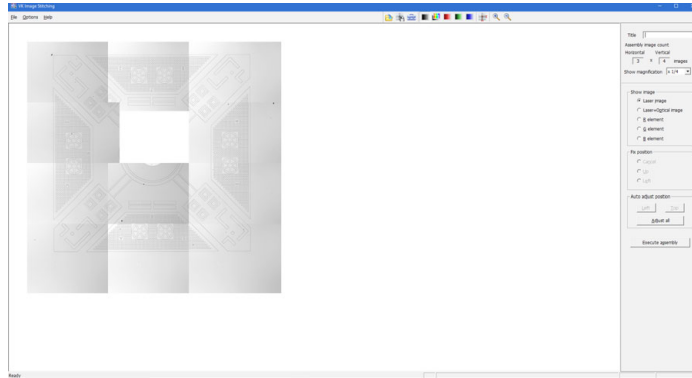
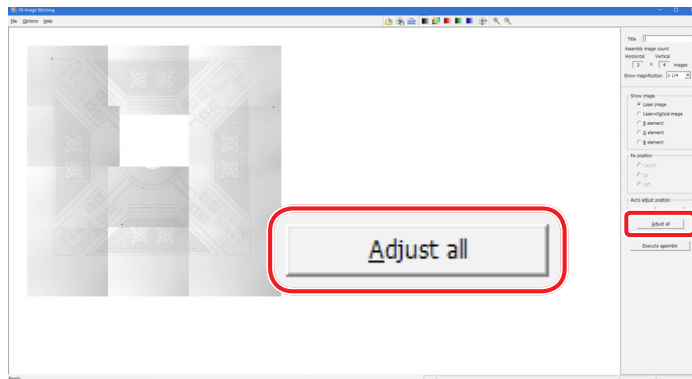
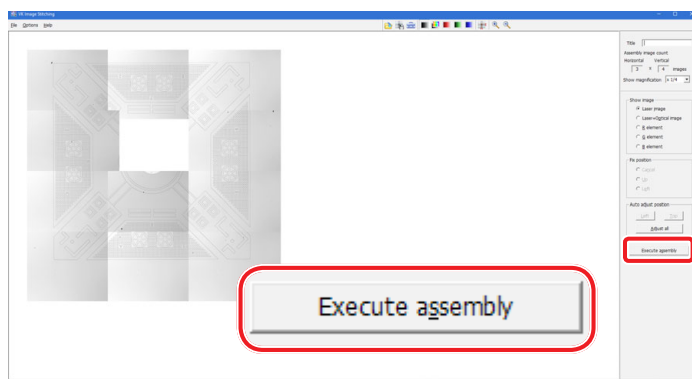
2. Move the focusing handle and objective lens so that the optical image is brought into focus.



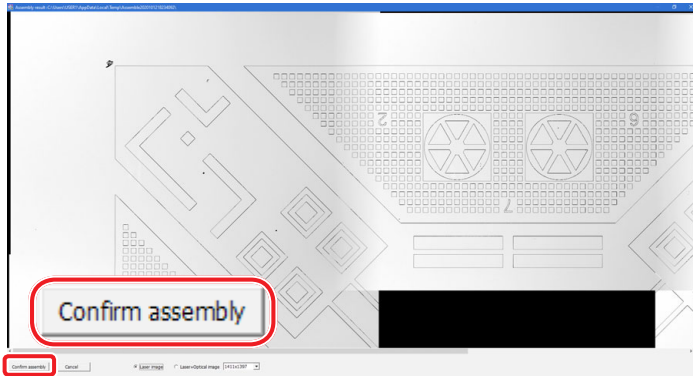
3. Click the [Start Measurement] button.



When the measurement starts and then it is completed, the [VK Image Stitching] screen will appear.

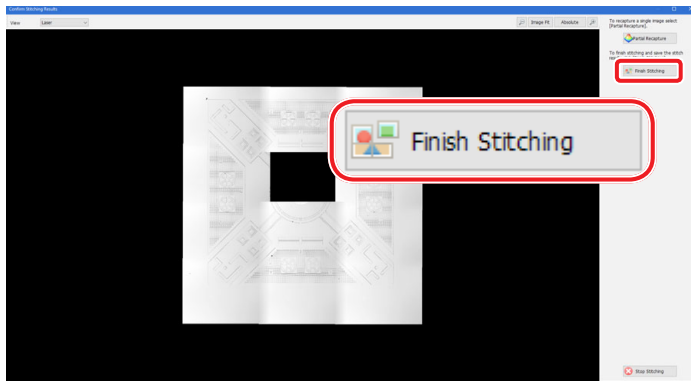
4. Check the obtained images.**5.** Click the [Adjust all] button to perform the position adjustment for the image stitching part.**6.** Click the [Execute assembly] button to execute the image stitching.

7. Click the [Confirm assembly] button.



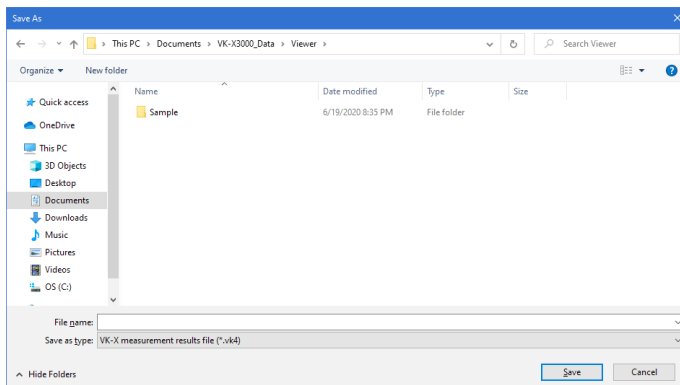
8. Finish the image stitching.

Click the [Finish Stitching] button.



9. Save the data.

Set "Save to" and "File name" of the data, and click the [Save] button.



● Partial recapture

The stitching image can be modified by recapturing a some portion of the intended area.

For more information, see ["VK-X3000 Series Viewer Application Reference Manual, Chapter 8 Stitching Measurement"](#).

MEMO

Specifications are subject to change without notice.

KEYENCE CORPORATION

1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku, Osaka, 533-8555, Japan PHONE: +81-6-6379-2211

www.keyence.com/glb

AUSTRIA

Phone: +43 (0)2236 378266 0

BELGIUM

Phone: +32 (0)15 281 222

BRAZIL

Phone: +55-11-3045-4011

CANADA

Phone: +1-905-366-7655

CHINA

Phone: +86-21-3357-1001

CZECH REPUBLIC

Phone: +420 220 184 700

FRANCE

Phone: +33 1 56 37 78 00

GERMANY

Phone: +49-6102-3689-0

HONG KONG

Phone: +852-3104-1010

HUNGARY

Phone: +36 1 802 7360

INDIA

Phone: +91-44-4963-0900

INDONESIA

Phone: +62-21-2966-0120

ITALY

Phone: +39-02-6688220

KOREA

Phone: +82-31-789-4300

MALAYSIA

Phone: +60-3-7883-2211

MEXICO

Phone: +52-55-8850-0100

NETHERLANDS

Phone: +31 (0)40 206 6100

PHILIPPINES

Phone: +63-(0)2-8981-5000

POLAND

Phone: +48 71 368 61 60

ROMANIA

Phone: +40 (0)269 232 808

SINGAPORE

Phone: +65-6392-1011

SLOVAKIA

Phone: +421 (0)2 5939 6461

SLOVENIA

Phone: +386 (0)1 4701 666

SWITZERLAND

Phone: +41 (0)43 455 77 30

TAIWAN

Phone: +886-2-2721-8080

THAILAND

Phone: +66-2-369-2777

UK & IRELAND

Phone: +44 (0)1908-696-900

USA

Phone: +1-201-930-0100

VIETNAM

Phone: +84-24-3772-5555

