KEYENCE

96M16492

3D Surface Profiler

Quick Start Guide

- Plane Measurement -

KEYENCE CORPORATION

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 plane measurement of 3D data gathered by the VK-X3000.

The plane measurement tool is a function that enables various 2D measurements, such as lengths, angles, diameters, and more.

Contents

Chapter 1

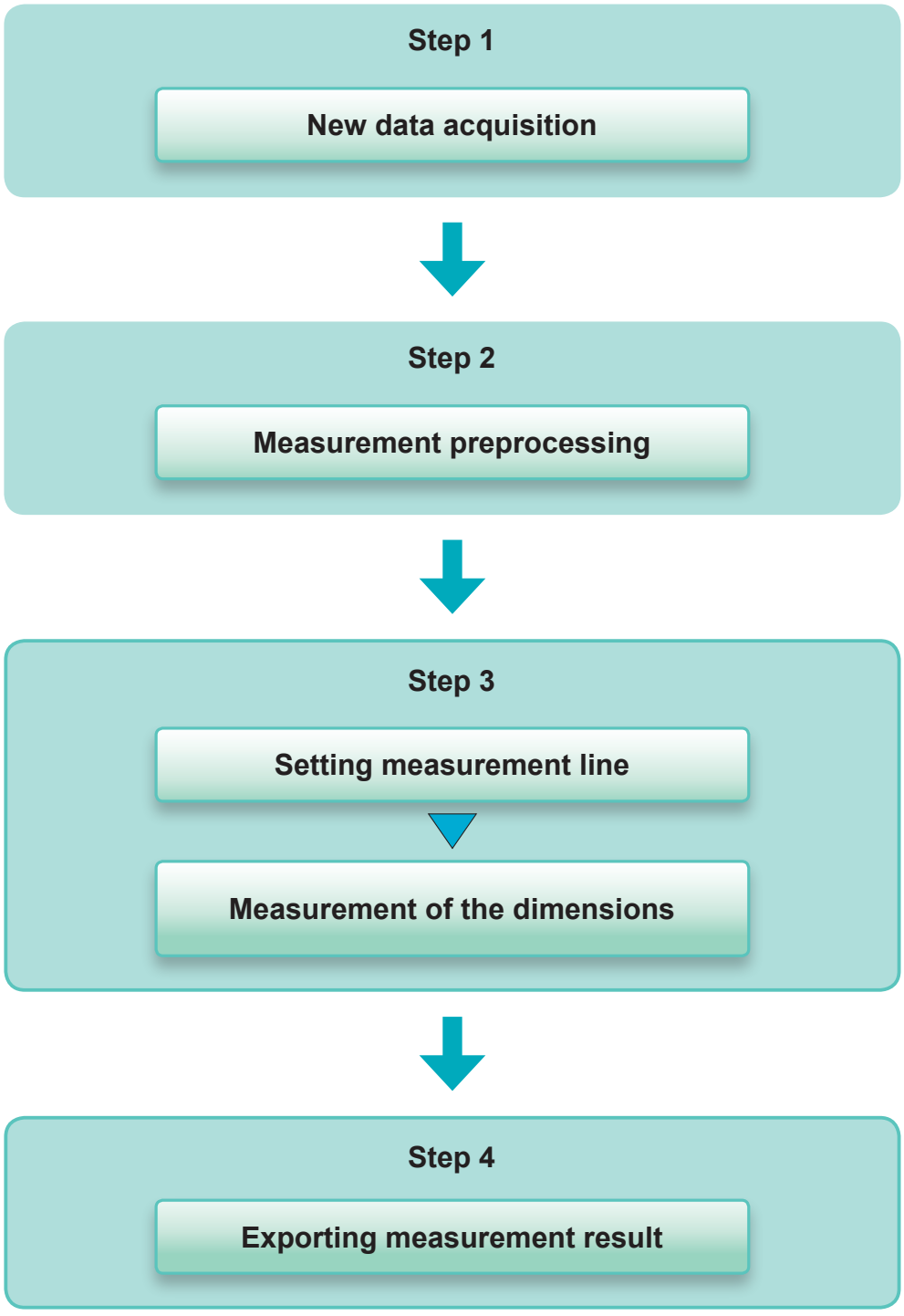
Before Starting Operation

1-1 Understanding the Operation Flow

The operation flow of the VK-X3000 Series is as follows.

Step 1: New data acquisition → Obtain a 3D image by measuring a sample
Step 2: Measurement preprocessing → Remove the tilt and noise of the obtained 3D image
Step 3: Use the measurement function → Measure preprocessed data using various functions
Step 4: Export measurement result → Output a measurement result to a report or Excel

This manual describes the Step 3 and Step 4.

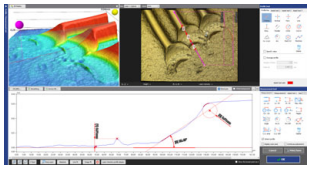


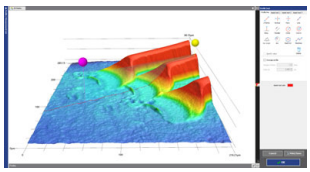
● **New data acquisition**
Measure an object and obtain a 3D image including color information.

For details, see "Quick Start Guide: Gathering New Data using Focus Variation/White Light Interferometer", and "Quick Start Guide: Gathering New Data using Laser Confocal".

● **Measurement preprocessing**
For details, see "Quick Start Guide: Image Processing".

● **Using the measurement function**
Perform various measurements from an obtained 3D image.
- Cross section shape measurement
- Roughness measurement
- Comparison of two types of data
- Film thickness measurement

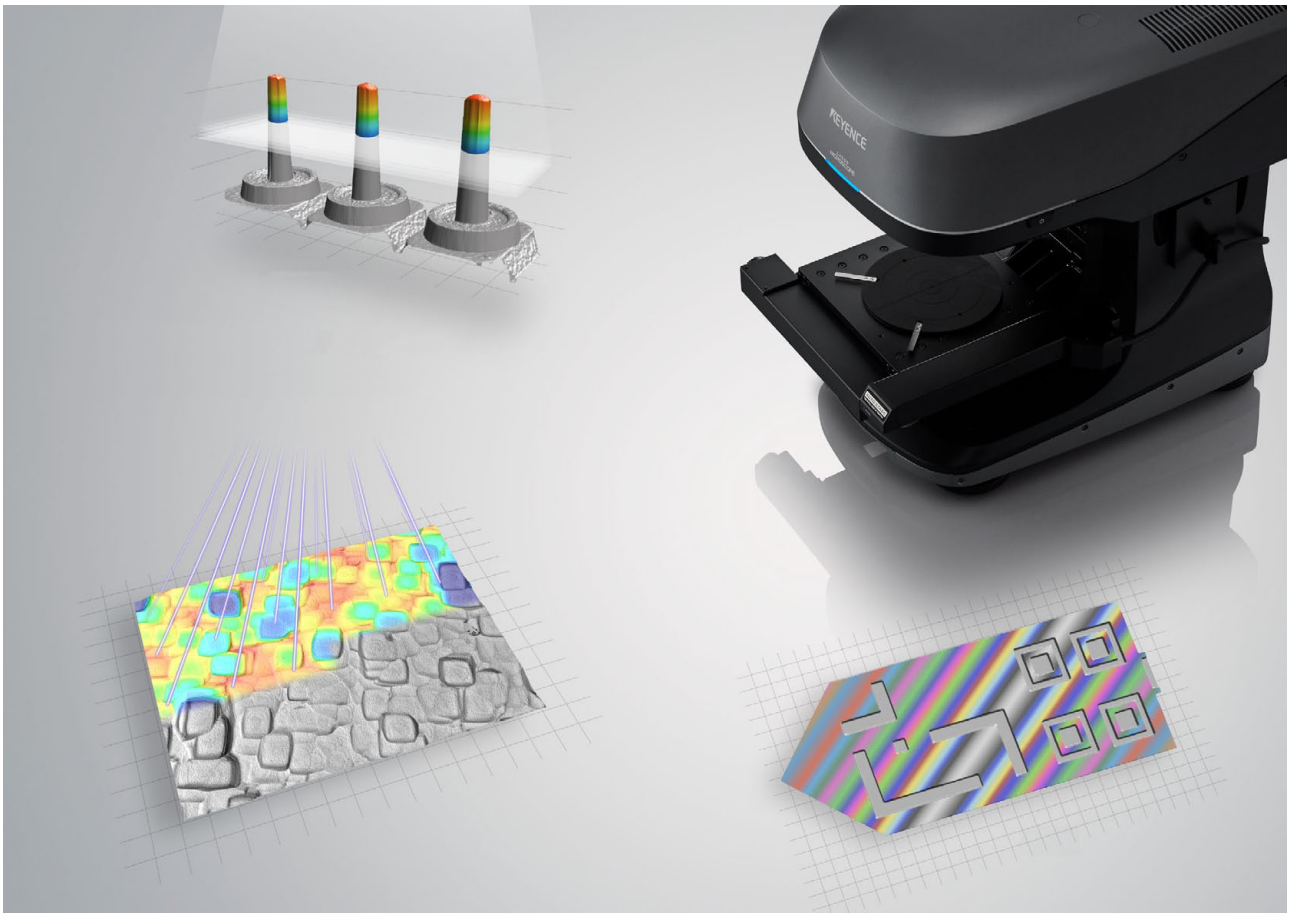




● **Setting measurement line**
Specify the place to be measured to the obtained 3D image. This is called the measurement line.

Chapter 2

Conducting Plane Measurement (Point Height)

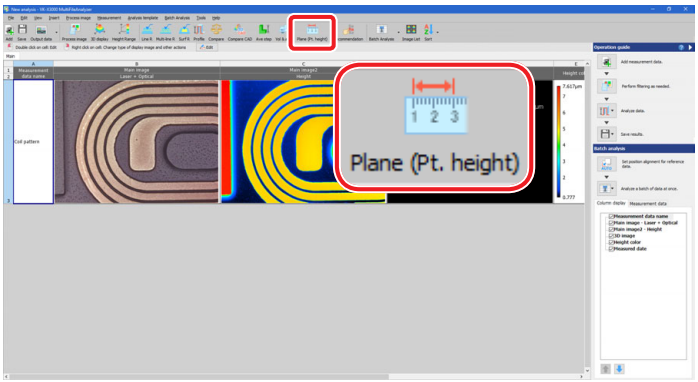


2-1 Setting Measurement Line

Specify the place to be measured to the obtained 3D image. This is called the measurement line.
First of all, let us create a measurement line.

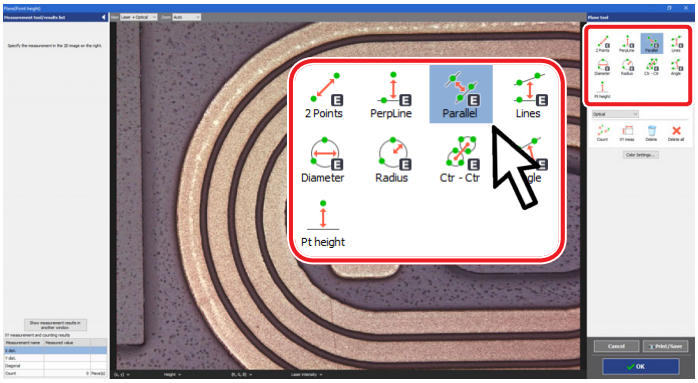
1. Select the plane measurement (point height).

Click the [Plane (Pt. height)] button on the toolbar. Alternatively, select [Plane (Point height)] from [Measurement menu].



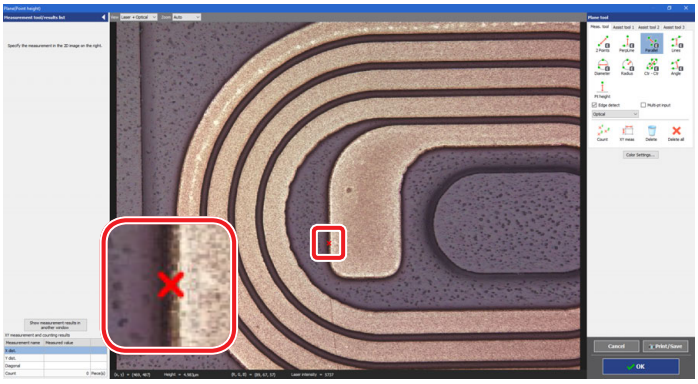
2. Select the measurement tool.

Set the measurement line using the 9 types of measurement tools that appear on the top right of the screen.
In this case, select the parallel line.



3. Specify the start point of the place to be measured.

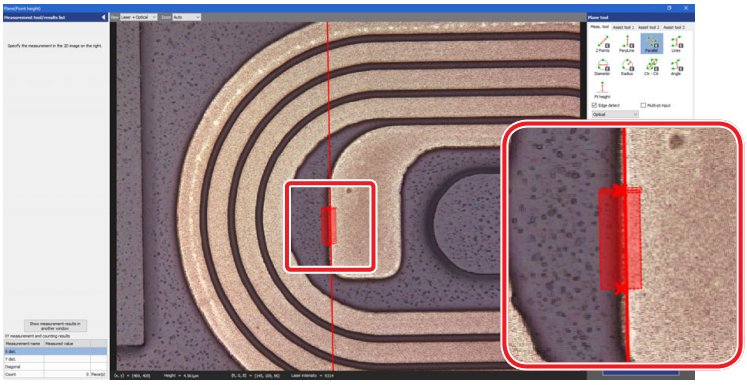
In the screen on the center, place the cursor over the start point of the area where you want to specify a line, then click it.



- **Setting the plane measurement tool**
  Specify the place to be measured to the obtained 3D image. This is called the measurement line.

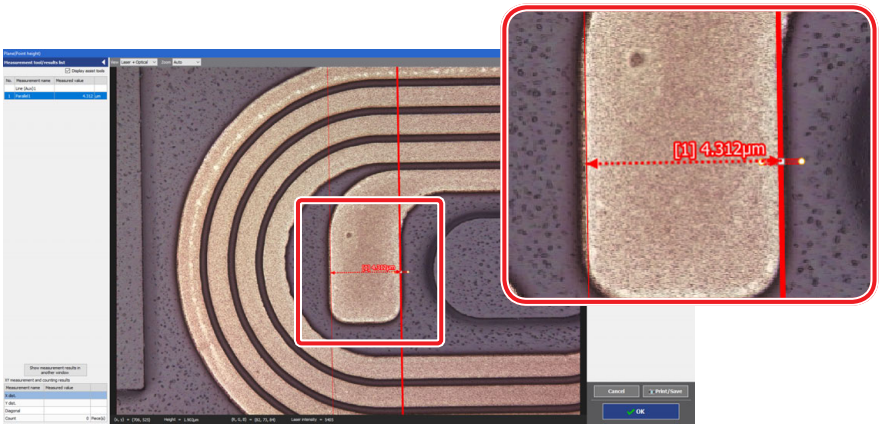
4. Specify the end point of the place to be measured.

Similarly, specifying the end point creates a straight line.



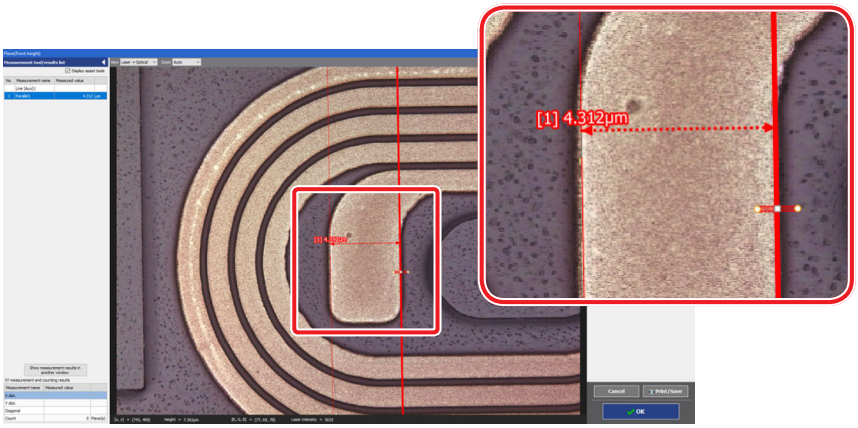
5. Specify another place to be measured.

Select another point on a line parallel to the line already created. The distance measurement will be displayed.



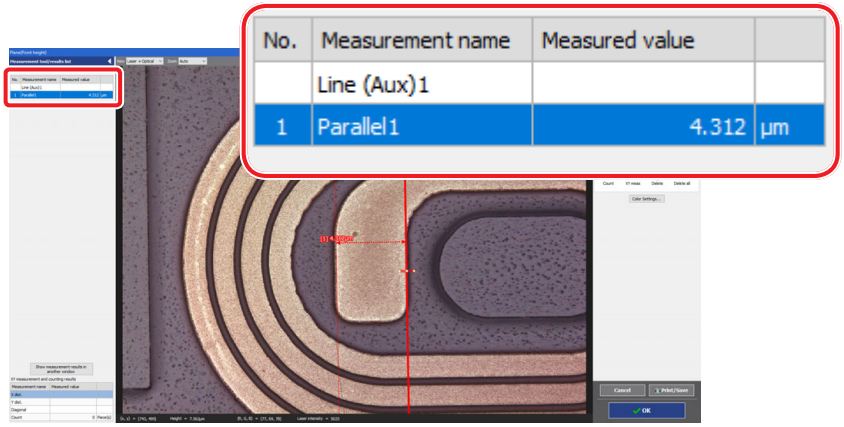
6. Specify the position to display the measured results.

Move the cursor and click a position on the image to display the measured value. You can place the label for the measurement anywhere.



7. Check the measurement result.

The measurement results of [Parallel] appears. The operation is complete.

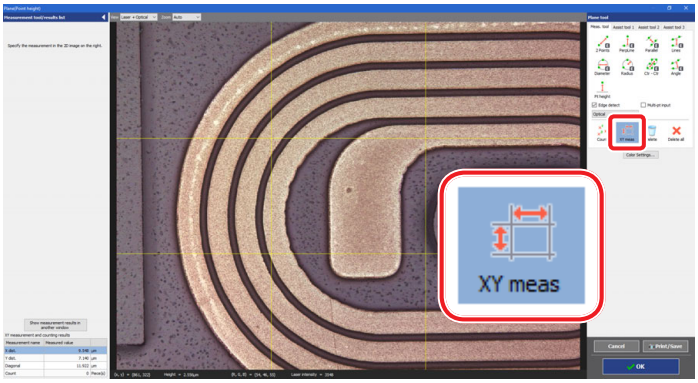


Performing XY Measurement

The XY measurement tool will allow for simple distances in the X and Y directions to be measured, as well as a diagonal distance.

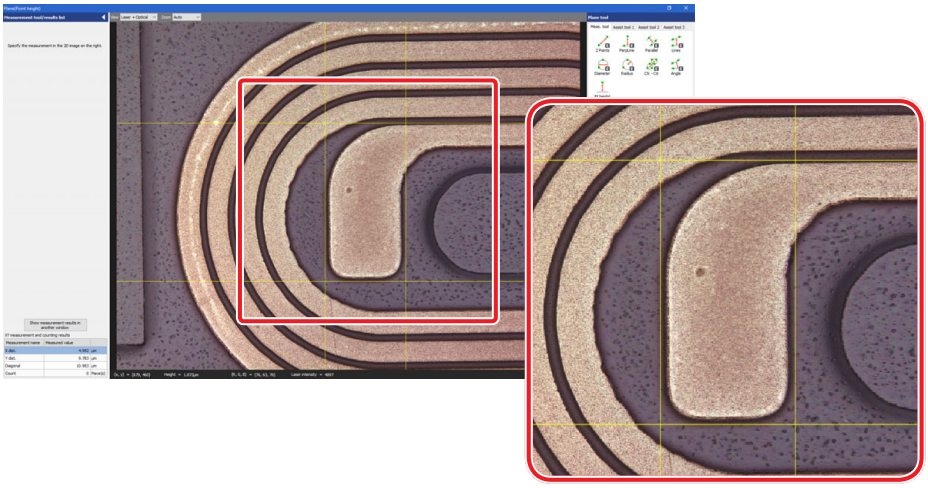
1. Select the XY measurement tool.

Click the [XY meas] button displayed on the right middle of the screen.



2. Drag the XY measurement lines to specify the measurement place.

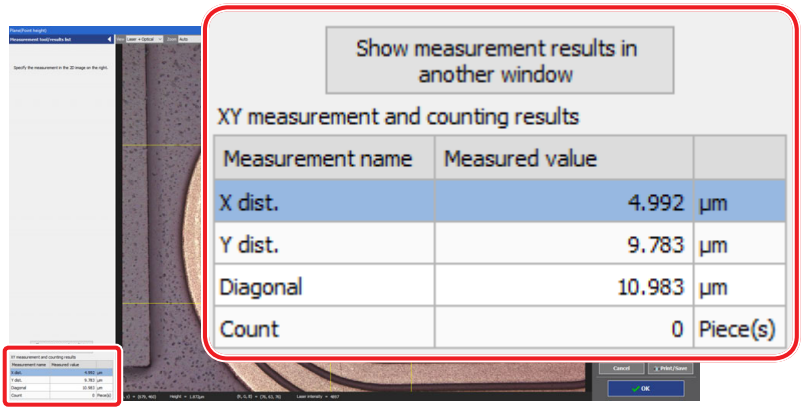
Drag the yellow XY measurement line displayed on the screen to the place you want to measure.



- **Displaying measurement results**
  Because measurement results are updated in real time while you are moving the XY measurement line, you can decide the place of the XY measurement line while confirming measurement results.

3. Check the measurement result.

The [X dist.], [Y dist.], and [Diagonal] of the measurement place are displayed in the measurement tool/results list.



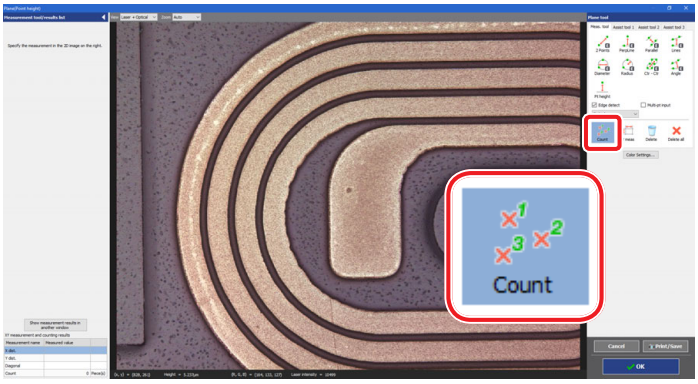
2-3 Counting the Number of Points

The count function is used to count features within the image.

Up to 999 points can be counted.

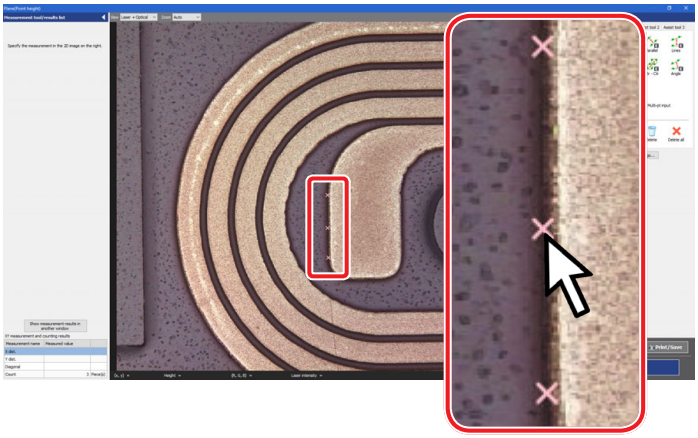
1. Select count.

Click the [Count] button displayed on the right middle of the screen.



2. Select features to count.

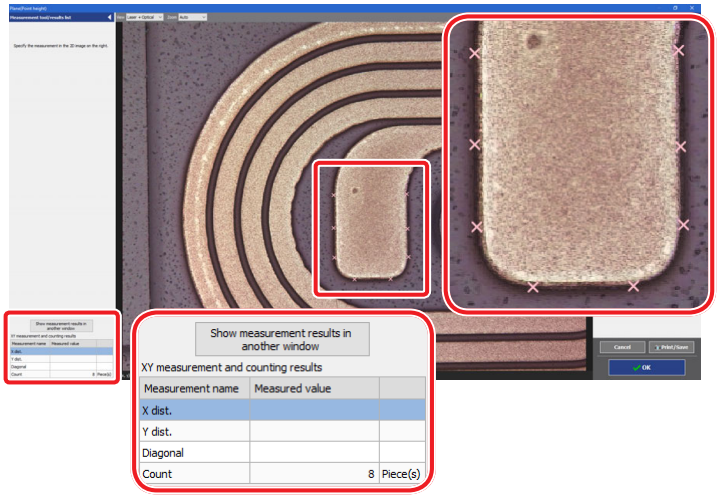
Click arbitrary places you want to count on the screen one by one.



3. Check that the points have been placed on the screen.

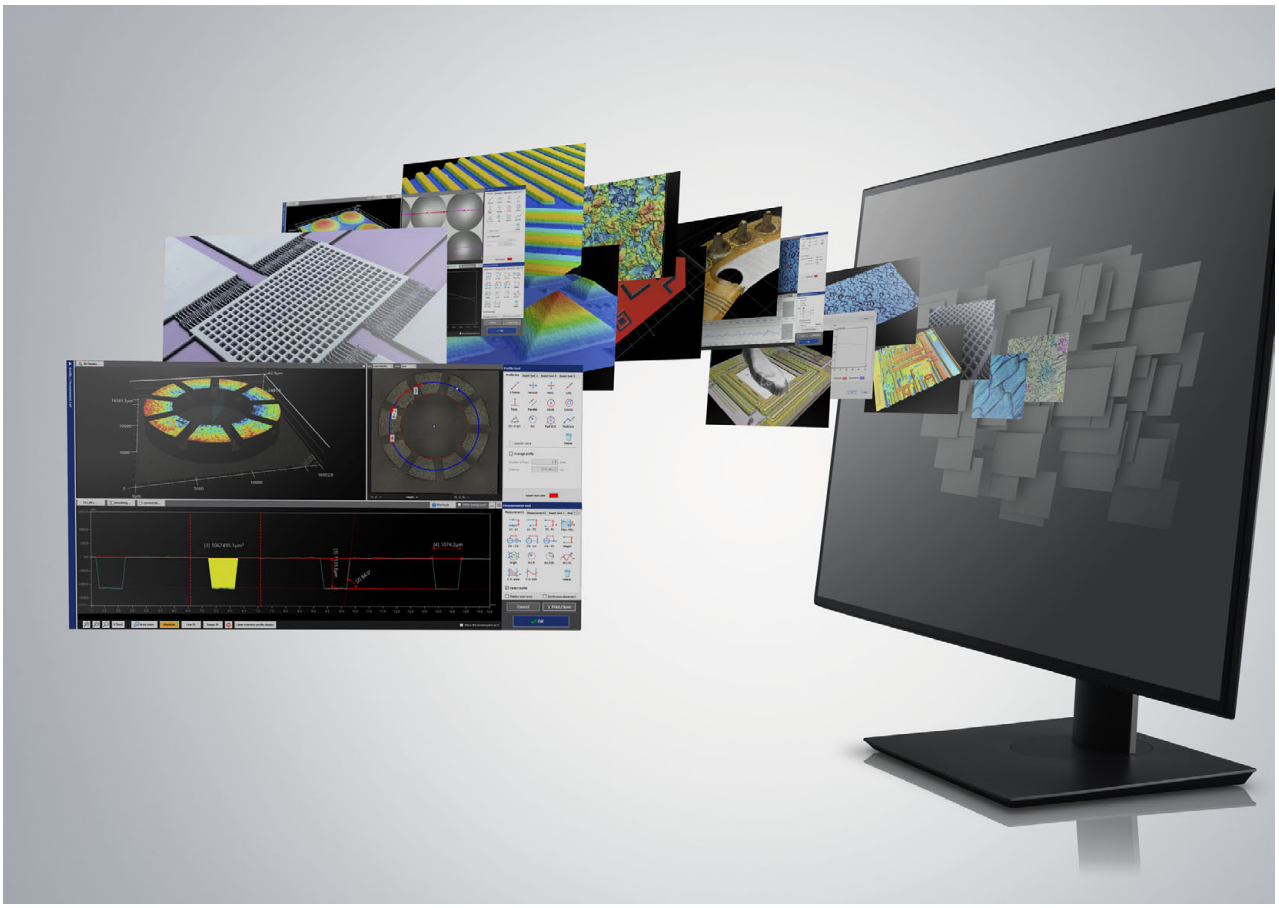
Check that the x symbols appear at the placed points.

The number of points placed is displayed in [Count] in the measurement tool/results list.



Chapter 3

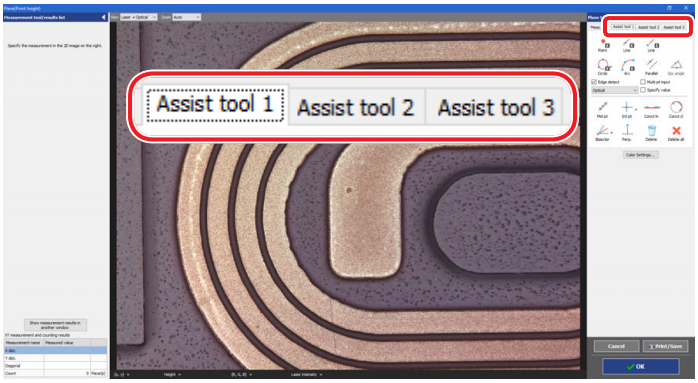
Advanced Settings

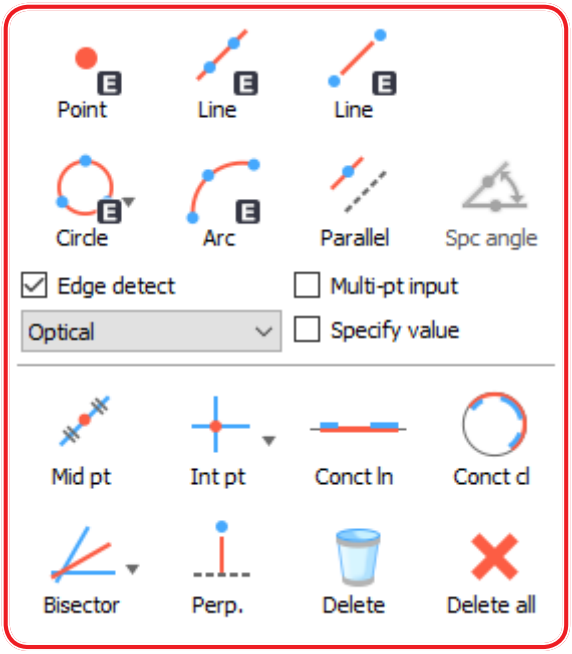


This section describes the use of assist tools in the plane menu.
Assist tools are supplementary points that can be referenced to make measurements more robust. Assist tools will make measurement analysis more accurate and efficient.

1. Click the [Assist tool 1], [Assist tool 2], and [Assist tool 3] tabs to check their contents.

Click [Assist tool 1], [Assist tool 2], and [Assist tool 3] from [Meas. tool].



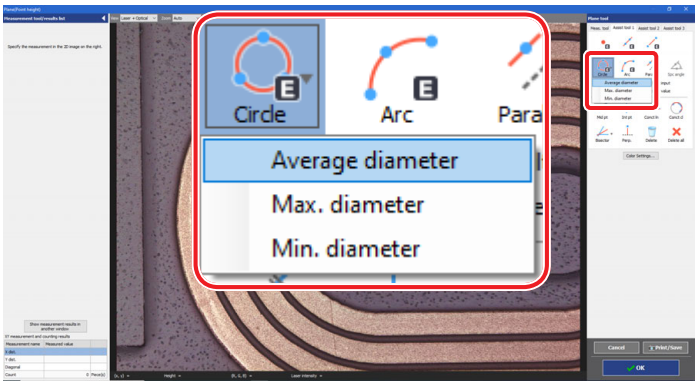


Assist tools such as points, lines, or circles can be used to assist in measurement.

In this example, a midpoint will be used.

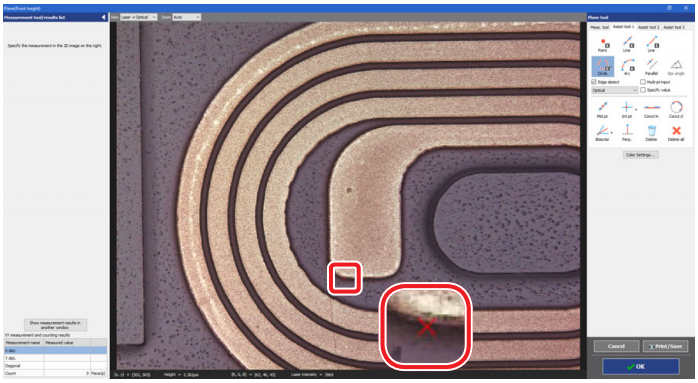
2. Click [Circle] → [Average diameter] from [Assist tool 1].

Click [Circle] → [Average diameter] from [Assist tool 1] on the top right part of the screen.



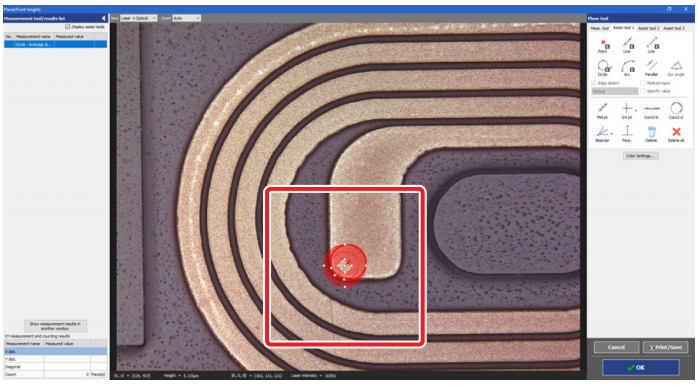
3. Specify the first point of the area where the edge is detected.

Select the area where the edge is detected by clicking the first point of the three points along the arc.



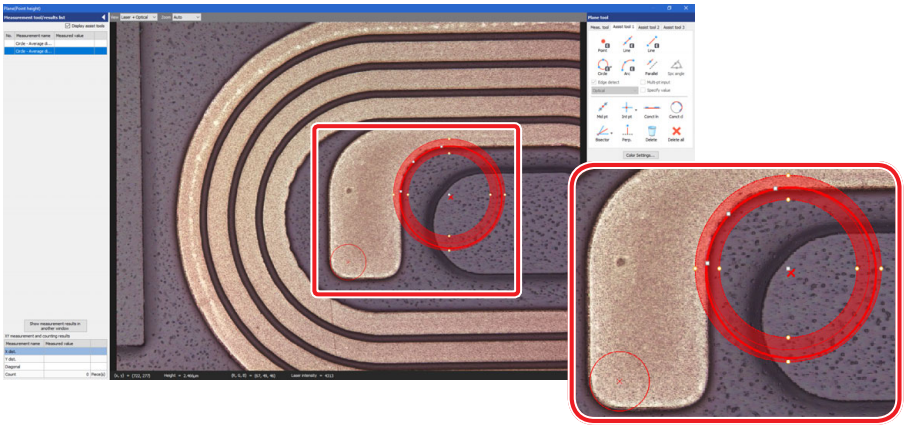
4. Specify the second and third points of the area where the edges are detected.

Similarly, clicking the second and third points sets the area where the edge is detected, and a circle is created.



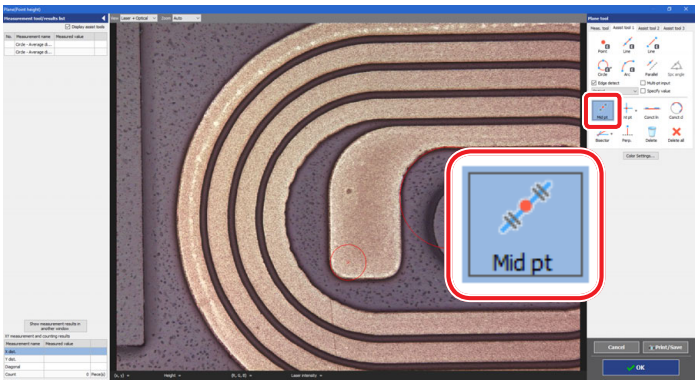
5. Similarly, create another circle.

Create the other circle on the right side in the same way.



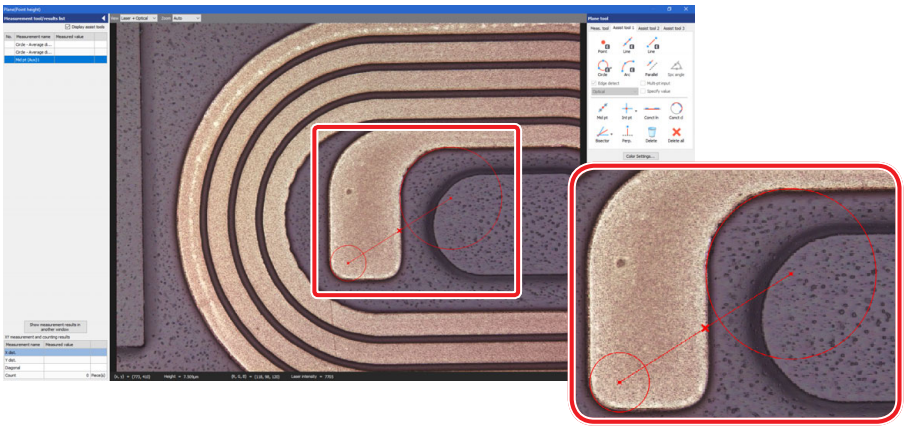
6. Click the [Mid pt] button from [Assist tool 1].

Click the [Mid pt] button from [Assist tool 1] on the top right part of the screen.



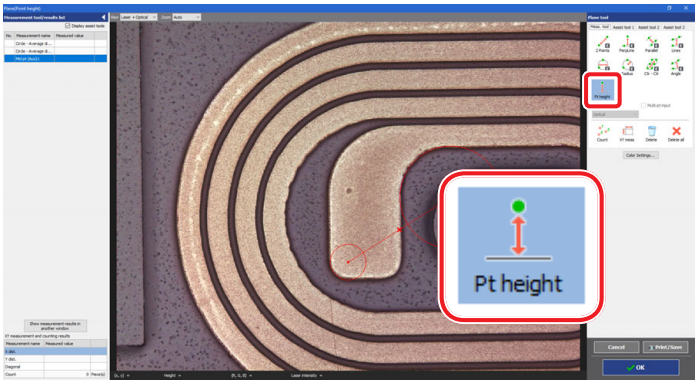
7. Click circles one by one on the left and right.

Clicking each circle on the left and right creates the midpoint.



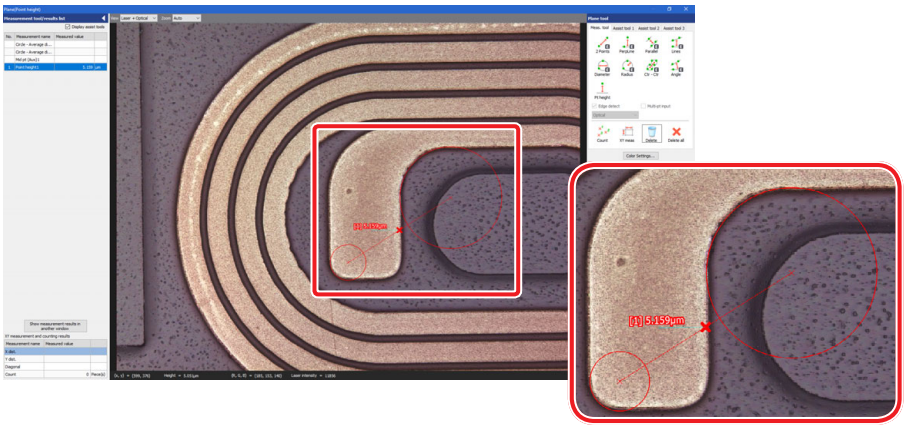
8. Select the measurement tool.

Click [Pt height] of the measurement tools on the top right part of the screen.



9. Click the created midpoint.

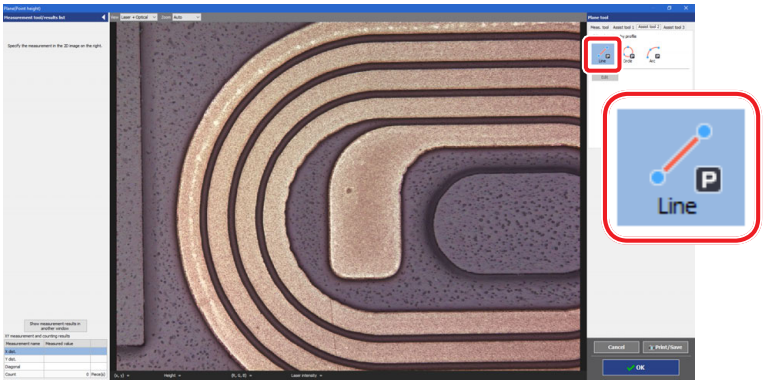
Clicking the created midpoint measures the height on the midpoint.



Edge detection can be used to assist with measurements and can reference both color and height information.

1. Select the measurement tool.

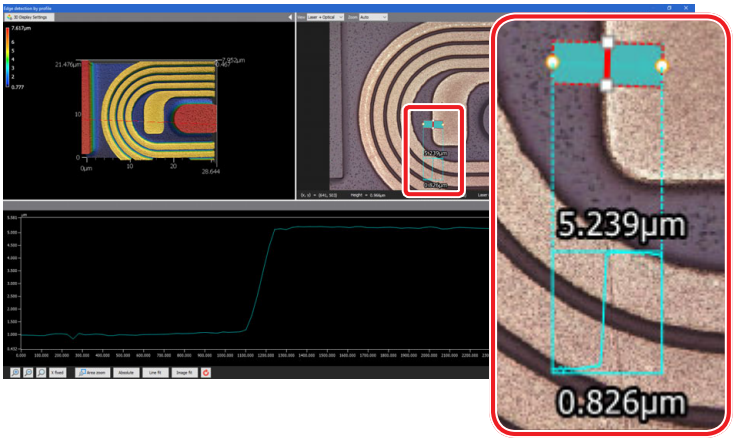
Click the [Line] button of [Assist tool 2] from [Meas. tool].



The edge detection by profile window appears.

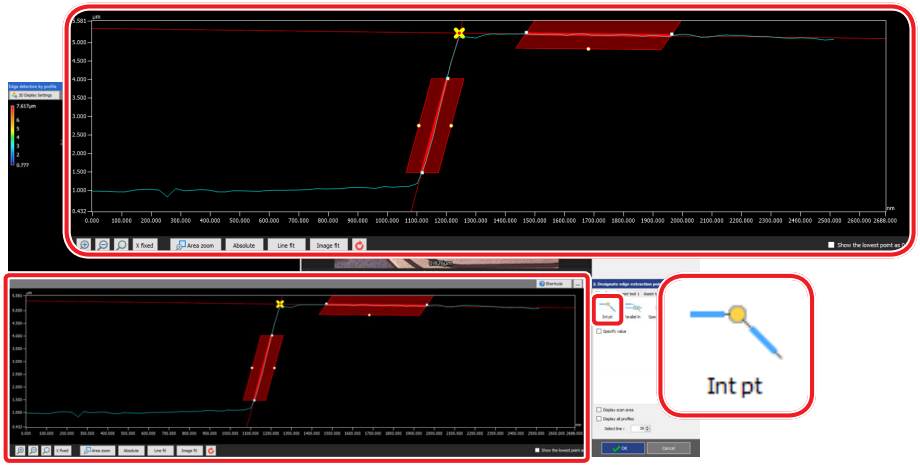
2. Specify a line segment at the position on the screen where you want to extract the edge.

The arrow that intersects perpendicularly with the specified line segment is displayed. The profile graph traced in the arrow direction appears.



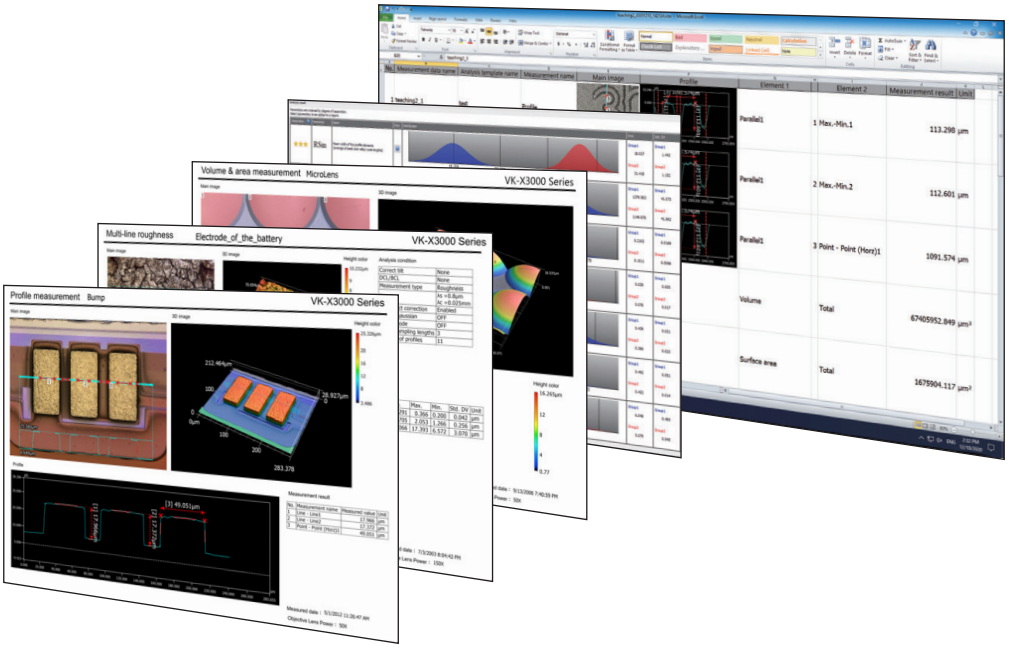
3. Click the [Int pt] button to select detection conditions of the edge on the profile graph.

Select the area for the edge detection on the profile graph. Lastly, click the [OK] button.



Chapter 4

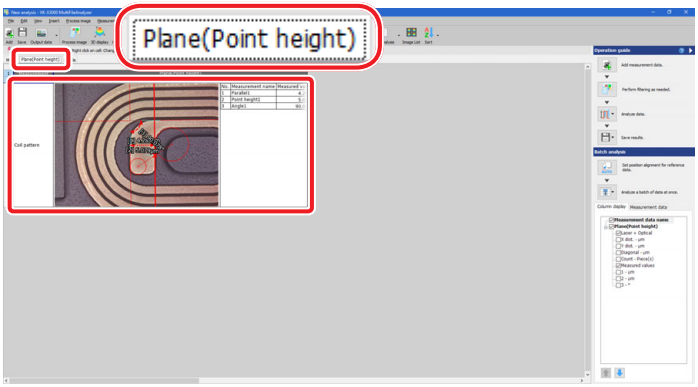
Exporting Measurement Result



Report Output

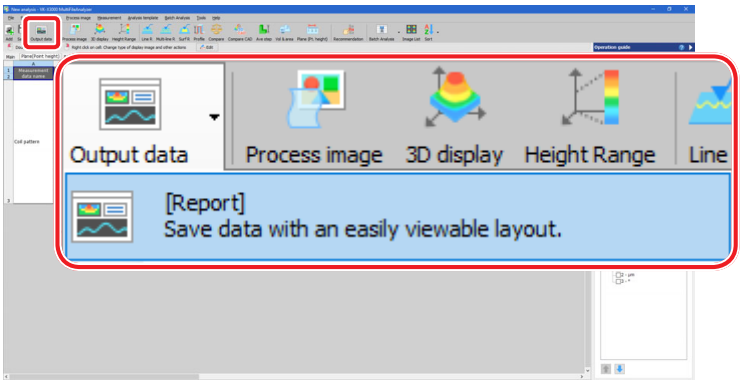
You can display a report of measurement results by the Multifile Analyzer in another window. For the report, its layout can be edited and file can be output.

1. Select the grid sheet including the measurement result you wish to display in report.

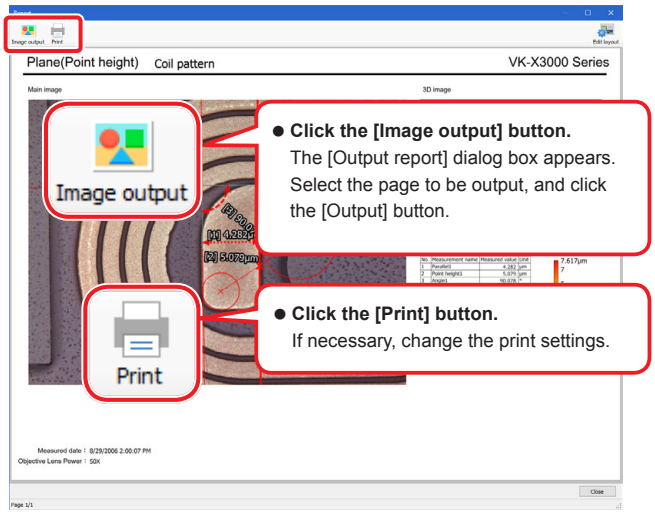


2. Select [Report] from the [Output data] button on the toolbar.

The report screen appears.

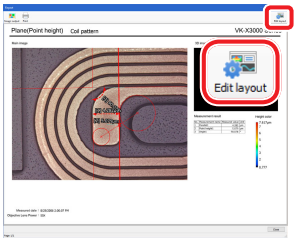


3. Save it as an image file by clicking the [Image output] button on the toolbar. Click the [Print] button to print.

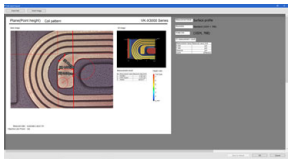


4. Click the [Close] button to close the screen.

● **Edit the report layout**
Clicking the [Edit layout] button displays the [Edit report layout] screen.



The report layout can be edited.



- Click the [Insert text] button to insert the text box.
- Select an image and right click it, a menu related to layout editing will appear.
- Click the [Insert image] button to insert the image.
- Click the [Back to default] button to return to default.

Exporting to Excel file

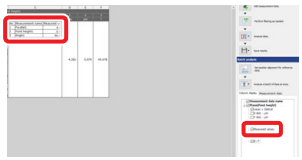
For the result measured by the Multifile Analyzer, the content of the grid view area is output to Excel file in unaltered form.

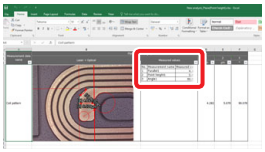
- The file is saved as an Excel workbook (*.xlsx). This extension is the standard file format for Excel 2007 and later.
- When you export to an Excel file, images, graphs, tables within cells and all other content of the grid sheet is output in unaltered form. Before performing the output, adjust the size of the grid sheet.

● **About the grid sheet layout and the cell of the Excel output**

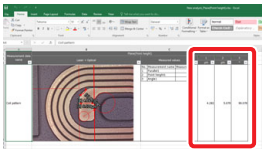
The layout of the grid sheet is applied on the Excel sheet as it is.

- The measurement results displayed in the [Measurement value list] checkbox of the [Column display] tab are output as images on the Excel sheet.

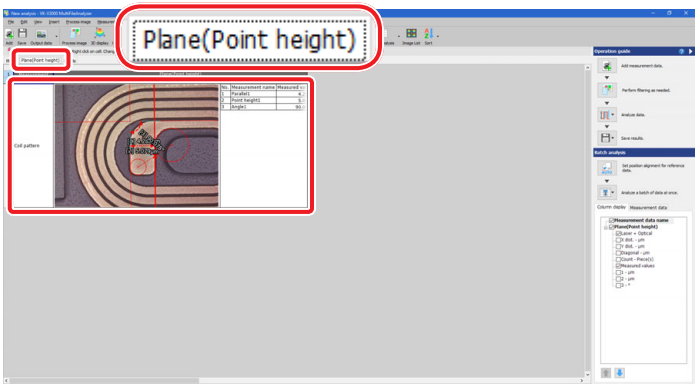




- The measurement results displayed individually in the [Column display] tab are output as numeric values to each cell on the Excel sheet.

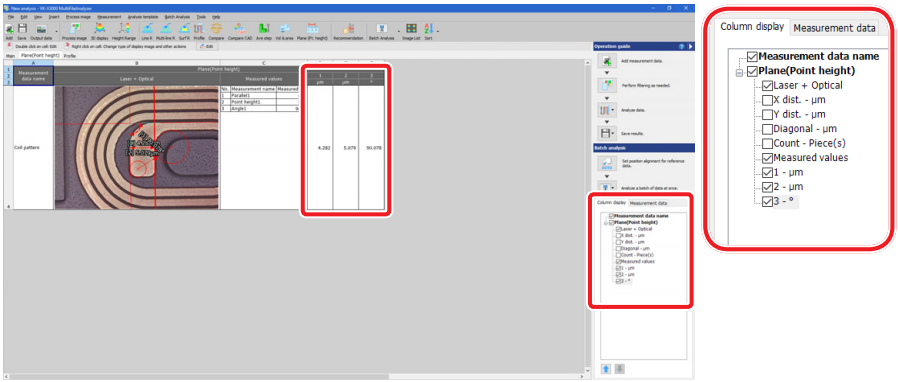


1. Select the grid sheet including the measurement result you wish to output in an Excel file.



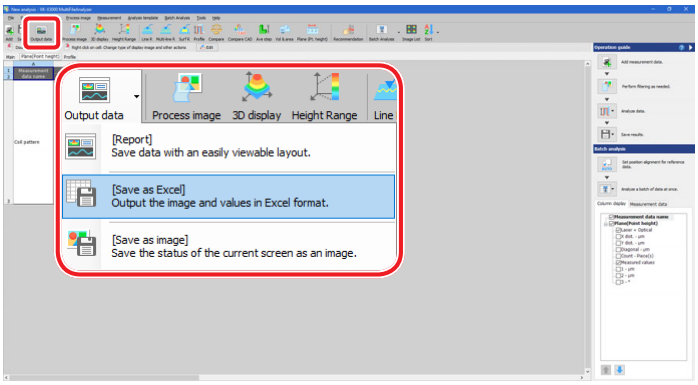
2. Select the measurement results you wish to output to cells in the Excel worksheet from the checkbox of the [Column display] tab.

Selecting the [Column display] tab adds the each result of the measurement items to each cell of the measurement results.

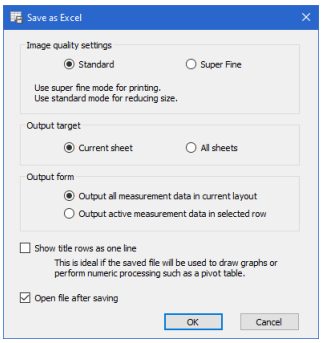


3. Select [Save Excel] from the [Output data] button on the toolbar.

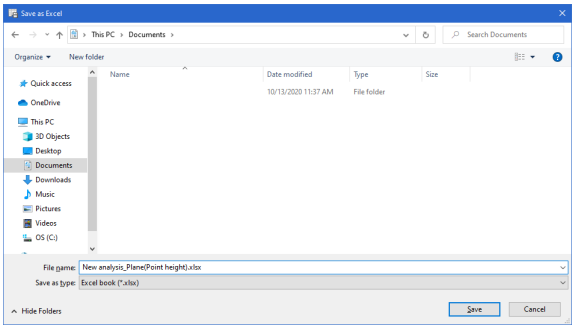
The [Save as Excel] dialog box appears.



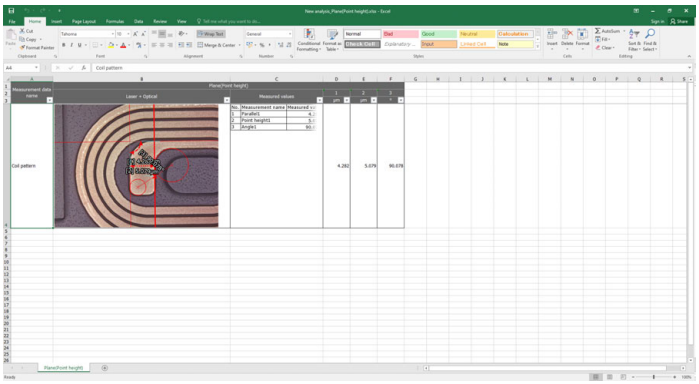
4. Change items as needed, and click [OK].



5. Select a destination folder in which to save the Excel file. Enter the file name, and click the [Save] button.



If Microsoft Office or Microsoft Excel is installed on your PC, the output file is displayed automatically.



Even if Microsoft Office or Microsoft Excel is not installed on your PC, the measurement results can be saved as an Excel format file.
In this case, use the output file with another PC.

- Microsoft Office, Microsoft Excel and Excel are registered trademarks of Microsoft Corporation.
- It is necessary to prepare Microsoft Office and Microsoft Excel separately when KEYENCE delivers the PC.

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Specifications are subject to change without notice.

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