**Profilometer-Keyence**

**Basic operation instruction**

Warning:

1. Make sure there is no object on the scanning stage before setting up the microscope.
2. After measuring, don’t forget to turn off the microscope and log out from the FOM.

**OPERATION PROCEDURE**

**a. Starting the microscope**

Log in to FOM.

Ensure that there is no object on the scanning stage before setting up the microscope.

|  |  |
| --- | --- |
| * Open the VR-3000 software. * Switch on the microscope stand. * Click on **Viewer.** | Graphical user interface  Description automatically generated |
| * The box will come up the screen and click **Yes** to return the stage to the XY and Z origin (Wait for 30sec). | Text, letter  Description automatically generated |

**b. Setting up the sample**

* Place the sample on the scanning stage.
* Adjust the sample position under the microscope- Manually or use ‘Mouse operation box’ for XY directions.
* Choose AF for Auto focus OR use rotation knob of microscope for Z direction.
* You can use the tool bar to adjust the **Camera brightness**, **View** and **Magnification**.



**c. Measuring (Acquiring) the image**

* **Measuring the image**

|  |  |
| --- | --- |
| * When you have a desire image, click **Measure** button to take your image. |  |
| You have 3 options to continue the process.   * If you are satisfied with the image, click on **Save OR** click on **Analyze** to analyze the image. * Click on **Back** to change the image. | Graphical user interface, text  Description automatically generated |

* **Stitching the image**

|  |  |
| --- | --- |
| 1. Select **Manual** for stitching  2. Click on **Measure** and then **Register** Graphical user interface, application  Description automatically generated  3. Select the area that you want to continue.  4. Click on **Measure** and then **Register**  5a. If done, click on **Excu Stitching** and then Click on **Save OR** click on **Analyze** to analyze the image.  Click on **Back** to change the image. | Graphical user interface, application  Description automatically generated  Graphical user interface, text  Description automatically generated |
| 5b. If you need more, click on **Continue**.  Click on **Specify the next measurement position** and select the position.  Click on **Measure** and then **Register.**  Repeat instructions again 5a. If done, click on **Excu Stitching** and then Click on **Save OR** click on **Analyze** to analyze the image.  Click on **Back** to change the image. | Graphical user interface, application  Description automatically generated |

**d. Saving the image**

Saving the data in **3** ways

1. Main menu- Select **Analytical template** and click on **Save.**
2. Use **Operation guide** on the right side of the screen—Click on **Save results and** Select (Report/Save as excel/Save as image/Save analysis results)

|  |  |
| --- | --- |
| 1. Use **Tool bar** and select one (Report/Save as excel/Save image)   Recommend-   1. To save each measurement, use **Tool bar/ Operation guide** and select **Report** (Save as pdf) 2. To save all of your data, use **Tool bar/ Operation guide** and select **Save as excel.** When **t**he box will pop up, check the options and then press **OK .** | A screenshot of a computer  Description automatically generated with medium confidence |

**File Saving-** Construct your data folder in **data share** folder. After your measurement, use MMCL server computer in room **532b** to get your data by Flash drive. Password (532b).

**e. Analyzing the image**

When you get your image (after section **c. Measuring (Acquiring) the image),** click on **Analyze.**

Main data (excel file) will pop up and that includes Measurement data name, Main image (Optical & Height image), 3D image and measured date columns.

There are 3 ways to select **Analyze the data**.

1. On Main menu, click on **Measurement.**
2. On Tool bar, click on directly the **specific tool** to analyze the data.
3. Operation guide- click on down arrow at **Analyze data** **.**

For example: On the main menu, click on **Measurement** and you can see the below options

Profile measurement/Plane measurement/Average step height measurement/Volume & Area measurement/Line roughness measurement/Surface roughness measurement

**Profile measurement**

Click on the main optical image and click on down arrow in **Analyze data** toselect **Profile measurement**.

Select the line style using **Profile tools** located at the top right side.

Choose the starting point and ending point (line position) on the image in **Optical view**.

Choose the measurement style using the **Measurement tool** located at the bottom right side.

Select the point/ line in **Profile graph** and click OK. Save as a report (Section d.4).

Note: Use the same instruction worked in Profile measure for **other measurement**.

Based on the measurement type, select the corresponding tool.

***Average step height measurement-*** Choose **Add an area-Select area** using tools then press **OK.**

***Volume & Area measurement-*** Select**convex/Concav**

***Surface roughness measurement-*** Choose **Add an area-Select area** using tools.

**f. Set measurement reference plane**

Click on **Reference plane setting** in **Operation guide** and click on **Specific area**.

Click on **Any Area** and Select Reference area on the image in **Optical view** using tools.

**g. Changing sample**

For thick sample, move down the stage to get enough space between the lens and stage.

Tap on microscope icon located on the bottom task bar to view OR Go **To viewer.**

**h. Finishing**-Close the window. Take the sample from the stage.

Switch off the microscope and Log out from FOM. Check **File Saving** mentioned in **section d** to get analyzed data**.**