**Optical Microscope-Keyence VHX 7000N**

**Basic operation guide**

**Warning:**

1. Ensure that there is no object on the scanning stage before setting up the microscope.
2. When changing the camera and light, handle carefully and fix properly.
3. After testing, don’t forget to turn off the microscope, turn the console power off and log out from the FOM.
4. **Introduce Microscope-Keyence in MMCL**
* There are Manual and automatic microscopes.
* Keyence VHX 600- Manual stage with Z20 and Z100 lenses- Magnification (100x-1000x).
* Keyence VHX 970F- Automatic stage with Z500, Magnification (500-5000).
* Keyence VHX 7000N- Automatic stage with Magnification (20-2000).
* Components- Computer, Stage**,** measurement unit control (MUC) with the clicky button and Camera
1. **Starting**
* Ensure that there is no object on the scanning stage before setting up the microscope.
* Switch on the microscope (Monitor) and wait 3-5mins to start the window.
* After the window screen pops up, wait for initialization of the stage (< 1 min).
* Remove the lens cover, turn on the light using MUC (if not).
1. **Setting up the sample**
* Lift up the lens to get enough space between lens and stage for setting up the sample.
* Click on  button and full ring unit and Lighting unit .
* Focusing the image (for **Z** direction) use rotation knob of microscope **OR** use the large and small knobs at MUC and check on the focus screen

For **XY** direction movement, use rotation knob at MUC or use the left mouse button.

1. **Acquiring the image**
* Choose the microscope lens power (Magnification). RED- 20-200x, BLUE-200-2000x.
* Click  button to get the image.
*  -Select ‘Optimize image’ to select the best image from 9 options.
*  -To choose the tool for measurement. (e.g Plane measurement)
* 
* Quick composition and 3D-simply follow the instruction.
* Fine depth composition
1. Check the pitch.
2. Click on setting to choose the option- if you choose-Move up from current position.
3. Adjust ‘Pitch’ depending on the sample surface thickness and close the small window.
4. Click on ‘Start capture’ to capture the images.
5. If you get all focus images, click on ‘Exec Composition’ and wait for composing images.
6. Choose image type-2D or 3D and save the image.
*  (Stitching)

You can stitch around the center of the current position. You can specify with number of images (X-Y direction)

If we choose ‘Lower to upper limit’ in step 3. Focus on the lower limit of the image (as a current position) and click ‘Set lower’ and focus on the upper limit of the image and click ‘Set Upper’. Then follow by step 3 to 6.

 3. Adjust ‘Pitch’ depending on the sample surface thickness and close the small window.

1. Click on ‘Start capture’.
2. If you get all focus images, click on ‘Exec Composition’ and wait for composing images.
3. Choose image type-2D or 3D and save the image.
4. **Elemental analysis**
5. Click ‘EA 300’ at the upper right corner or Click ‘Elemental analysis’ on the menu.
6. Choose the analysis type
7. For example- 
* Choose type of multi point position by ‘Set multi point position’ and select the point position.
* Click ‘Execute in batch’ and laser power depending on the sample hardness (e.g Fober-weak, plastic-Normal, Metal-strong)
* Click ‘Run analysis’ to run.
* Edit the element using periodic table- Choose the material in table and Click ‘Edit detection setting’.
* You can get the spectrum by clicking the ‘Spectrum’ and use **+** sign to see the detail peak of each element.
1. Click  button to get the image. Click Report to get the data.
2. **Saving the data**

Depending on your data type you want, you can save data by CSV, image .jpg, using recode, save and report.

Saving- Hard disk. Data folder>File name

Make sure to save your data and transfer it to the Data share folder. Check in D:> Common Data> File name.

1. **Finishing**

Lift up the lens to get enough space between lens and stage for taking out the sample.

Close the software.

Switch off the computer.

Don’t forget to log out from the FOM.