



NORTH PENN HIGH SCHOOL ENGINEERING ACADEMY

LANSDALE, PENNSYLVANIA

HITACHI TM3000

OPERATING INSTRUCTIONS SETTING UP THE MICROSCOPE



Initial Considerations

Before operating the Hitachi TM3000, please be sure to read this entire operation sheet and the associated safety precautions.

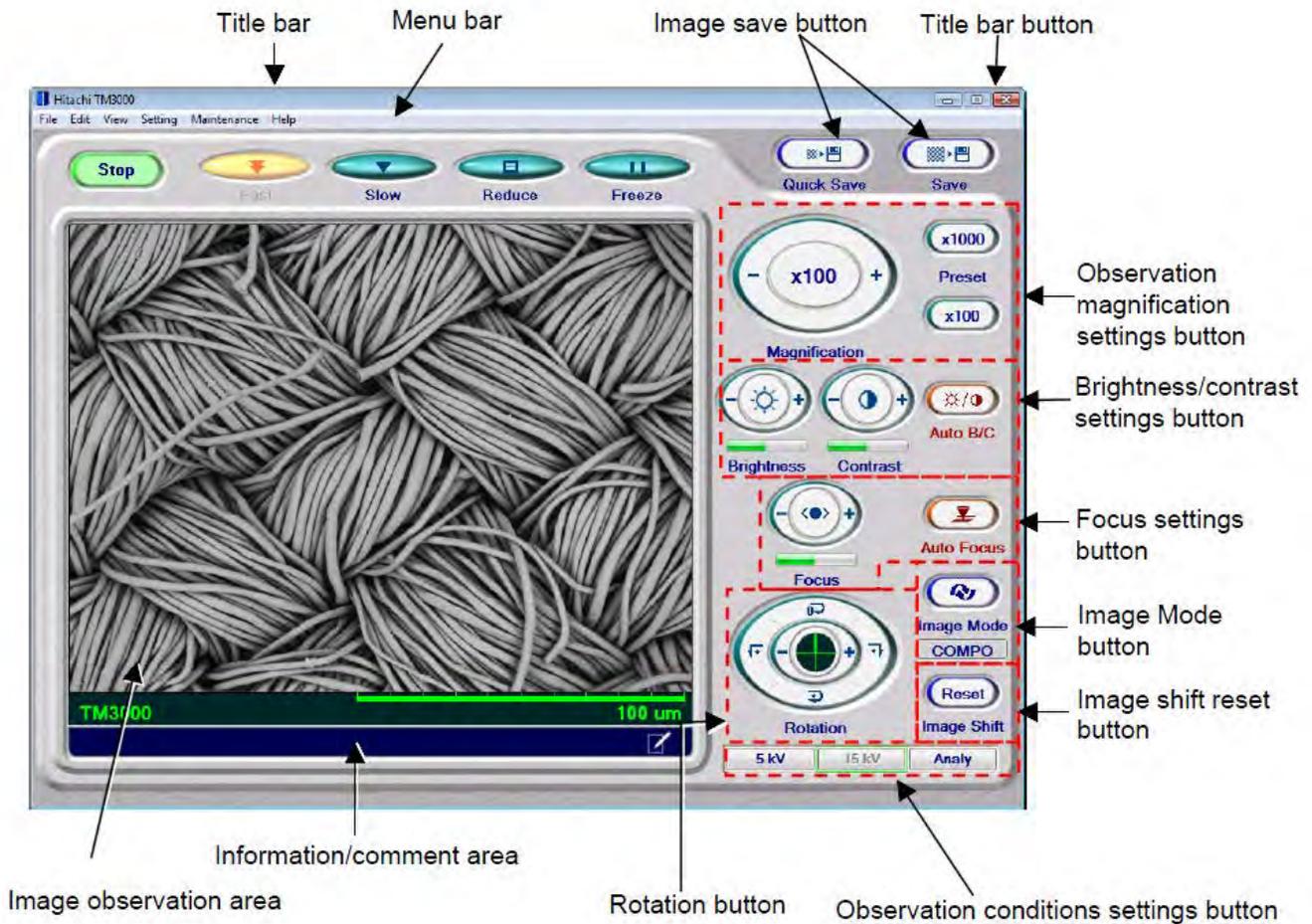
1. Be sure that you have received proper training before using the microscope.
2. Use only approved stub mounts and obtain permission for all samples before your analyze them.
3. Develop a clear plan for what you are looking to analyze and where on the sample you plan to begin your analysis.
4. Document everything on your SEM Analysis Sheet and in your journal:
 - Sketch of the stub layout
 - Record observations with the corresponding stub ID
 - Record findings and speculations based upon experimental procedures
5. Get Mr. Boyer to sign your SEM Analysis sheet before you begin your analysis.



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Operating Instructions – Software Controls



General Microscope Considerations

The microscope should ALWAYS be under vacuum. (Blue LED – EVAC). The only time the microscope is not under vacuum is when you are loading and unloading a sample.

Be sure to have your prepared sample(s) ready to load before you release the vacuum from the chamber.





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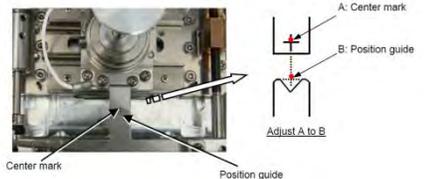
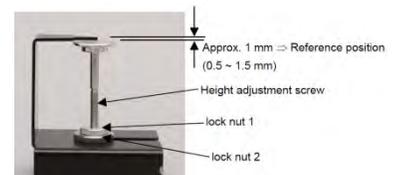
Preparing the Specimens

Prepare the specimen stubs according to the procedures outlined in the stub preparation document and the class demonstration.

See Mr. Boyer for special mounting procedures for samples other than nanofibers.

Starting the System

1. The microscope should already be on and under vacuum when you are ready to begin analysis. The Blue EVAC LED should be solid.
2. Ensure that you have your stubs prepared and ready to load with all of the necessary tools: Two hex keys and stub tweezers.
3. Remove the vacuum from the chamber by pressing and releasing the EVAC / AIR button.
4. The Yellow LED will blink. Once the yellow LED stops blinking and remains solid, the chamber will be ready to open.
5. Slowly open the chamber door, locate the specimen holder set screw and loosen. Remove the entire stub holder from the chamber and place it on the specimen height gauge.
6. Close the chamber door.
7. Remove the old specimens by loosening the set screw for each stub. Use the stub tweezers to remove and place the stubs in their appropriate stub holder.
8. Place your stub(s) in the holder with the sample ID of each stub facing toward the center hole according to your SEM analysis sheet diagram. This will allow you to easily find the correct specimen when you are running your analysis.
9. Tighten each corresponding set screw to ensure your stub is mounted securely in the holder.
10. Ensure that you have a 0.5 to 1.5mm clearance.
11. Tighten lock nut 1 and 2 and recheck the height of your sample(s).
12. Open the chamber door and place the specimen holder on the X, Y stage. Make note of the specimen position in your notebook and SEM analysis sheet. It is also helpful to take a picture.
13. Carefully tighten the set screw at the base of the mount. Do NOT over tighten.
14. Zero the X,Y stage by rotating the knobs on the chamber door until the crosshairs on the stage line up in the alignment notch.





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15. Slowly close the chamber door. As you close the door, double-check to ensure that the stubs have enough clearance to enter the chamber.
16. While pressing and holding the chamber door closed, press and release the EVAC/AIR button to remove the air from the chamber. You will hear the vacuum pump begin.
17. Wait 10 seconds and then you may remove your hand from the chamber door.
18. The Blue LED will blink until the chamber is at the proper vacuum level.
19. Once the chamber is at the proper vacuum, the blue LED will remain solid.
20. You are now ready to start the Microscope and begin the specimen analysis process.

SEM Operation Checklist

- SEM analysis sheet is properly completed with Mr. Boyer's signature.
- Stubs prepared and mounted with stub labels facing toward center of multiple specimen holder.
- Sketch of stub position in SEM before door is closed.
- Stub height measured with specimen height gauge.
- X,Y stage is zeroed with the crosshairs lined up with the alignment notch.