TESCAN MIRA3 XMU SEM
Safety instructions and Troubleshooting

Basics

- Never use the microscope if you are not allowed to.
- Never open the housing with the electronics or manipulate with the instrument parts (e.g., detectors, cables).

Safe Sample Loading Procedure

- Always wear gloves!
- The samples should be cleaned and dried prior to loading them to SEM chamber. Think of possible contamination!
- Blow your samples by compressed nitrogen or dry air especially in the case of powdered samples.
- Move with the SEM stage to the sample exchange position (via red number buttons on the carousel in the Stage Control panel activated when SEM chamber is vented).
- Make sure that the sample is fixed to the specimen stub/holder (turn it upside down) and that stub/holder is tightened to the SEM stage properly (but not overtightened).

Safe Stage Movements

- Check that you are in perfect focus by using degauss function (image should stay in focus after that) before moving at large distances via WD&Z function. There is a collision risk with SEM objective, RBSE, STEM and EDS detectors! Two or more steps moving up is recommended for large distances.
- Place the cursor over Stop button and watch Chamber View when the stage is moving. Hit the Stop button immediately when it seems there might be a collision!
- Rotate and tilt before approaching to SEM objective. If you are very close to the objective, move down with the stage and then rotate or tilt it.
- When you are tilting a large sample, make sure that the outer limb of your sample is flat to avoid collision with SEM.
- Check if the "Keep view field" function is active - the stage movement is different with and without this function!
- The touch alarm doesn´t work if the sample is nonconductive!

No SEM Image

- Check that Electron beam is ON.
- Check that you have an appropriate detector chosen (SE detector is recommended in the beginning).
- Go to minimum magnification.
- Use the Auto-Brightness/Contrast function.
- Check that the electron emission is not zero (see the Electron beam panel) – in such a case call the guarantor immediately.
- When using the In-beam SE detector, check that the In-beam mode is activated.

Vacuum

- All retractable detectors must be in the parking position prior venting the chamber.
- TMP error – Go to Health Status window – Vacuum panel and restart the TMP electronics by clicking on the Reset TMP button. Retry pumping the vacuum. If the chamber is pumped, you can continue work as usual. If not, switch the microscope to Standby mode and log off from the Mira TC Software. Always notify the guarantor!

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RBSE Detector

- Don´t move with RBSE detector to working position if the WD&Z (after focusing) is smaller than **12 mm**. In Chamber view check the mutual position of the detector and the stage with the samples during the detector movement. Hit the Stop button (Motorized RBSE panel) immediately when it seems there might be a collision!
- The minimum recommended WD&Z (after focusing) to be used with the RBSE detector is **9 mm**.
- When finished, move with the RBSE back to parking position.

STEM Detector

- When installing/uninstalling the APG 10 STEM stage, make sure that the stage is in the sample exchange position. Align all pieces of the stage such that the number 1 mark points to the same direction. **Wear gloves!**
- Don´t move with STEM detector to working position if the APG 10 STEM stage is not properly inserted, activated in the Mira TC software and brought into the working position. Recommended WD is **2-6 mm**, ideal WD is **5 mm**. Always check using the SE detector that the sample grid is beneath the electron beam while inserting the STEM detector!
- Retract the STEM detector when switching between samples!
- Switch off the IR LED chamber illumination prior activating the STEM detector (i.e., selecting the detector for observation). Select the SE detector first before activating the IR LED again!
- When finished, move with the STEM detector back to Home position.

UniVac

- Always make sure that the final aperture is inserted when activating the UniVac and removed when deactivating it!
- Use the mounting screw for handling the final aperture. **Wear gloves!**

Plasma Cleaner

- Using plasma cleaner is only allowed to users who have been instructed and approved by the guarantor!
- In case you would like to clean chamber using plasma cleaner make sure that all detectors are in the parking position. Using plasma cleaner when EDS is inserted may cause fatal damage to the detector!
- Move with the SEM stage to Home position before the start of the cleaning.
- Consider if you can leave your samples on the stage during the cleaning.
- Make an entry to the log book on the PC desk.

EDS detector

- Always put the EDS detector to parking position prior venting the chamber!
- When finished, put the EDS to parking position (within AZtec software) and close AZtec software.
- No or weak signal on the EDS detector:
    - Check that the EDS detector is cooled down and inserted into the working position.
    - Check that the electron beam is ON and focused on the sample (not in the FC or a hole because of a shielding). Check that you are using sufficient HV and BI for the expected composition of the sample.
    - Check that the WD&Z (after focusing) is **15 mm**. The detector loses more than half of the signal already at WD&Z of 14 mm.
    - If that does not help, contact the guarantor.
- If an element is not appearing in the spectrum (after AutoID), check that it is not set as a coating layer or marked to be avoided from the evaluation. Contact the guarantor if necessary.

Notes

- Close the SEM/EDS control SW and restart SEM/EDS computer if a function in the SEM/EDS SW does not work properly. Check if a problem still occurs after the restart. If the problem is still there or if there is another serious problem, always contact the guarantor. Send the mail about it to other experienced users and make a note to the instrument book.