

This guide obtains just brief information. In case you need detailed instructions, read the JPK NanoWizard OEM Manual and the NanoWizard Handbook.

JPK NanoWizard

Getting started

1. Turn on the control unit and the AFM computer.
2. Start the SPM desktop application.
3. Replace the tip if the current tip is worn off or if a different type is required. See the *Tip replacement* procedure.
4. Turn on the camera's live view, find the cantilever and focus on it.

If necessary, slide down with the stepper motors by 500 μm step size until focusing on the cantilever is possible.

Beware crashing the tip against the sample/stage.

5. Locate the laser spot and position it at the end of the cantilever.
6. Center the reflected laser spot into the middle of the 4-quadrant photodetector.
7. Select the feedback mode and make appropriate calibration/setting.

Contact Mode: Calibrate the spring constant using the *Calibration Manager*. Select appropriate tip parameters; our standard tips are pre-set in the tip list. Click *Run*, then accept the value.

AC Mode: Record the resonance spectrum of the tip by the *AC Feedback Mode Wizard*. Select the *driving frequency* slightly below the main resonance peak and the *set point* in about $\frac{1}{2}$ – $\frac{3}{4}$ of its height. Adjust the *phase shift* such that the lock-in-phase is zero at the driving frequency. Increase the *Gain* value for coarse surfaces (faster reaction), decrease it for flat surfaces (slower reaction).

QI Mode: No additional settings are required.

Force modulation mode: Find the off-resonance frequency, typically 30-40 kHz.

8. Place the sample beneath the head and land the tip. When landed, click on the *retract* button once to retract the piezo drives or twice for retracting the stepper motors.
9. Select the scan region. Retract the piezo drives before confirming the new scan region; otherwise, the tip may scratch the surface of the sample.
10. Press the *Run* button to start the scan.

Turning off procedure

1. Retract the tip by at least 2000 μm .
2. Remove the sample.
3. Close the software, turn off the computer, and the control unit.

Tip replacement

1. Flip the head on the back.
2. Wearing gloves, unlock the tip holder, rotate it by 90°, remove it and place it into the stand, then lock it again.

Do not touch the optical faces of the holder!

3. Untighten the screw to release the spring, remove the old tip with tweezers and place a new one. The cantilever should be aligned in the middle of the holder, and it should slightly extend over the optical face. Secure the tip underneath the spring by tightening the screw.
4. Put the tip holder back into the head (screw is facing left while the cantilever is facing right) and lock it.
5. Flip the head into working position. **Beware crashing the tip against the sample/stage.**