



## Standard Operating Procedure: 4 Point Probe

Signatone Pro4

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## 1. Lab Safety Information

- ✓ All GMU NFF users are required to complete the Lab Safety Orientation (LSO) before performing any lab work.
- ✓ Proper Personal Protective Equipment (PPE) should always be worn before entering the clean room: safety glasses, hair net, shoe covers, gloves, and lab coat. Additional PPE is available for specialized chemical work as needed.
- ✓ No shorts, sandals, tank tops, or spaghetti-strap shirts are allowed in the clean room!
- ✓ Material Safety Data Sheets (MSDS) are available in a binder in the gowning room.
- ✓ Read the SDS for any chemicals you plan to use before proceeding with your work. Any materials used in the clean room for the first time should be brought in after the approval of NFF staff.
- ✓ A safety buddy is required in the clean room with you when doing chemical work. They must remain in the clean room the entire time you are handling the chemical. Feel free to ask NFF staff if no one qualified is available!
- ✓ Prohibited clean room items: cardboard, pencils, cloth, hats/coats, and contact lenses.
- ✓ Accepted clean room items: plastic, pens, synthetic fabrics, clean room paper.

## **2. 4 Point Probe Safety Information**

- ✓ Any irregular system behavior should be reported to NFF staff promptly. Never attempt to fix the system yourself!
- ✓ The probe head contains 4 spring loaded probe tips. Proper adjustment of the probe head is critical to prevent damage to the head.
- ✓ Gloves can become contaminated when loading wafers or removing wafers. Always check your gloves and replace them when necessary.
- ✓ Failure to use the system safely and properly may result in your access to the system being reviewed and/or revoked.
- ✓ Fill out the logbook before you begin.
- ✓ If a new recipe is required ask for assistance from the NFF staff.

### 3. Principles of 4 Point Probe

The Pro4 is designed to measure Resistivity and Sheet Resistivity of wafers and other materials. The system includes the test stand with probe head (Figure 1), test meter, software and notebook computer. If there are any questions about the setup of the software or any measurements, please contact a staff member of the NFF.

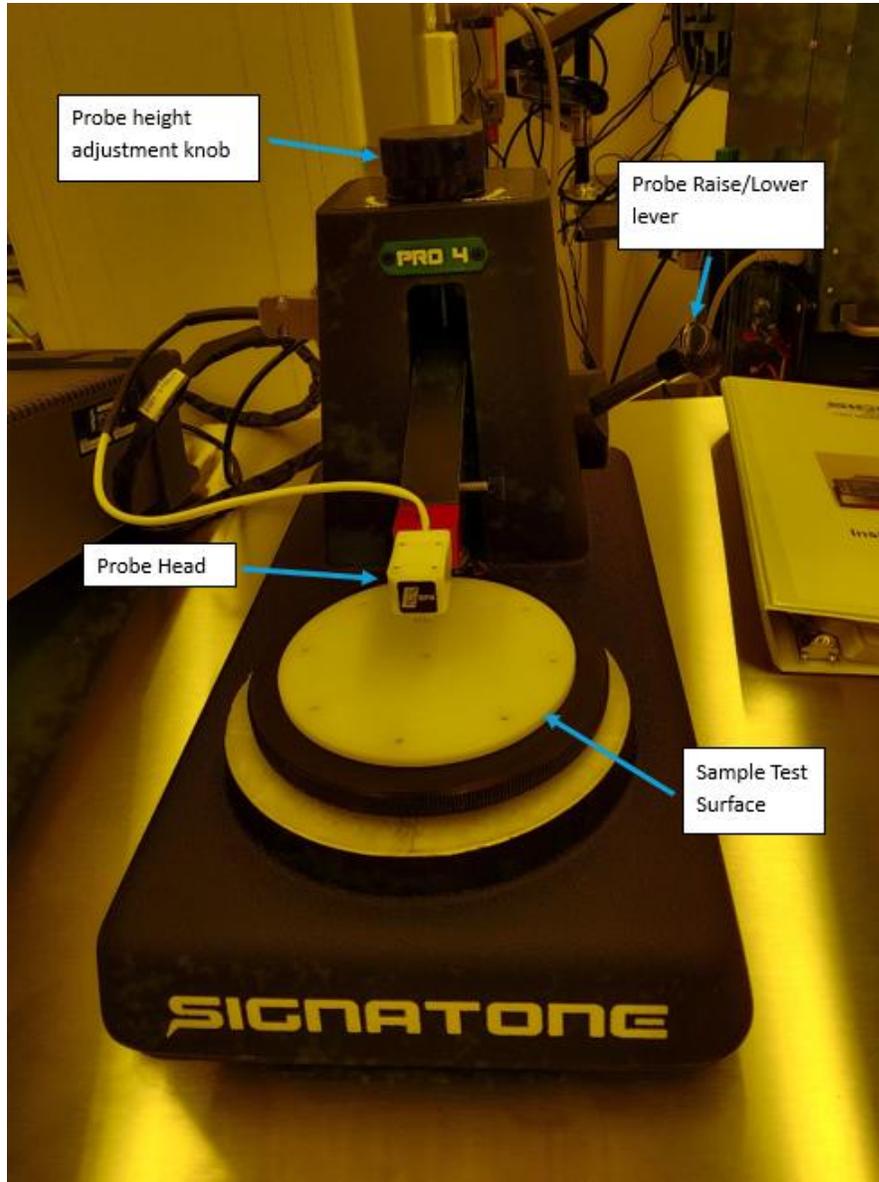


Figure 1. 4 Point Probe

## **4. Operation**

### **4.1. Loading the sample**

1. The test stand is shown in Figure 1.
2. Use the lever to raise the probe head above the test surface.
3. Turn the height adjustment knob in the UP direction until the probe head is far enough above the surface that loading a sample will not hit the probe tips. At least 3 cm above the surface is a safe distance.
4. Load the sample to be measured onto the test stand. The sample is simply placed on the plastic sample test surface.
5. Use the lever to lower the probe head. The head should still be well above the surface of the sample.
6. With the lever in the down position turn the height adjustment knob in the DOWN direction until the probe tips just make contact with the sample.
7. Turn the adjustment knob in the down direction until the probe tips are compressed into the probe head about 50% of the length of the tips.
8. Move the lever into the raised position.

### **4.2. Set up the software for the test.**

1. The software screen of the system is shown in Figure 2. The first step is to configure the software for the sample being tested. Enter the number of test points, edge exclusion, sample size and shape into the boxes in the sample configuration area of the screen.

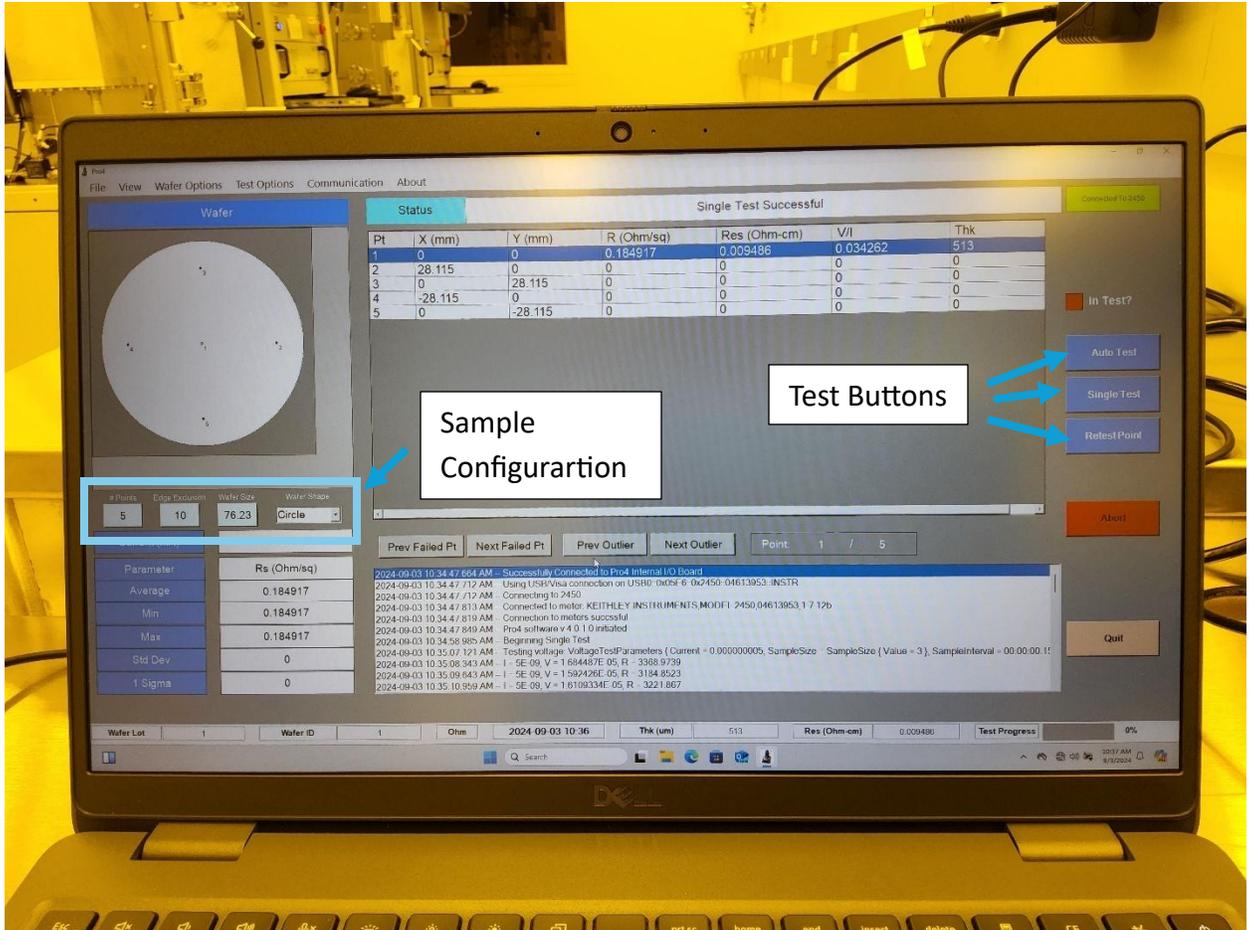


Figure 2.

2. Select the test button for the type of test you want to run. “Auto Test” will go through testing all points configured in the sample configuration. At the end of the auto test the average value will be displayed just below the sample configuration area. “Single Test” will only test one point and then display the results. “Retest Point” is used to retest a point that was measured in the auto test.
3. After pressing either Auto or Single Test a pop up will appear on the screen. The pop up is show on Figure 3. Enter either the known thickness of the film you are measuring. Press OK.

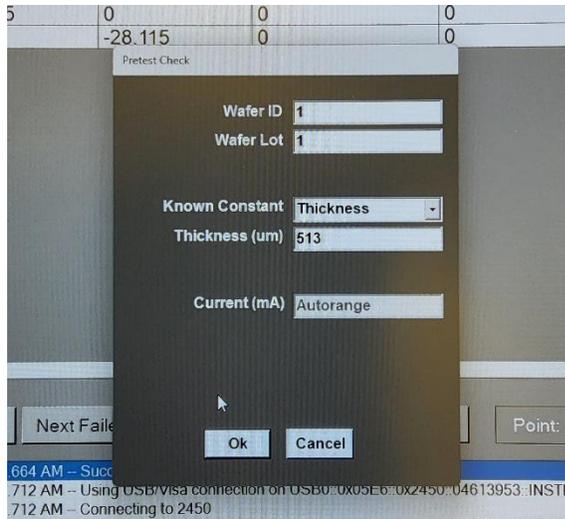


Figure 3.

4. After pressing OK another pop up will appear. This pop up is shown in Figure 4. Place the position to be tested under the probe head. Using the lever lower the probe head to make contact with the sample. The test starts automatically.

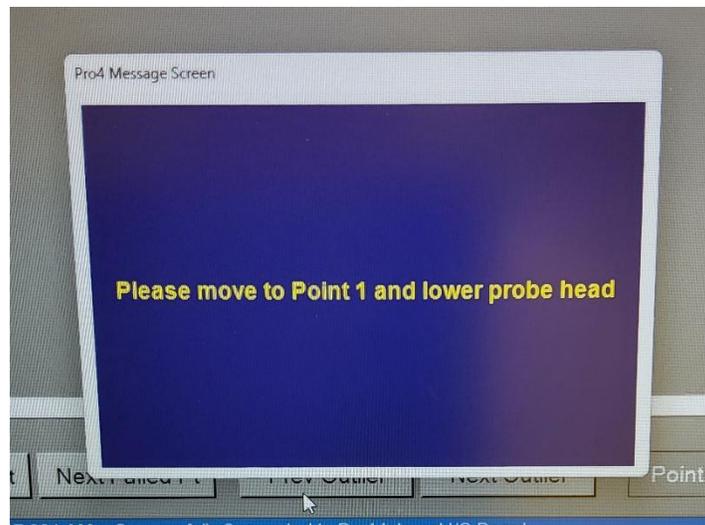


Figure 4

5. If running auto test the message screen will reappear and tell you to move to the next point and lower the probe head. Be sure to raise the probe head before moving the sample. The software will step you through testing all the points and then display the results of the test.

6. If running the single test no further movements of the sample are required and the results of the test are displayed.
7. The test is finished.

#### **4.3. Unload the sample**

1. At the end of the test the probe head is still in contact with the sample.
2. Use the lever to raise the probe head above the test surface.
3. Turn the height adjustment knob in the UP direction until the probe head is far enough above the surface that unloading a sample will not hit the probe tips. At least 3 cm above the surface is a safe distance.
4. Remove the sample from the plastic test surface.