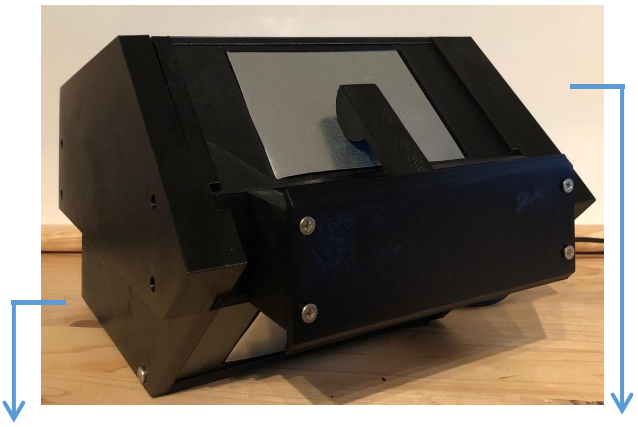
UV-Reflectometer by Klaus Wojczykowski

Manual

1. Proper installation of the panels

After connecting the Reflectometer to the power supply and PC and after starting the Reflectometer software the device will be ready to use. Below picture shows the Reflectometer with both panels installed.



Without the test panels installed it is possible to see inside the test chamber with the sensor carrier:

The left picture shows the chamber through the lower opening with the sensor inside the sensor carrier (in initial position) and the UVC LEDs in the back of the chamber. The right picture shows the chamber through the upper opening.

The panels should be flat and have a size of 70 x 100 mm. Avoid sharp edges that could cause injury when installing the panels. The thickness of the panels should not exceed 0.5 mm.

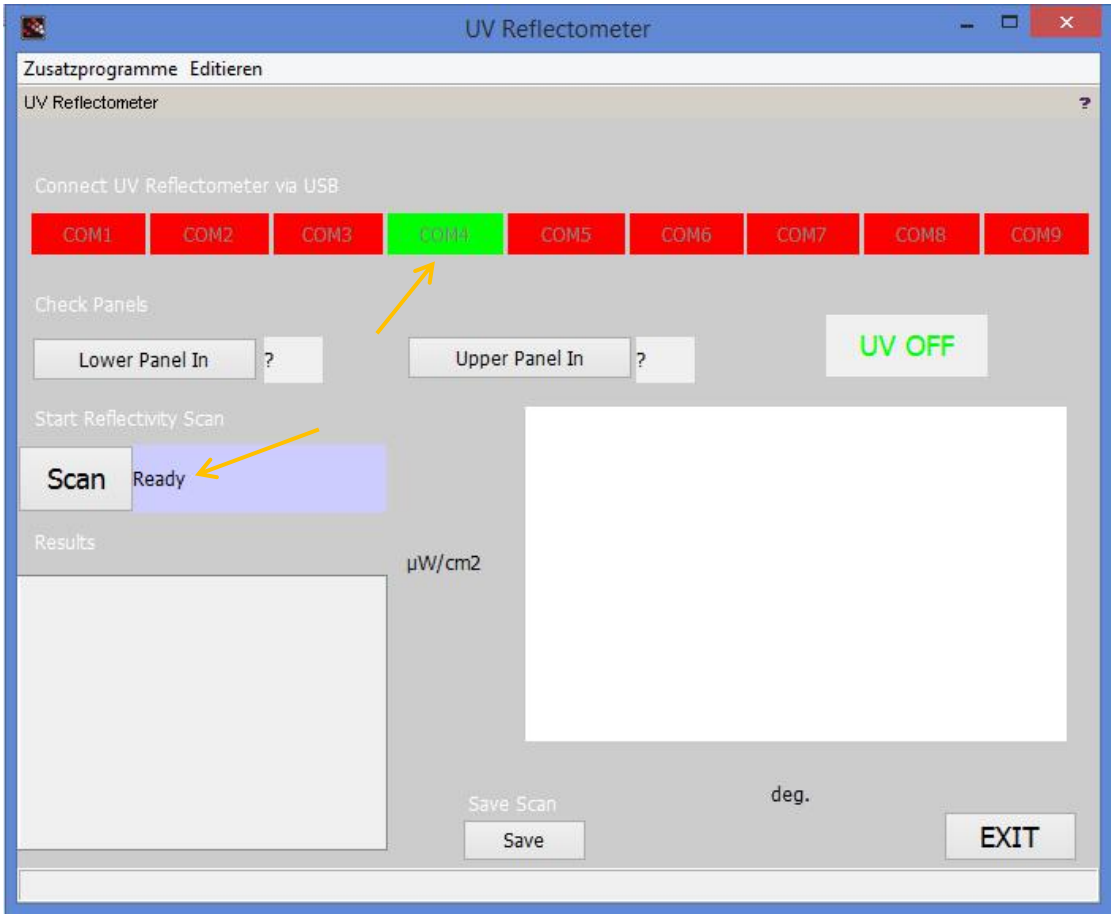
Install panels starting with the lower one by lifting the lower lever to its end-position given by the spring. You should hear the micro switch being triggered (safety mechanism to avoid UV radiation outside the chamber). Carefully slide the panel from the side along the panel support area in the rectangular opening then underneath the lever until it is completely centered and no gaps are visible. The panel should be fully positioned inside the rectangular recess and the lever held in the lifted position (with the safety switch triggered).

Repeat this operation with the upper panel.

The Reflectometer is now ready for the reflectivity scan.

2. Using the software

The picture below shows the Refelctometer software after it is launched.



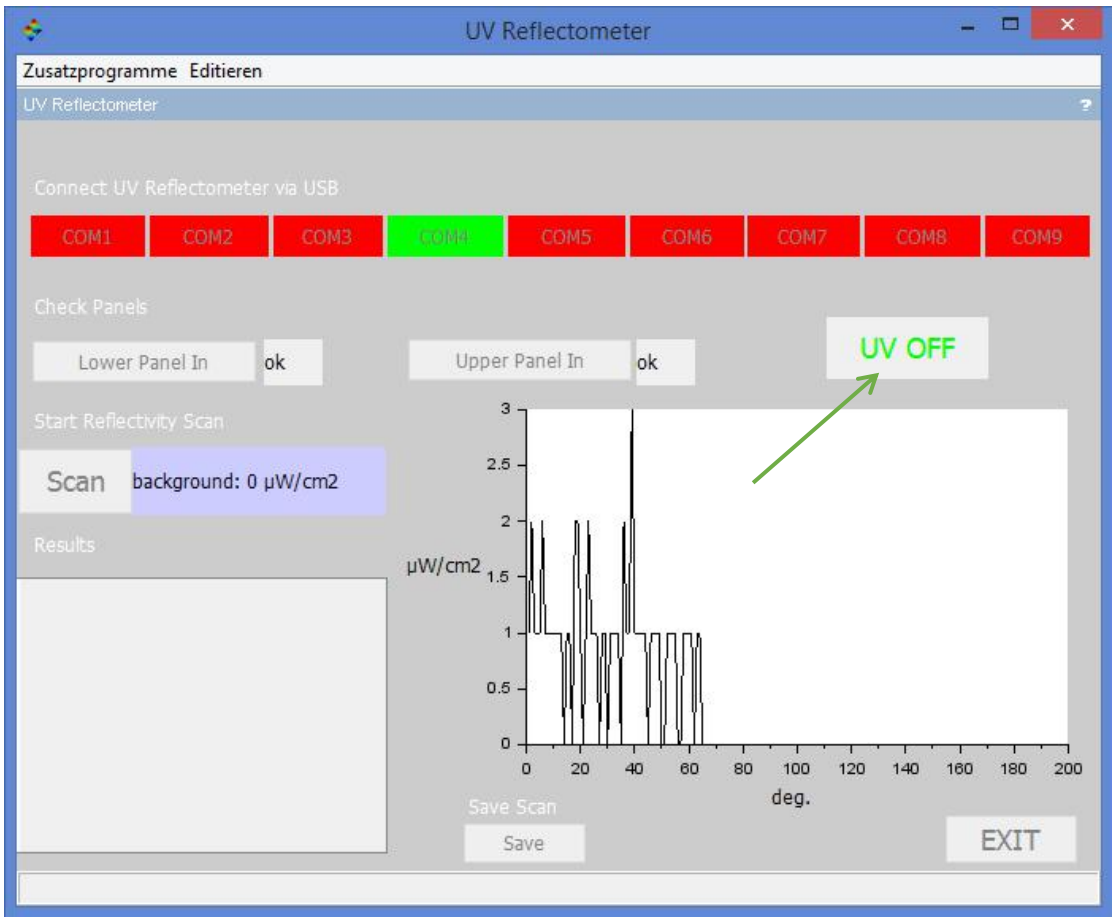
After start-up the software found the reflectometer connected via USB (here: COM4) and is ready for the scan (see orange arrows).

It is now possible to check the proper installation of the panels by using the push buttons under „Check Panels“

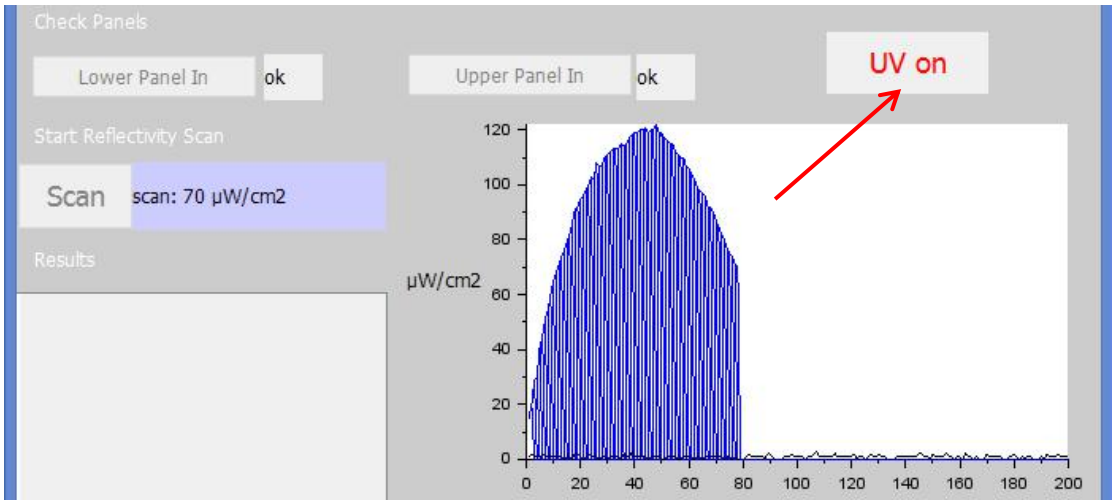
In the upper screen shot both buttons were pushed and the message „ok“ next to both indicates that the panels are properly installed (blue arrows).

Manual checking of the panels is an optional step because this check is also done before each scan and the scan will only start if both panels are properly installed.

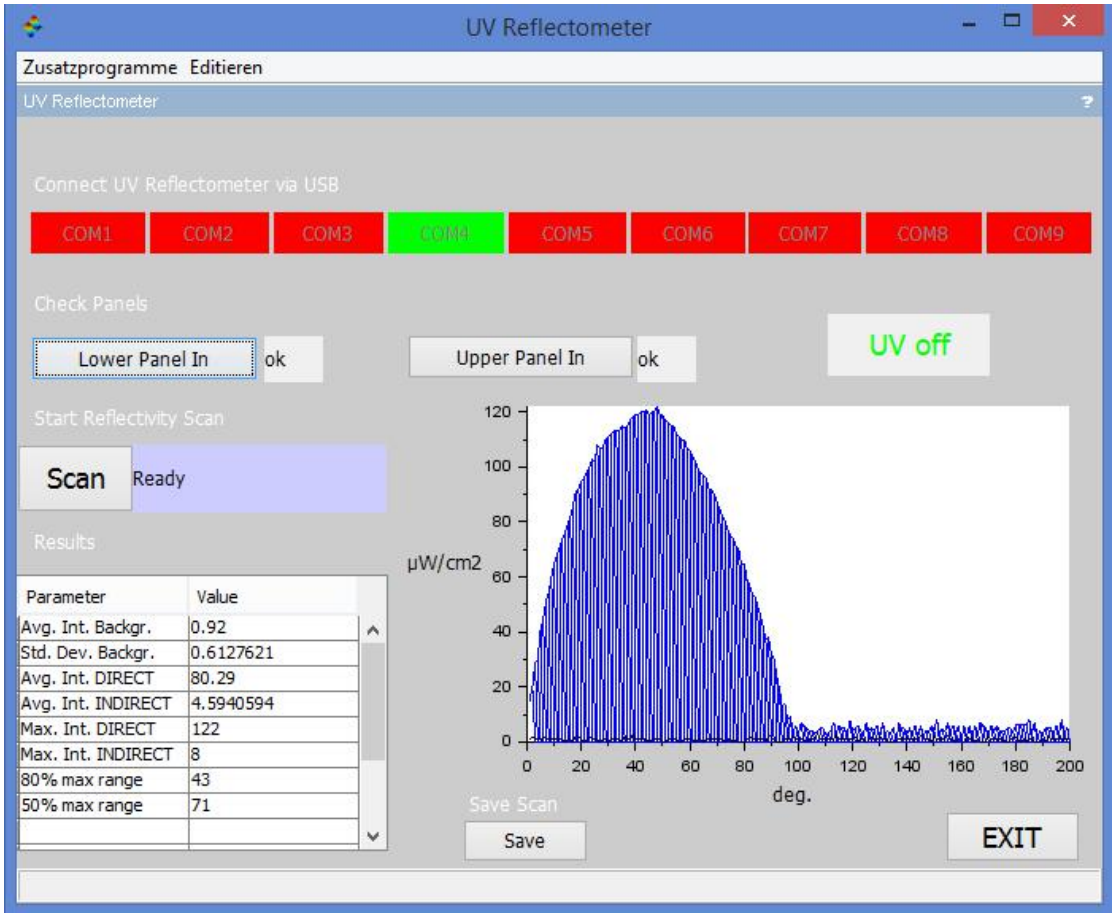
After clicking „scan“ the check for panel installation is done and, when successful, a **background scan** is initiated. During the backgroud scan the UV source is still switched off (green arrow). The sensor is tilted from the initial position facing downwards over 200 degrees until the final position facing upwards. The signal recorded during this scan is the background noise. The signal (roughly expressed as µW/cm^2 based on the specifications of the GUVA-S12SD sensor and the ~10x amplification given by the external OP) is plotted live in the graph on the right.



After the background scan the stepper motor moves the sensor back into the initial position, the UV source is switched on (red arrow) and the actual scan is performed with the values plotted in the same graph window as the background signal.



After the scan the sensor is moved back to the initial position, the UV source is switched off and some calculations are being done based on the data acquired:



The values listed under „results“ in detail are:
- Average intensity and standard deviation of the background scan (full scan 0-200 deg.).
- The average intesities of the DIRECT reflection (--> lower panel --> scan range 0-100 degrees) and the INDIRECT (diffuse) reflection (--> upper panel --> scan range 101-200 degrees)
- The maximum intensities in both the DIRECT and the INDIRECT scan range
- The angular range which receives more than 80% (50%) of the maximum measured intensity

In the example shown it is obvious that the indirect/diffuse reflection from the upper panel results in a very low average intensity - that intensity is however exactly the average intensity of the background scan PLUS six times the standard deviation („six sigma“) and hence a significant signal.

The table under „Results“ can be copied and pasted into a spreadsheet program to further process and compare data from different panel materials.

The raw data of the scan can be saved by clicing the „Save“ button. A file selection window will be prompted and after a file name is entered two files will be saved: A FILENAME.dat file with the intensitiy values of the actual scan and a FILENAMEbackgr.dat file with the intensity values of the respective background scan.

By clicking the „EXIT“ button the Reflectometer is disconnected from the PC and the program is closed.