# Airmodus MPSS quick guide

## Step 1: Make the hardware connections

- Connect your CPC (A20 or A30) and Airmodus MPSS controller to power and turn on the device from the power switch in the device back panel.
- Connect your CPC to a vacuum pump
- Connect the CPC and the MPSS controller via USB to a computer
- Connect the CPC to MPSS with the provided BNC cable
- Connect the MPSS to the DMA with both the Sheat In and Sheath Out tubing
- Connect the ground monitor loop to your DMA
- Connect the DMA outlet to the CPC inlet using conductive rubber tubing
- Connect the DMA inlet to a neutralizer of your own choice
- *Optionally, you can add a dryer to your MPSS controller sheath loop, if needed*

## Step 2: Setup the Airmodus MPSS software

### Connect devices

From lefthand side menu, under **Before starting** -> **Device Settings** choose the **DMA COM por**t by clicking the **Select Device** text

The software should connect the MPSS controller, and the **Connected** tick box should appear ticked once the connection is successful.

Repeat the steps for the Ref CPC connection.

**Important: Depending on your DMA you might need to change the DMA parameters.**
The default is a short Vienna type DMA, but for other DMA's you need to set the R1, R2 and L parameters, under DMA properties.

*Optional: If you wish, you can at any point click on the **Save settings** button, to store the connection and other settings as a template for future use. These can be accessed from the **Load settings** button*

*Optional: Set the data storage settings under **Data settings**. The software automatically adds a timestamp to the file name, but in addition you can add other specifiers with the **File name** field*

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## Determine flows, wait times, and size range

You can next set the desired sheath flow and turn on the sheath with the **Sheat air on** -tick box. Similarly, you need to turn the HV before measuring using the **HV on** -tick box.

*Check that the **Sheath flow** under **Current values** in the software agrees with the desired setpoint, as if there are too high-pressure losses in the sheath tubing, the instrument might not achieve the desired setpoint.*

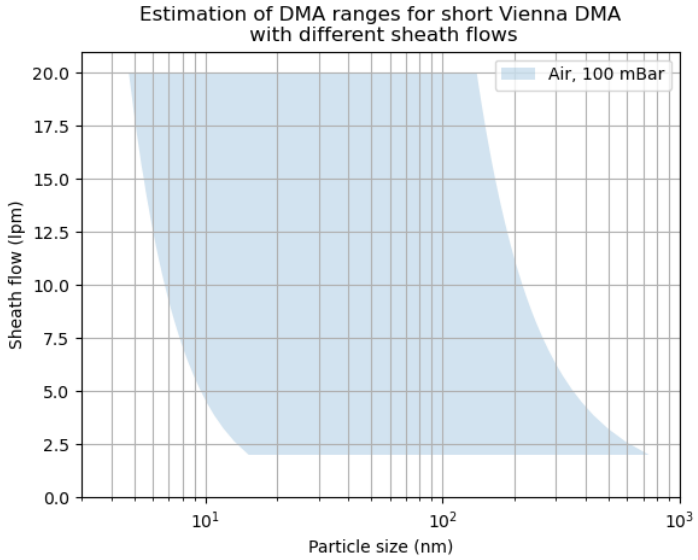


Figure 1. Particle size ranges that can selected using a short Vienna type DMA for sheath flows between 2 – 20 lpm.

The software allows for very flexible size ranges, so the user should check before scanning if the selected size range is feasible with the system. A rough size distribution can be selected from Figure 1, but more accurate size range can be gotten with the following procedure:

- Set the desired sheath flow from **DMA controls**.
- Select Manual DMA voltage, and set the value of 12 V. Click **Apply manual voltage**.
- Check from **Current values** the value in the field **Current Dp**. This will give you the smallest size available with the selected sheath flow.
- Select Manual DMA voltage, and set the value of 9000 V. Click **Apply manual voltage**.
- Check from **Current values** the value in the field **Current Dp**. This will give you the largest size available with the selected sheath flow.

Based on these values, the user can now set the desired scan region for the **Min size (nm)** and **Max size (nm)** in the **Size scan settings**.

The wait time and measuring time are also subject to change based on the length of tubing, type of DMA and the flows of the CPC and the DMA. Hence the user needs to set these accordingly. The recommended procedure is such:

- Set the DMA sheath flow to predetermined desired value
- Set Manual voltage to zero
- Set Manual voltage to 1000 V and record the time it takes for the CPC concentration to stabilize.

You can repeat this procedure a few times to be ensure that the wait time is sufficient. Too long wait time will only slow down the measurement, while too short wait time will distort the size distribution measurement.

The measuring time should be chosen so that the CPC will get sufficient signal, i.e. in high concentration environments even as short as 1 second measuring times will be acceptable, while at lower concentration environments it is recommended to use longer measuring times. However, longer measuring times will lead to slower scans (Figure 2.), so it is up to the user to find a suitable combination of wait times, measuring times and number of sizes to be scanned.

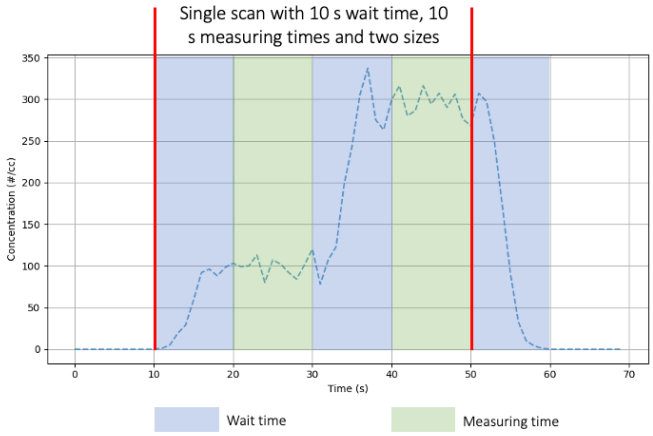


Figure 2. Example of the devices logic showing to sizes measured with 10 wait times, and 10 second measuring times.

**Step 3. Measure**

The error indicator in the MPSS GUIs bottom lefthand size should turn green and state “OK” if everything is ready to measure.

After setting the Wait time, Measuring time, Min and Max size the MPSS system should now be ready for measuring size distributions. To start measuring check the **Scanning on** tick box to initiate a size scanning. The instrument will continuously measure size scans until the tick box is unchecked, or the **Apply manual voltage** button is pushed.

When the **Save data** tick box is checked, the instruments begin saving data. This should produce two data files. One with the CPC 1 Hz data, and one where the particle number size distribution is stored, along with the metadata required for inverting the data.

While scanning, the GUI displays four most recent size scans in the upper main figure, and the surface plot of last 20 scans in the bottom main figure. The righthand side figures show the raw CPC concentration, sheath flow, and the DMA pressure, temperature and RH, respectively.