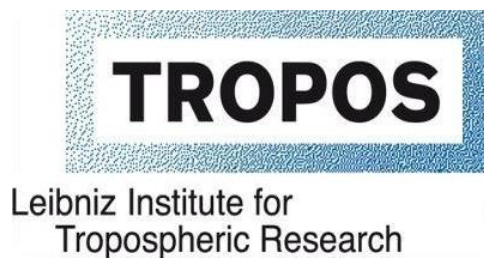


ACTRIS Round-Robin-Tour

by TROPOS



Dear User,

In this box, you receive a Reference Condensation Particle Counter (RCPC), which should be used in the ACTRIS on-site intercomparison exercise as part of the quality assurance program for your mobility particle size spectrometer (MPSS). The CPC should be operated parallel to the MPSS at your station to be able to compare the MPSS integral particle number concentration [10-800nm] to the RCPC.

To make the whole Round-Robin-Tour 2018 more transparent and simple, we developed a website. Please have a look at this website and use only this one for all information and data sharing from now on. On the website, you will find all the manuals, Tour-Plan, and forms you need to fill up to send us all necessary information. This website will also serve as a platform for sending data to me.

<https://round-robin.kayweinhold.de>

It is not necessary anymore to use the SD-card to log the data from the RCPC. This method is quite hard to handle and has many problems regarding the logging. It is preferable that you use the TSI-software with the connection over USB. You will find the software from TSI on the CD included in the box. Please connect the RCPC to your MPSS PC/Laptop or another one and log the data with the TSI software. A second option for all users of a TROPOS MPSS is the possibility to use the BNC cable + 50 Ohm resistor in the Box to connect the RCPC directly to our Labview Software. Please take care that the logging of the RCPC is switched on. With this method, it is necessary to perform coincidence and flow corrections. If you have a second total CPC on your station, please send the data as well. Instructions regarding these data logging options are included in this manual. Please don't forget to send me the time series of the MPSS- (Level 1) and RCPC data directly after the intercomparison. I need also the measured flows (RCPC + MPSS) of both instruments to correct the concentration.

Please read this manual carefully and fill out all necessary forms on the website to make this "ACTRIS Round-Robin Tour" successful. This manual is divided into several chapters. The structure will lead you to the "step by step" instructions regarding the RCPC setup, the data handling, and data submission. Furthermore, the tables on the website helps us acquire all the necessary CPC-related information during the intercomparison. So please fill out the forms. You don't need to wait to fill out the form until the end of the intercomparison. You can

give us an update anytime and fill only the necessary parts. Also, please do not hesitate to contact me over the form in website for any questions.

The MPSS-RCPC intercomparison should last about 2 full weeks of valid data. After the intercomparison, please fill out the form on the website and upload data. Place everything back in the box and contact the next station to arrange the shipping of the instrument.

If there are any questions, problems, or missing spare parts, you may contact me over the website or directly:

Kay Weinhold

e-mail: weinhold@tropos.de

mobile phone: +49 (0) 174-3033239

Thanks!

Kay Weinhold

TROPOS

How to use the website

1. On the Menu, click on the Box number assigned to your station.
2. There you can find a table containing information about the Round Robin CPC provided by each station.
3. You will also find forms, which are basically logbooks and data submission, that you must complete latest after the inter-comparison. I will put all the information you sent on the table.
4. After analysing the data you will find the results under "Results" in the table for each box.

Setup in the lab

The installation of the TROPOS CPC Model 3772 (from this point denoted as “RCPC” or Ref CPC) should be close to the MPSS. We would like to avoid long tubes with additional particle losses by diffusion. The whole setup should be documented with photos to get a transparent output. The logging time of the RCPC has to be the same as the MPSS.

2.1. Setup on the measurement site.

Place the RCPC on a safe and stable surface (e.g. on top of the MPSS), preferably as close as possible to the MPSS inlet, like shown in the following picture.

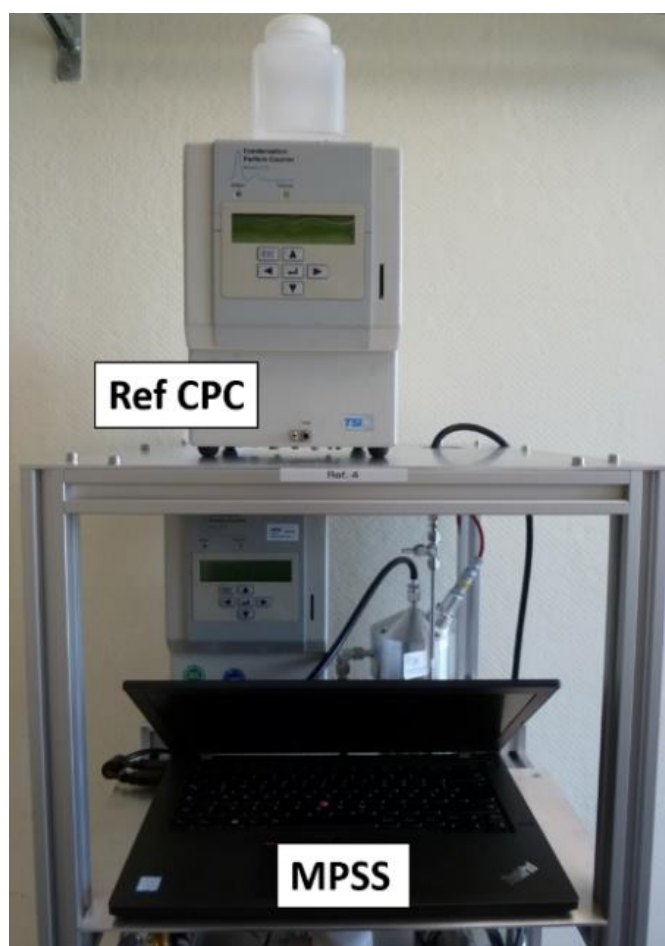


Figure 1

Remove both black dirt caps that cover the inlet (front) and the vacuum line socket (back).

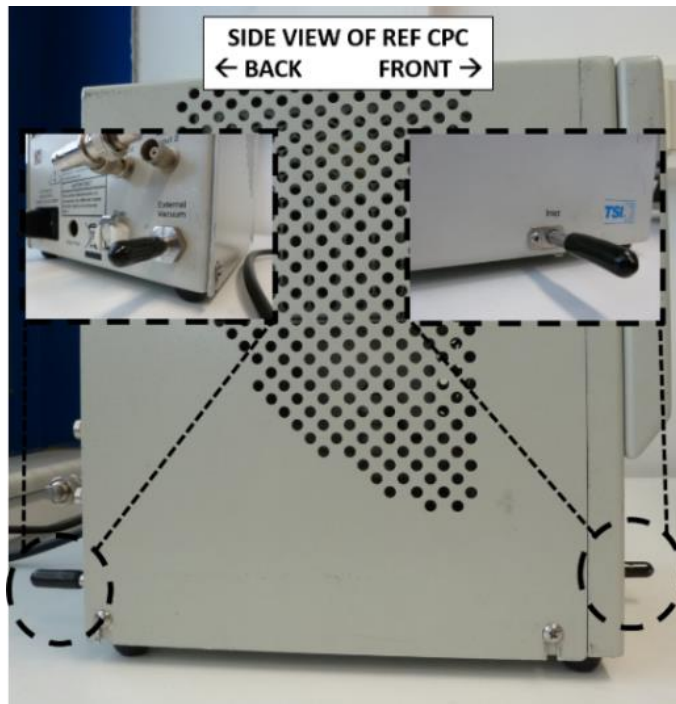


Figure 2

Connect the power cable to the back panel of the Ref CPC.

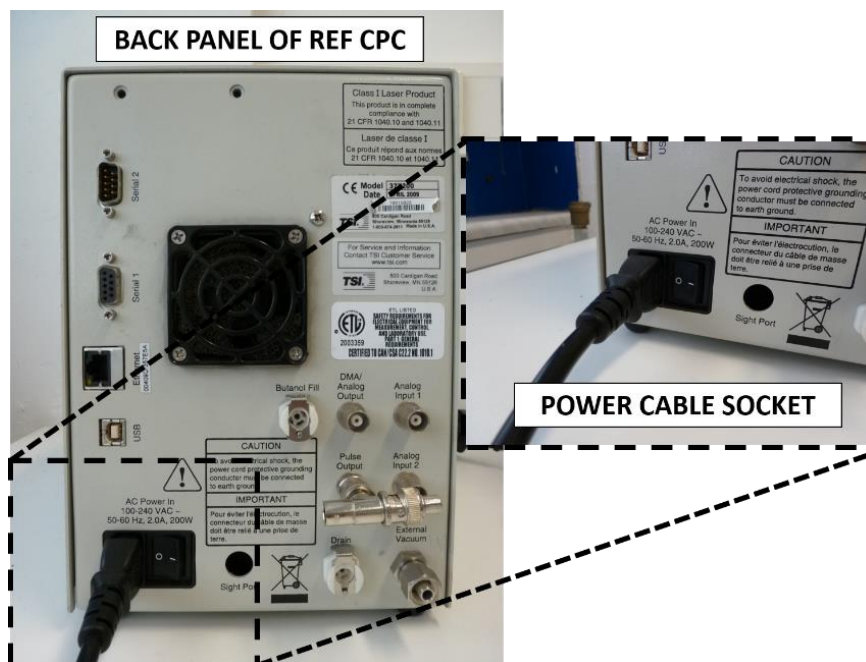


Figure 3

Connect the Ref CPC to a vacuum pump using the white tube. You may use the same vacuum pump that is connected to the MPSS.

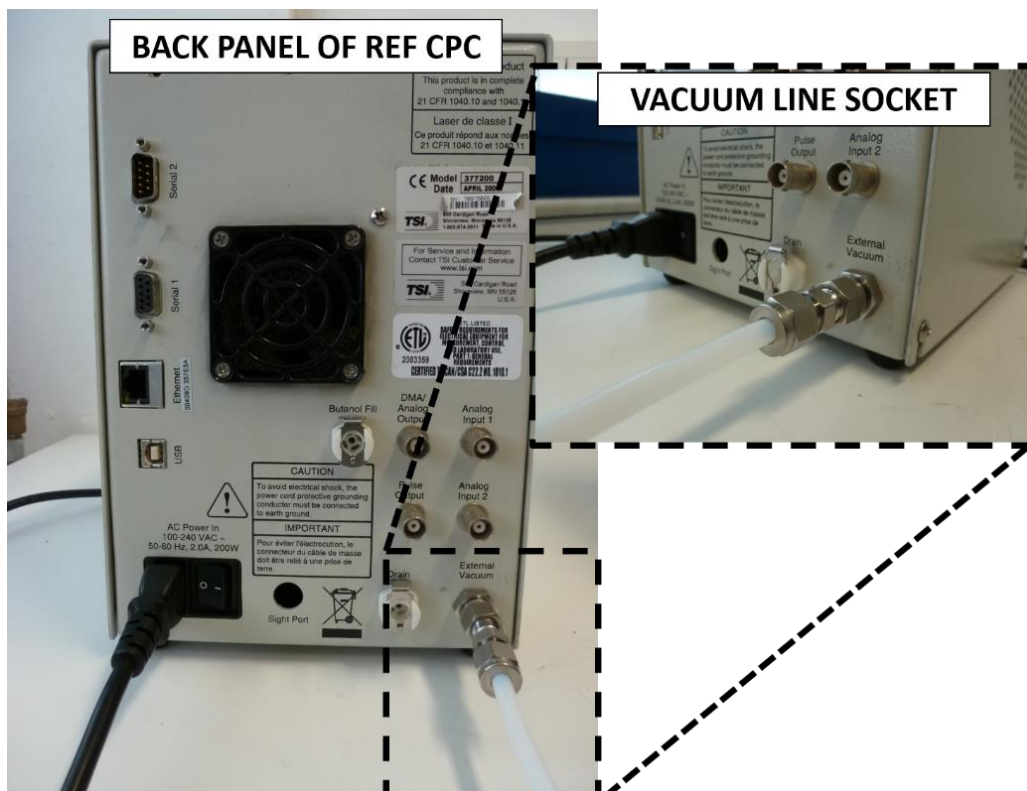


Figure 4

Connect the Ref CPC and MPSS to the inlet system using the “Y-splitter” and the black tubes. Take the first black tube and connect one end to the inlet of the Ref CPC. Take the second black tube and connect it to the inlet of the MPSS. Connect the ends of both black tubes to the angled legs of the “Y-splitter”. Take the third and last black tube, connect one end to the last open part of the Y-splitter. Then connect the other end of this black tube to the main inlet. Make sure you follow the correct orientation of the Y-splitter as shown in the image below. **Note: Use only TROPOS provided materials for this set-up.**

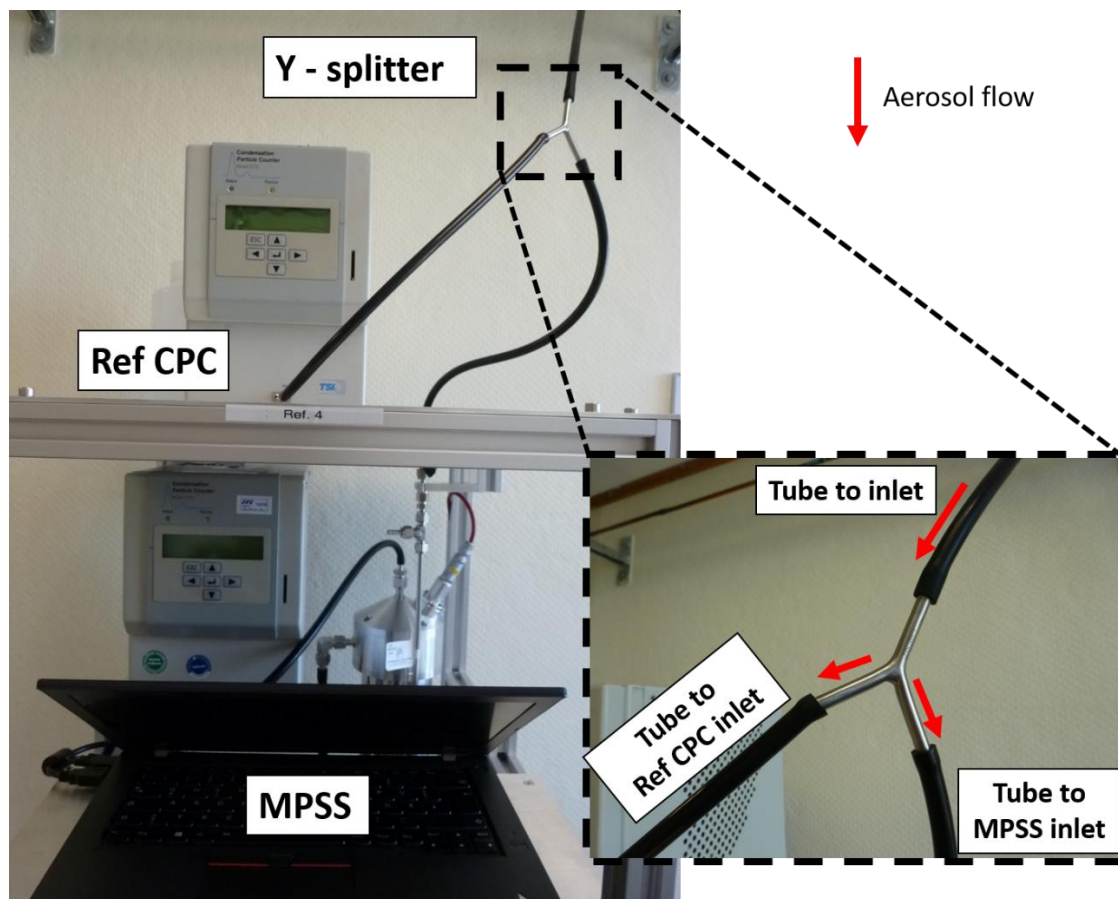


Figure 5

Connect the butanol bottle with the label “CPC FILL bottle” to the back panel of the Ref CPC to fill it with butanol.

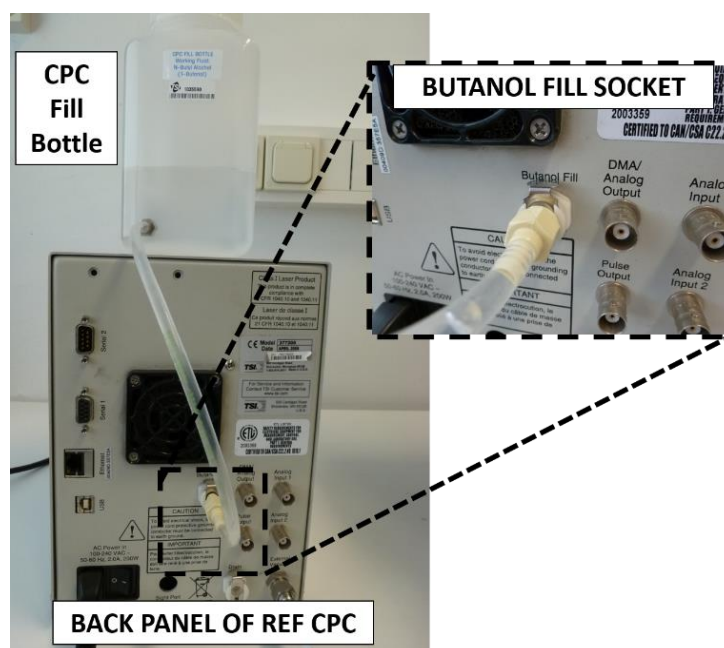


Figure 6

If there is no aerosol dryer in the main inlet system, you need to activate the “water removal” function which can be found in the “USER SETTINGS”. Connect the butanol bottle with the label “DRAIN BOTTLE” to the back panel of the Ref CPC in the port labeled “DRAIN”.

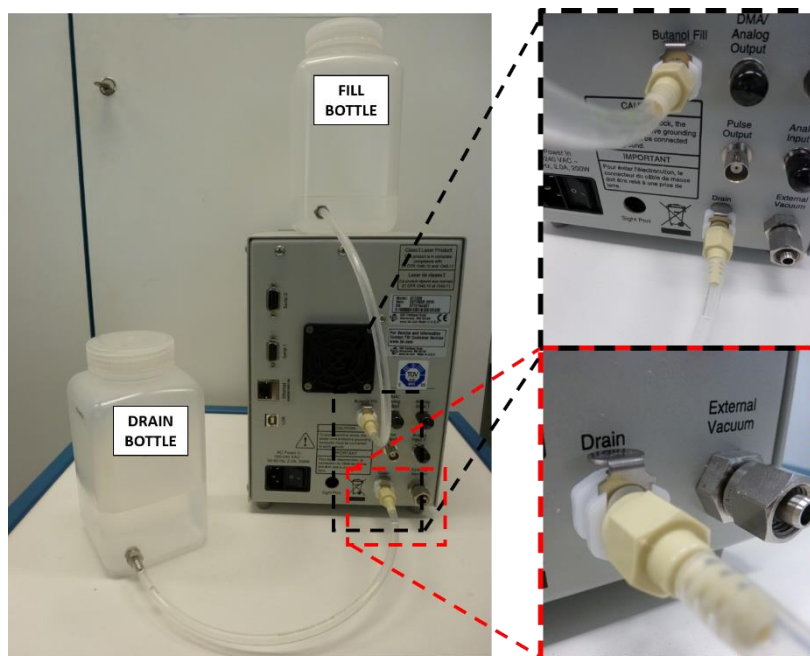


Figure 7

Switch on the Reference TSI CPC. It takes minimum 10 minutes to warm up. The warm up process is shown on the display of the Ref CPC.

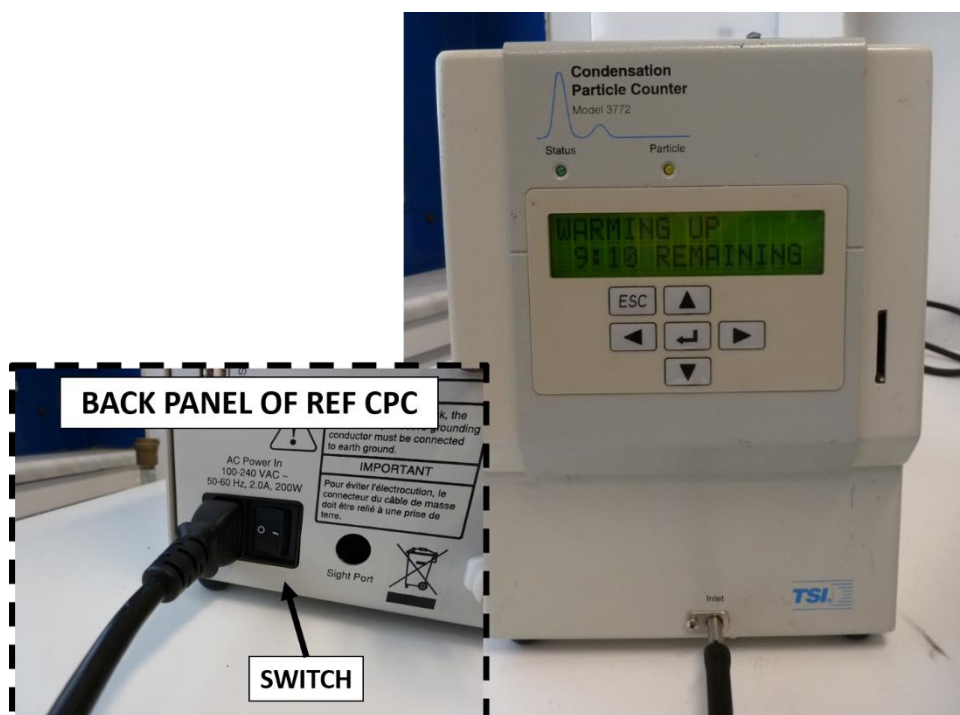


Figure 8

Check if the “status –LED” on the front panel of the RCPC is **green**. If not, check the status points of the RCPC or contact TROPOS.



Figure 9

Zero check. Remove the end of the black tube connected to the main inlet. Use the blue filter or “zero filter” and place it in this open end. Check over 30 minutes that both instruments get a clear zero count.

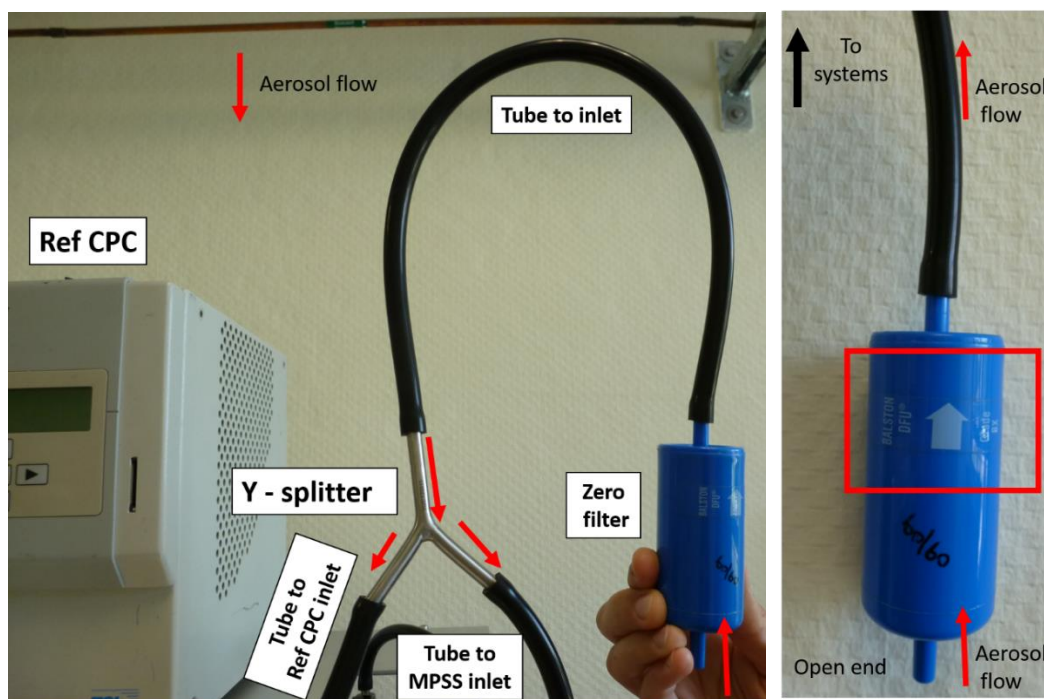


Figure 10

Flow check. Measure the flow of EACH SYSTEM. For the Ref CPC, the flow should be approximately 1 L/min. Take note of the measured flow.

Checklist – before shipping to the next station

Instructions:

1. Dry the Ref CPC: Run the Ref CPC minimum 24 hours with empty butanol bottle.
2. Turn off Data Logging.
3. Turn off Ref CPC. Disconnect all the tubes and cables. Place back dirt caps.
4. If necessary, empty Fill and Drain bottles
5. Data submission:
 - 5.1. Process the MPSS and RCPC Data:

Create a time series of the data from the MPSS system (including all corrections):

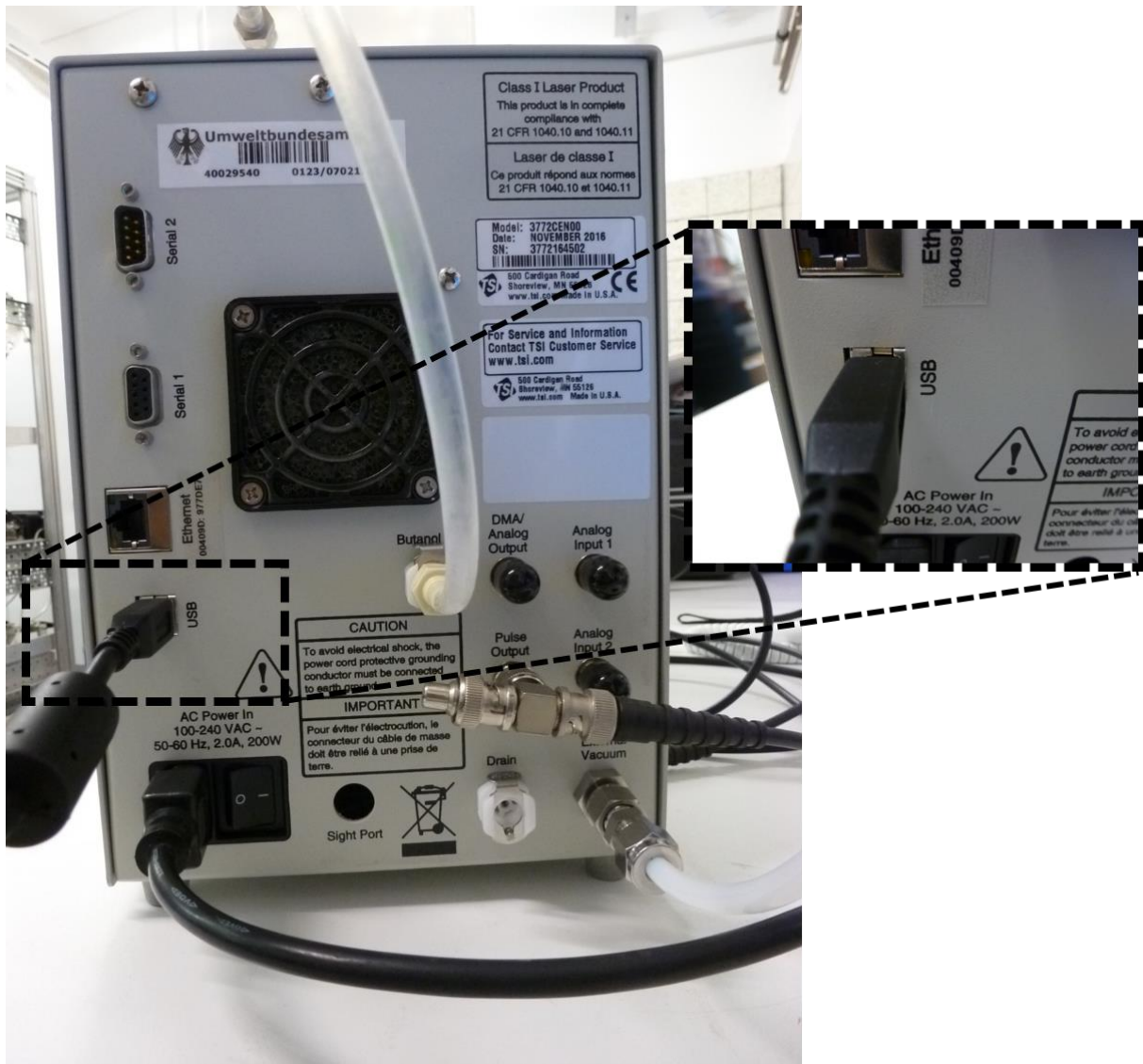
First column: Date and Time

Second column: Concentration (N 10 -800 nm) -> if Different please right down the integration range!
 - 5.2. Fill out the form on the website together with the data submission.
6. Collect all materials and place in the box.

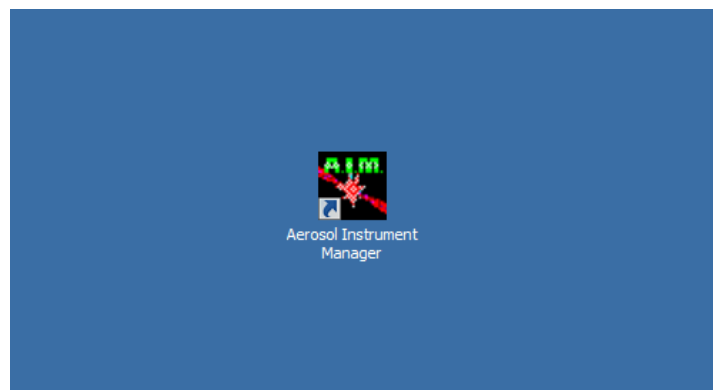
Data logging with TSI Software over USB

A CD containing the TSI software is included in the Box. Please install this software on the computer or laptop where you want the data to be logged.

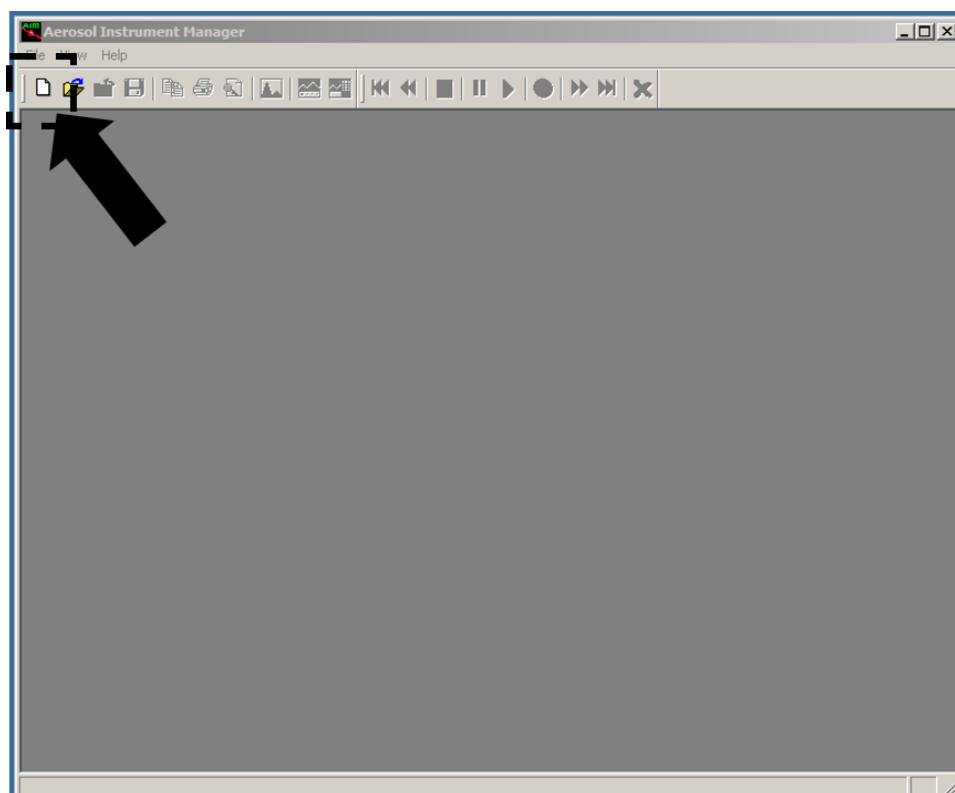
Connect the RCPC to the laptop/computer using the USB cable provided in the box.



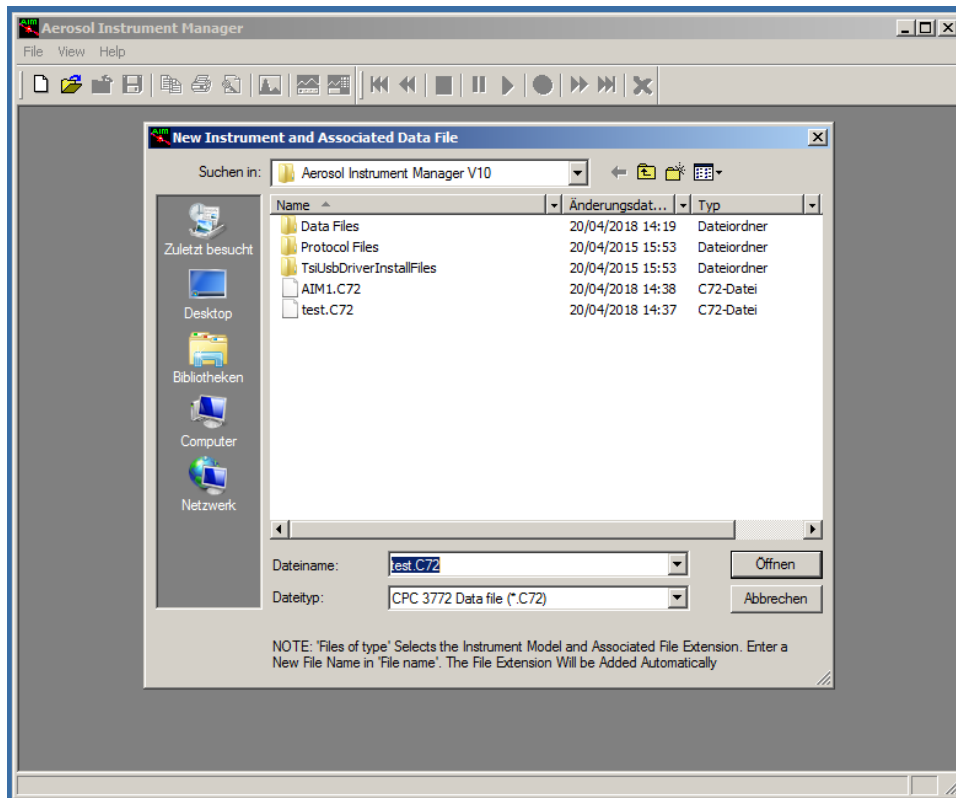
Open the TSI Software.



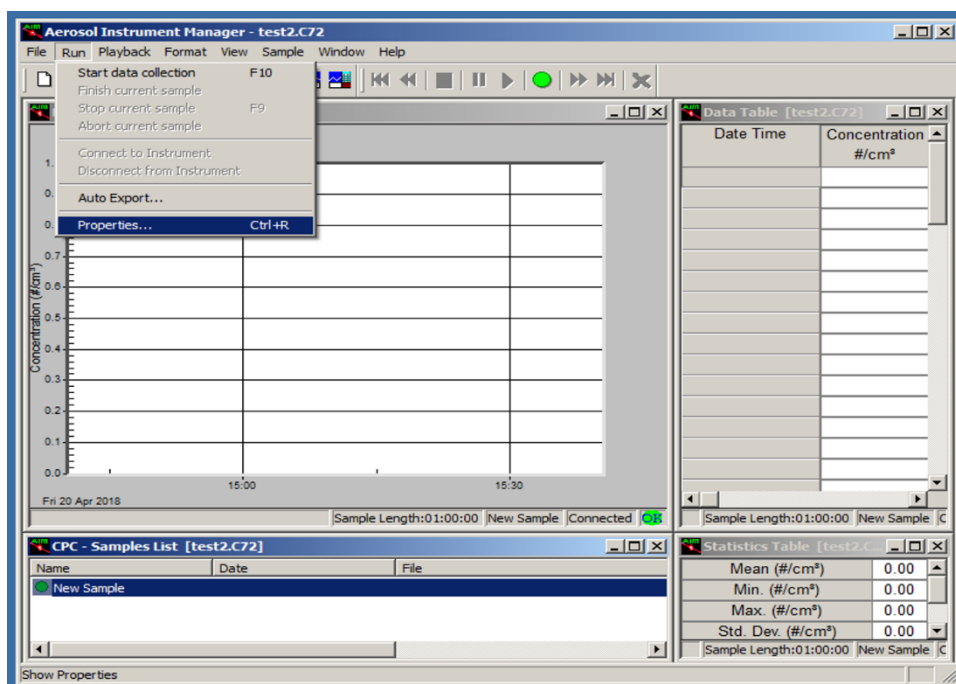
Start a new data logging by clicking the “New” icon.



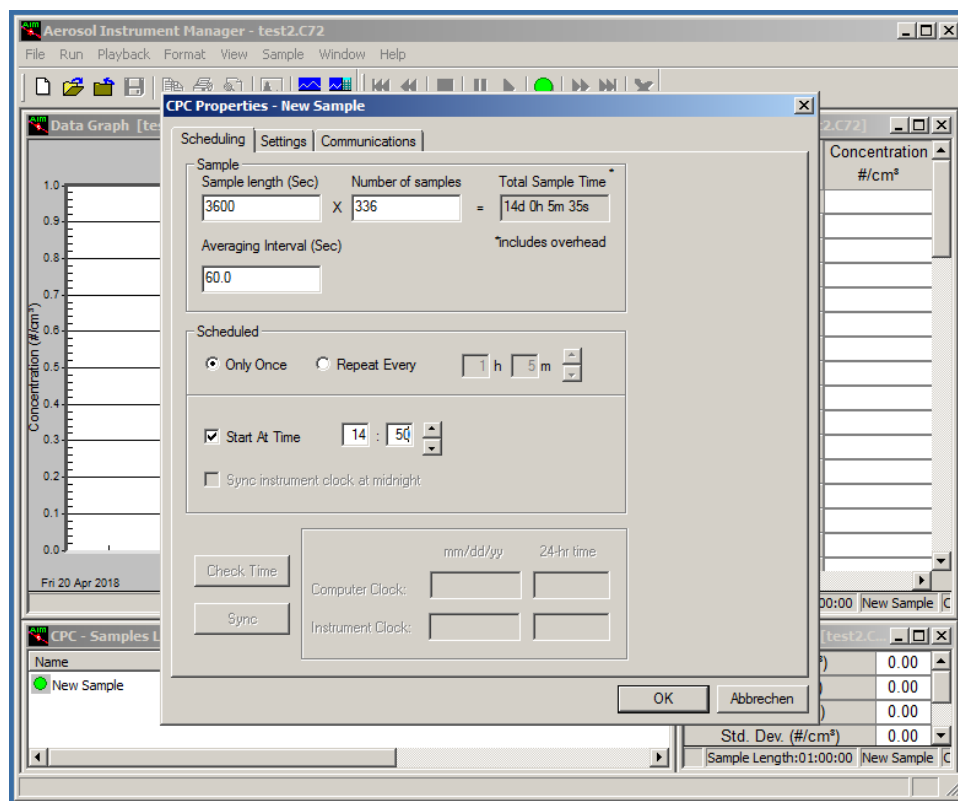
A window will open prompting you to choose a folder where the data should be stored. Please make sure that the data type saved is *.C72.



Configure the sampling settings. Click “Run” and choose “Properties”.



Enter the following settings for sampling and click “OK”. Set the start time at full 5 minutes time stamp: 00:00 or 00:05, etc. These settings mean that the TSI software will log data in 1 day with 60 seconds interval for 14 days.

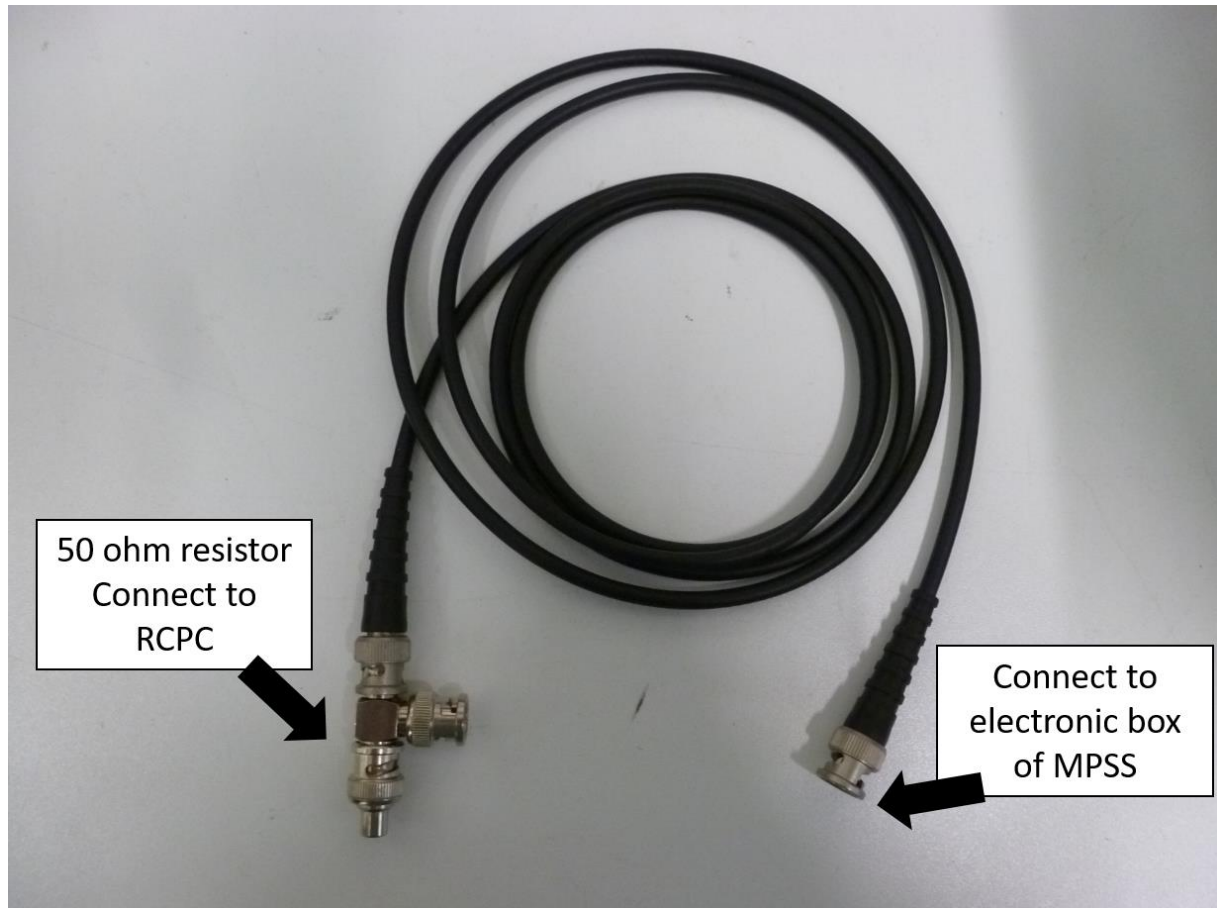


After the intercomparison period, please export the data into an excel file with two columns: one for time and one for concentration.

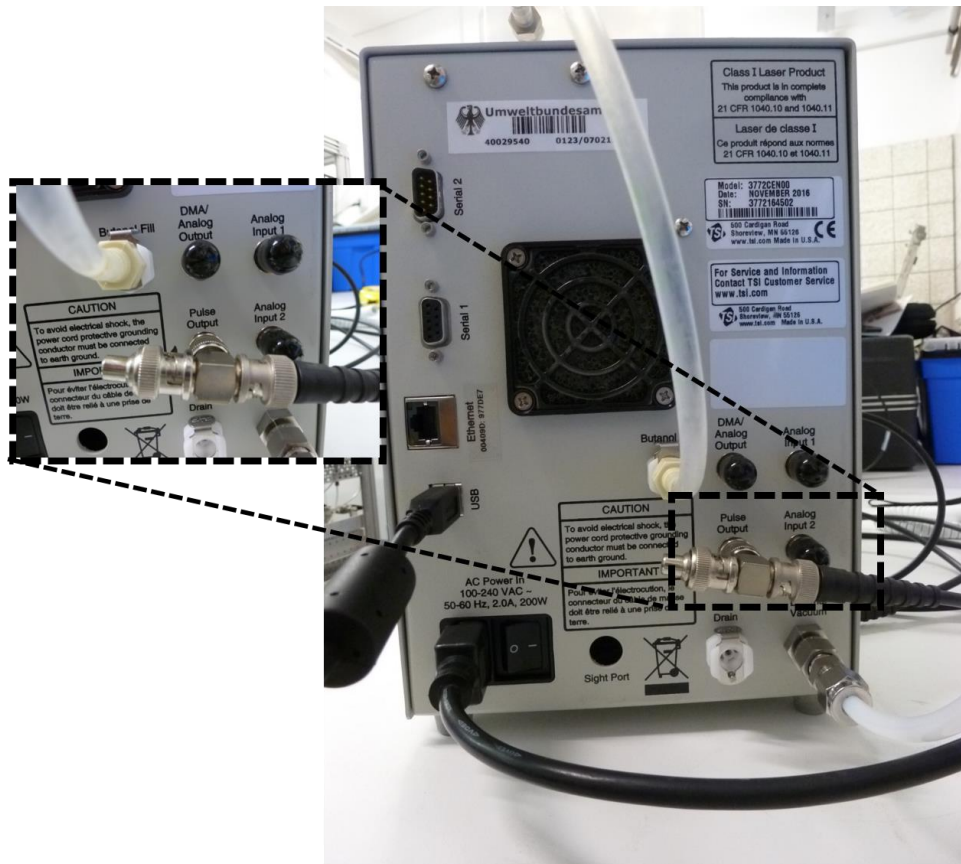
Data logging with BNC cable over TROPOS Software

This method is applicable to stations with TROPOS MPSS Systems. The data from the RCPC can be logged using the TROPOS MPSS software. To start this data logging, the “SCAN” program of the MPSS must be closed at first.

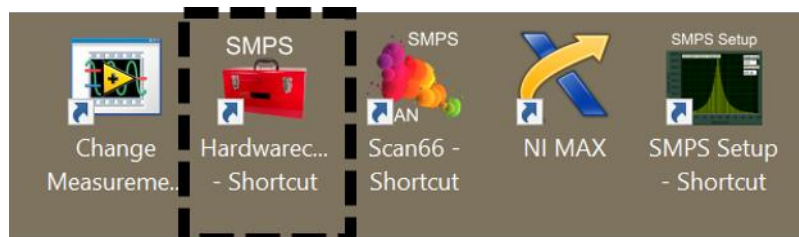
A BNC cable is included in the box. One end connects to the electronic box of the MPSS labelled as “Counter 1”.



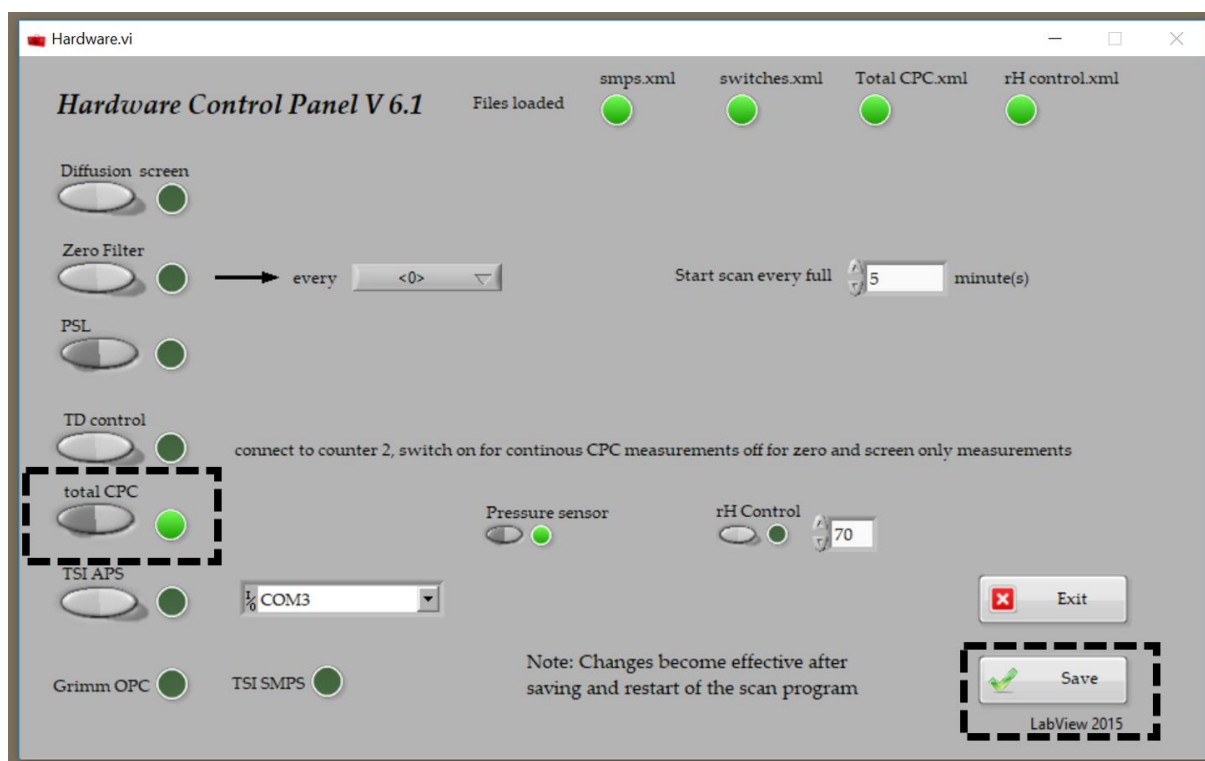
The other end, which has a 50 ohm resistor, connects to the RCPC in “Pulse Output”.



On the desktop, open the “Hardware Control” program.

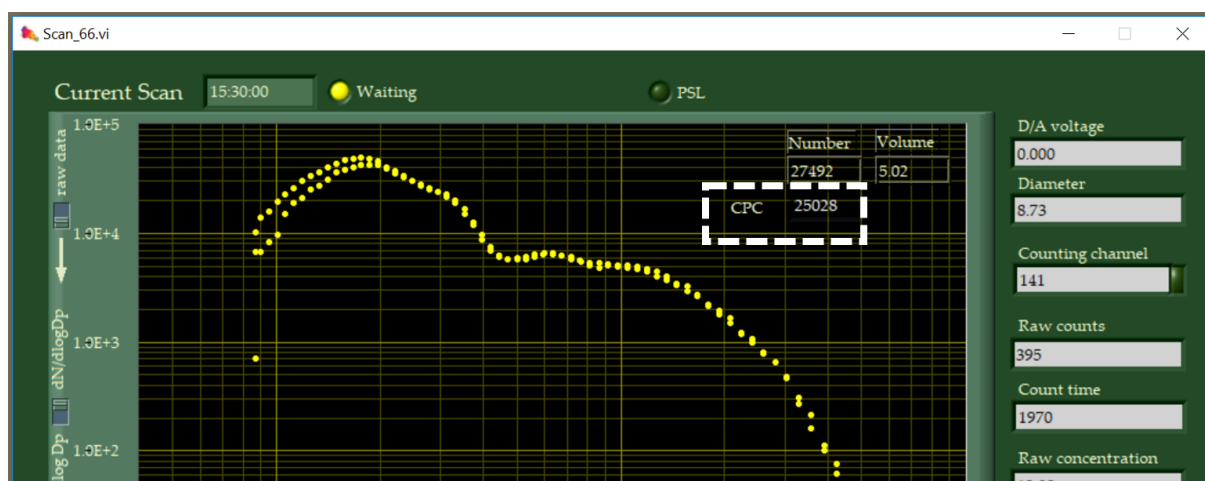


Turn on the Total CPC data logging (which should turn bright green) and click **SAVE**.



A window will pop out asking for a code. **The code is 42.**

Start the “SCAN” program again and wait until the program registers the RCPC which is indicated by the concentration appearing on the interface after one full scan.



To make sure that the RCPC is logging, check the diagnostic file. A new column should be logging the data from the RCPC.

Data logging with SD card

Due to a TSI-CPC software problem, it is necessary to restart the data logging twice per week, e.g. Monday and Friday. Laboratory tests showed a maximum logging time with the SD memory cards of five days. If it is possible, **don't use** this method to log the total concentration.

Place the SD Card in the slot on the front panel of the Ref CPC.



Figure 1

Change the “Data Averaging” on the CPC to **60 s**. For this, you have to go to the “settings mode”. Press the “down” button until you see “USER SETTINGS: TO VIEW” on the display. Press the middle button to select. Press the “right” button until the display shows 60 s.

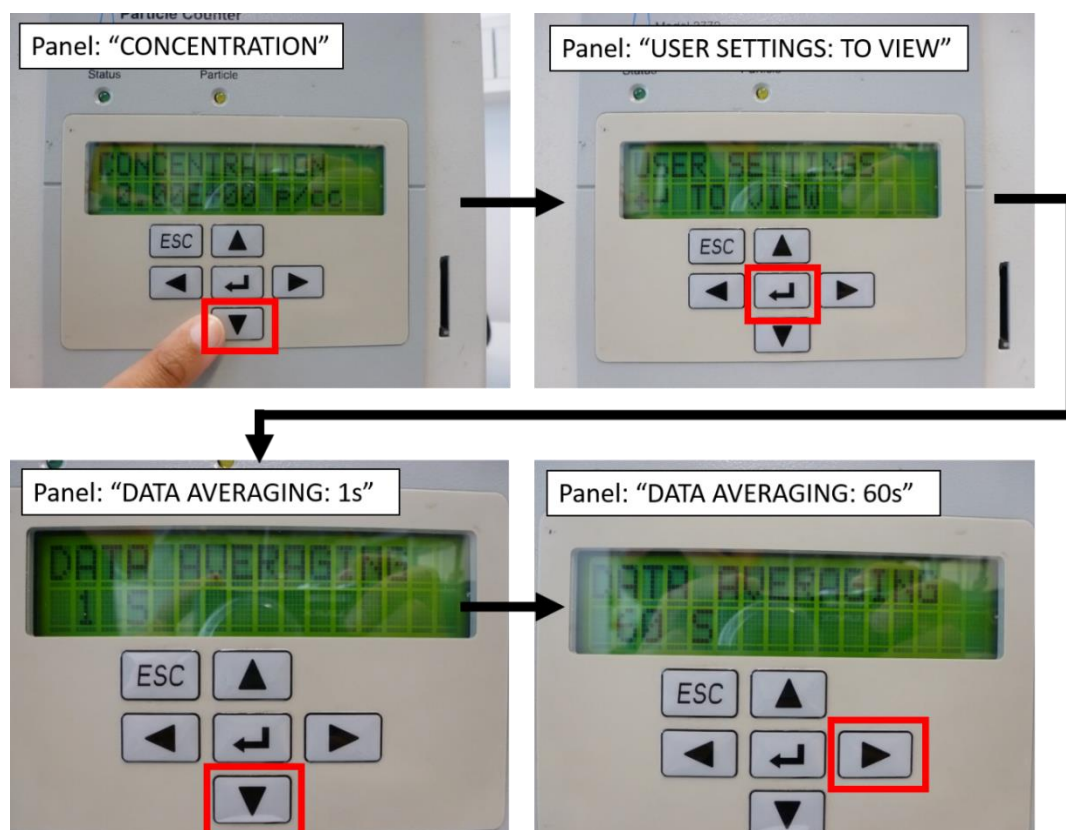


Figure 2

Start data logging by pressing the "down" button again until "DATA LOGGING:OFF" is displayed. Press the "right" button to turn the data logging ON. Once done, press the ESC button to return to the main display: "CONCENTRATION":

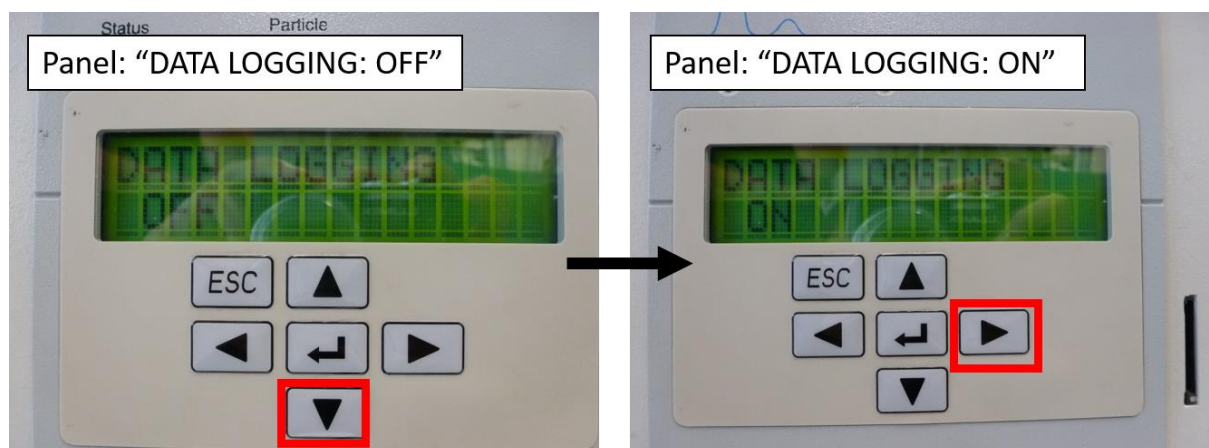


Figure 3