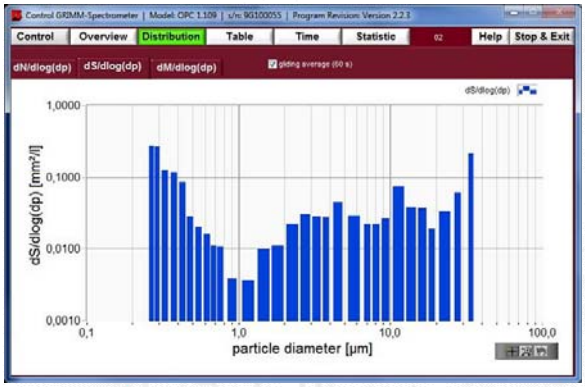
GRIMM AEROSOL Technik GmbH & Co. KG

GRIMM Software

for

Optical Particle Counter

Portable Aerosol Spectrometer 1.108/1.109



1 GENERAL INFORMATION 4

Annotation 4
Meaning of the used symbols: 4
System requirements 5
Demo mode / licence file 5

2 INTRODUCTION 6

3 SOFTWARE INSTALLATION 7

Step_1_LabView-Runtime-Environment-and-VISA 7
Step_2_Grimm-Spectrometer-Software 9
Step_3_License-File-for-Software 12
Step_4_USB-Driver-for-Grimm-Data-Cable 13

4 CONNECTING THE SPECTROMETER TO THE PC 14

5 PROGRAM FEATURES 15

6 STARTING A MEASUREMENT 18

Starting a measurement 18
Tab Overview 21
Tab Distribution 22
Tab Table 23
Tab Time 24
Tab Statistic 25

7 SAVE AND OPEN MEASURED DATA 26

Save Data 26
Open Data 28

Contents:

Figure 3-1: USB flash drive folders 7
Figure 3-2: Installation process of the LabView Runtime 8
Figure 3-3: Setup File 9
Figure 3-4: End User License Agreement 9
Figure 3-5: Software components to install 10
Figure 3-6: Destination folder 10
Figure 3-7: Completing the installation 11
Figure 3-8: Location of the license file 11
Figure 3-9: Installed software 11
Figure 3-10: Location of the license file 12
Figure 3-11: Driver file 13
Figure 5-1: Control window 15
Figure 5-2: Graph menus 16
Figure 5-3: Graph context menu 16
Figure 5-4: Graph plot menu 17
Figure 5-5: Graph zoom menu 17
Figure 6-1: Scan Ports 18
Figure 6-2: Select serial port manually 18
Figure 6-3: Control view 19
Figure 6-4: Select time interval 19
Figure 6-5: Synchronize Time 19
Figure 6-6: User settings 20
Figure 6-7: Control Buttons 20
Figure 6-8: Tab Control 21
Figure 6-9: Tab Overview 21
Figure 6-10: Tab Distribution 22
Figure 6-11: Tab Table 23
Figure 6-12: Tab Time 24
Figure 6-13: Tab Statistic 25
Figure 7-1: Main window Control - Memory Card 26
Figure 7-2: Read data from memory card 26
Figure 7-3: Read data from memory card 26
Figure 7-4: Choosing the destination for saving data at 27
Figure 7-5: Choosing the folder for saving data at 27
Figure 7-6: Convert and save memory card data 27
Figure 7-7: Choosing a file to open 28
Figure 7-8: Opening the file 28

1 General information

Annotation

Do not operate the hardware and software until you have carefully read these operating instructions! The manufacturer cannot be held liable for damages caused by improper operation, use, cleaning, or operating errors!

Many software and hardware designations mentioned in this manual are registered trademarks and are to be treated accordingly. The author's intention is to provide you with as complete and accurate information on the described hardware and software as possible. However, Grimm Aerosol Technik do not guarantee absolute completeness and accuracy of the following information thus foreclosing any entitlement to damages, neither direct nor consequential, resulting from the use of this manual and / or the use of the software and hardware. Moreover, we do not guarantee the full functionality of this software under Windows Vista. Grimm Aerosol Technik will not be held responsible for damages resulting from patent infringements or abuse of a third party's rights.

Due to continuous improvements to our hardware and software, minor discrepancies may occur with respect to the instructions and illustrations of this manual as compared to the actual hardware and software. If this is the case, please ask for the latest version of this manual.
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Meaning of the used symbols:

In this manual the following pictograms are employed to indicate important hints, advice, and warnings.

This pictogram indicates useful hints to facilitate and optimize your working process.

This pictogram indicates potential dangers that may lead to malfunctions or even damage to the software and / or hardware and offers advice as to how such dangers can be avoided.

System requirements

To successfully install and use the GRIMM software the minimum system requirements are as follows:

- operating system: Windows 2000, Windows XP, Windows Vista, or Windows 7
- LabVIEW 8.6.1 development system <Grimm Software>
- 5MB free disk space (200MB if LabVIEW 8.6.1 development system is not installed yet)
- USB-RS232 driver if you use the USB-to-RS232 cable <Grimm Software>
- license file according to the serial number of the spectrometer (provided with the USB flash drive).

Demo mode / licence file

To use all program features without limitation, you need a licence file for each hardware device. This licence file must be in the same folder as the installed program executable. If the program does not find such a licence file, it will run in **Demo Mode**. You can still test all program features, but there are two limitations:

- max 25 measurements/scans can be stored in one file
- the program will stop after 1h.

A licence file can be purchased at:

GRIMM Aerosol Technik GmbH & Co. KG
Dorfstrasse 9
83404 Ainring
Germany

Phone: ++49 / 86 54 / 5 78 – 0
Fax: ++49 / 86 54 / 5 78 – 35
Email: software@grimm-aerosol.com
Homepage: www.grimm-aerosol.com

2 Introduction

This manual provides you with all necessary information on how to obtain accurate measurements, how to store the measurement results, and how to convert the data to your favored form for subsequent analysis of the particles measured in ambient air.

With this state-of-the-art software you will be able to easily conduct your measurements as it is almost self-explanatory. This software was specifically designed to simplify your measurements and to safely store this valuable data. There is no need for complicated settings – just follow the instructions step by step.
The following chapters will guide you through the use of the software and show you how to set it to your personal demands.

Make sure to carefully read this manual to be able to conduct reliable measurements and to properly use the purchased software.

Should you require any assistance with regards to this software where this manual does not provide appropriate troubleshooting, please contact:

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Dorfstrasse 9
83404 Ainring
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E-Mail: software@grimm-aerosol.com
Homepage: www.grimm-aerosol.com

3 Software Installation

This chapter guides you through the installation process of the new developed GRIMM Spectrometer Software 1178 in order to run the spectrometers 1108, 1109, 1129, 1209, and 1320 (even EDM models within “Count-Mode”) as well as to evaluate all measured data.

Please note: This guidance uses screenshots of the software version 2-2-3. For later versions, all installation steps have to been done accordingly.

The provided USB flash drive contains four folders; the content of each folder has to be installed sequentially.

Figure 3-1: USB flash drive folders

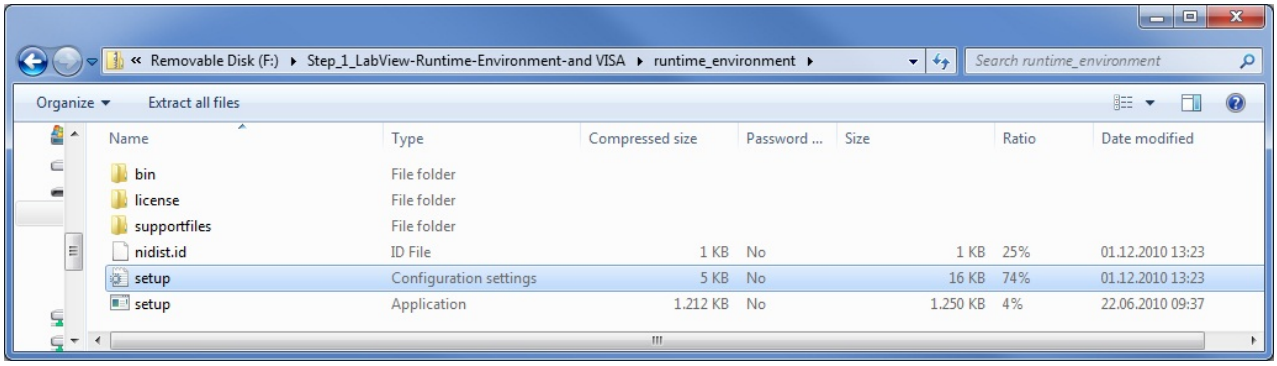
Name and content of the folders:

- Step_1_LabView-Runtime-Environment-and-VISA
- Step_2_Grimm-Spektrometer-Software
- Step_3_License-File-for-Software
- Step_4_USB-Driver-for-Grimm-Data-Cable

Step_1_LabView-Runtime-Environment-and-VISA

The packed zip-file **runtime_environment.zip** contains three modules: LabView Runtime Engine 2011, its previous version 8.60, and the so-called VISA module. The first two files are necessary that the LabView programs are executable on a PC, and the VISA module enables the interface communication (USB cable, RS-232, COM ports, etc.).

Open the folder Step_1_LabView-Runtime-Environment-and-VISA and execute the file setup.exe



Please follow the instructions; all three modules described above will be installed onto your PC.

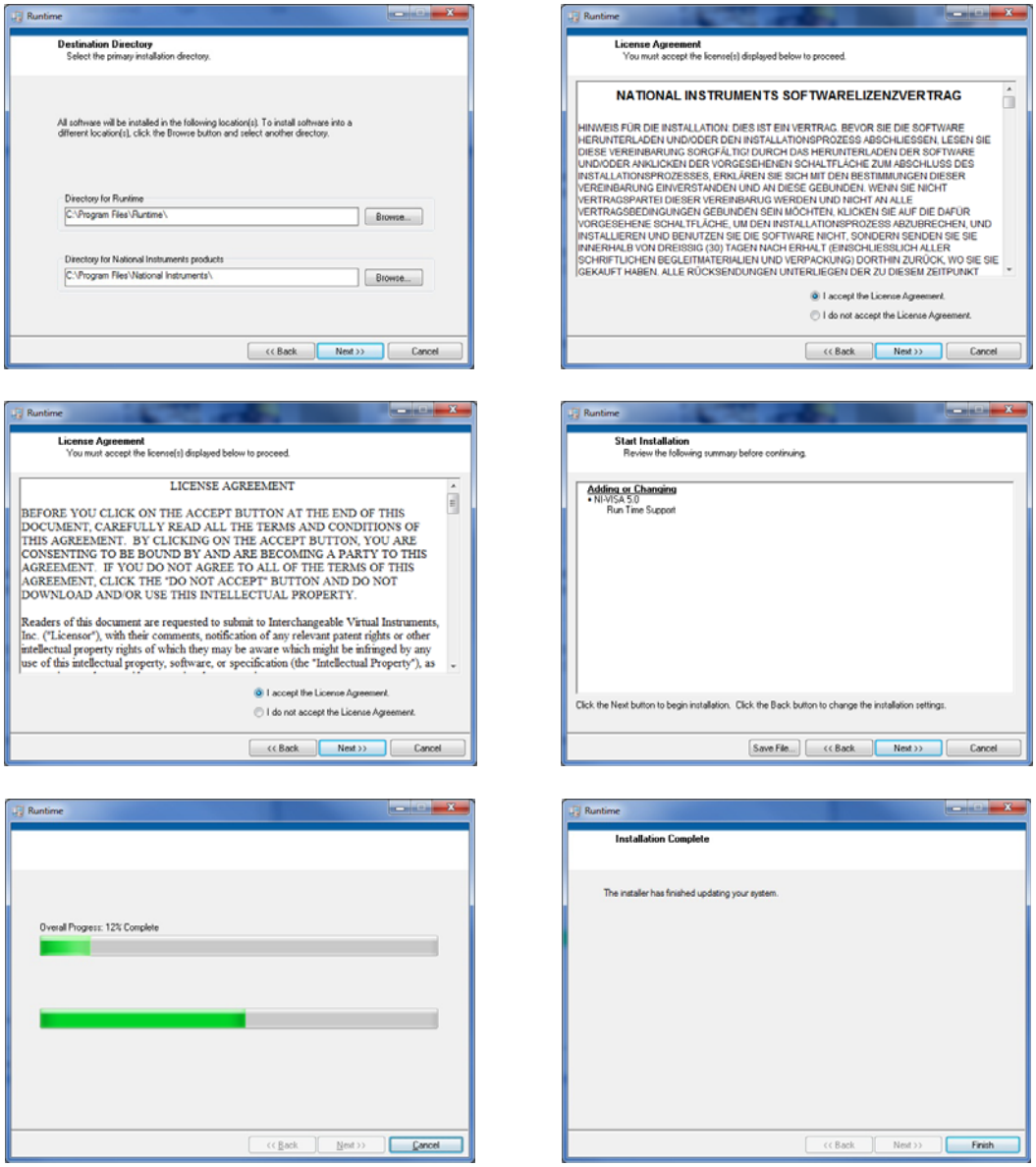


Figure 3-2: Installation process of the LabView Runtime

After installation you will be asked for restarting your PC. Restart your PC **LATER** after „**Step 2**“.

Step_2_Grimm-Spectrometer-Software

After you have installed the LabView Environment, please proceed with the installation of the actual software. This is the Grimm Spectrometer Software 1178, e.g. version **Install_Spectrometer_V_2_2_3.zip**.

Execute the setup file.

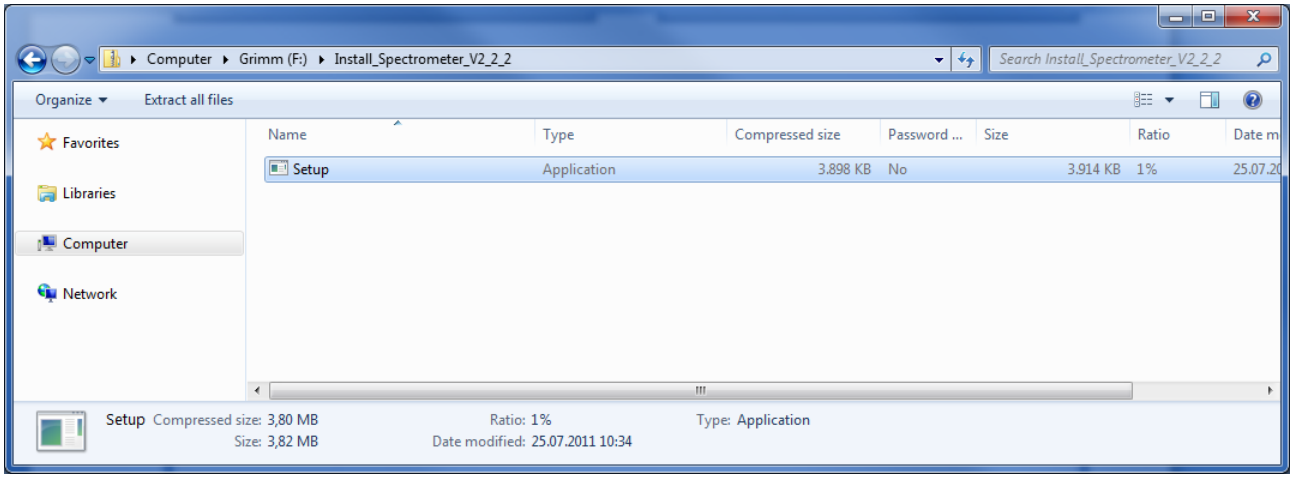


Figure 3-3: Setup File

For this installation process you need to have administrator rights.
The User Account Control (UAC) might show up warning you, that an unidentified program wants access to your computer. If you want to continue with the installation process, click on “Allow”.
The setup process starts with the End User License Agreement, the so-called “EULA”. Please read the whole EULA carefully (scroll down the dialog box for the whole text) and continue if you agree with the terms of Grimm Aerosol Technik GmbH & Co. KG by clicking on “Agree”.

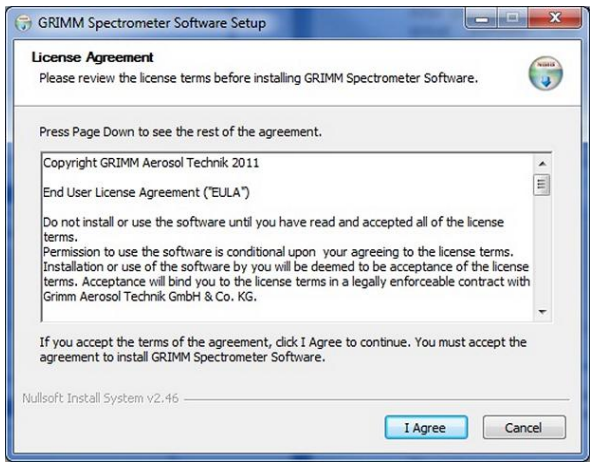


Figure 3-4: End User License Agreement

The second step is an information of what you are about to install. Please click on “Next” to continue.

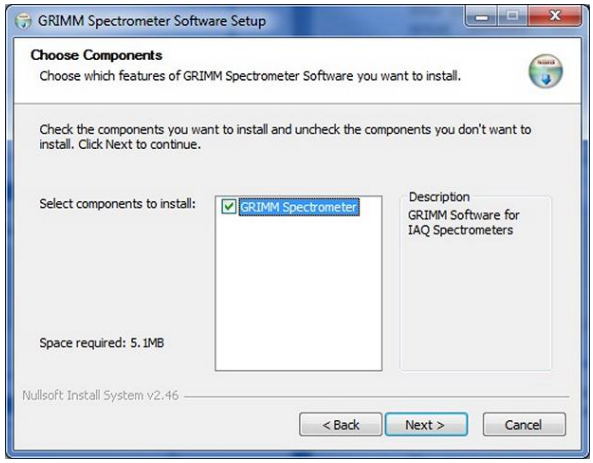


Figure 3-5: Software components to install

The setup automatically suggests installing the GRIMM Spectrometer Software into the path C:\Program Files\Grimm\Spectrometer. To install in a different folder, click “Browse…” and select a different folder. The setup now installs the program. Furthermore, the setup process creates an empty folder at C:\Grimm_Measurement_Data where your measured data can be stored at

The default path for installing the software is the directory
C:\Program Files\Grimm\Spectrometer
Another empty folder will be created at C:\Grimm_Measurement_Data. This folder is intended for saving your measured data.

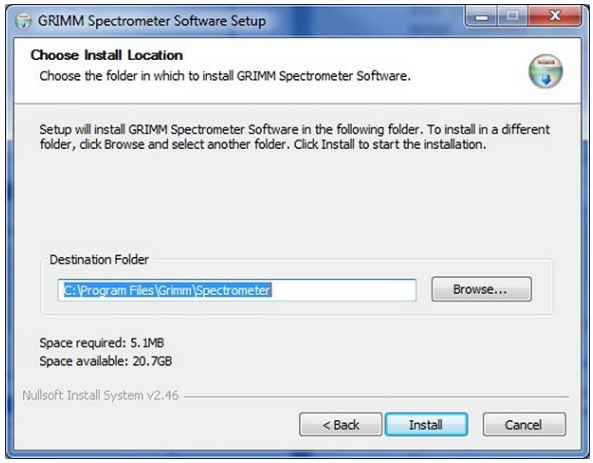


Figure 3-6: Destination folder

In order to complete the installation process, please click on “Finish”. In this last installation window you can choose if you want to start the software subsequent to the installation or not by setting on unsetting the checkmark. The setup process will automatically create a desktop icon.

Figure 3-7: Completing the installation

After you click on “Finish”, a further window will appear, advising you, that your measurement data has to be stored on the just created directory C:\Grimm_Measurement_Data because of the directory rights of Windows.

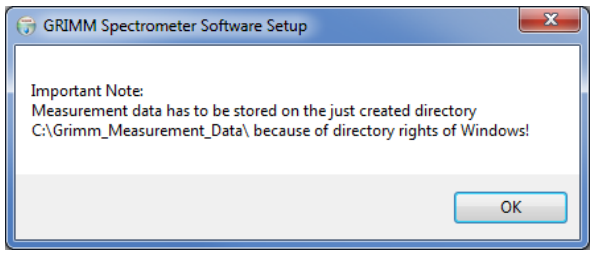


Figure 3-8: Location for saving measurement results

Depending on having the checkmark set or not in the previous window, the software will automatically start up after the installation is finished. You can also start up the program by clicking on the application file Spectrometer_V2-2-3 (Grimm logo in front of the file name) or via the shortcut on your desktop.

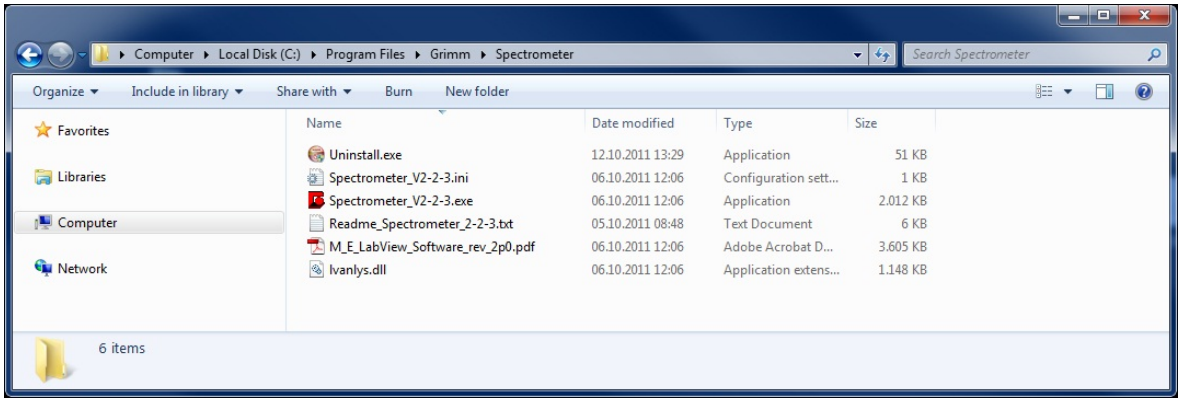


Figure 3-9: Installed software

Please note: The software is now ready to use as demo version. In order to use the full version (see **Step 3**), you have to purchase a license file.

Step_3_License-File-for-Software

Activating the full version.

Please note: all further explanations refer to the installation of the software into the default destination directory:

C:\Program Files\Grimm\Spectrometer

If you chose a different destination directory before (**Step 2**), please follow the instructions according to the file path you selected (location of the Spectrometer_V2-2-3.exe file).

In order to run the software 1178 as full version, you need to have a license file with the file ending *.lic. For GRIMM aerosol spectrometers the name of the license file is identical to the 8-digit serial number of the device, e.g. 8F100031.lic or 9G080012.lic. This license file has to be copied into the directory where the software has been installed at. The setup file is called Spectrometer_V2-2-3.exe (respectively a higher number for later versions) and is labeled by a red GRIMM logo.

Sometimes, the directory rights prohibit – as a safety feature of Windows – to directly drag files into the destination C:\ProgramFiles\.
When having an error message, that moving or copying the license file into the folder C:\Program Files\Grimm\Spectrometer\ is not possible, please copy your license file first from the USB flash drive onto your desktop, and then into the folder C:\Program Files\Grimm\Spectrometer\.

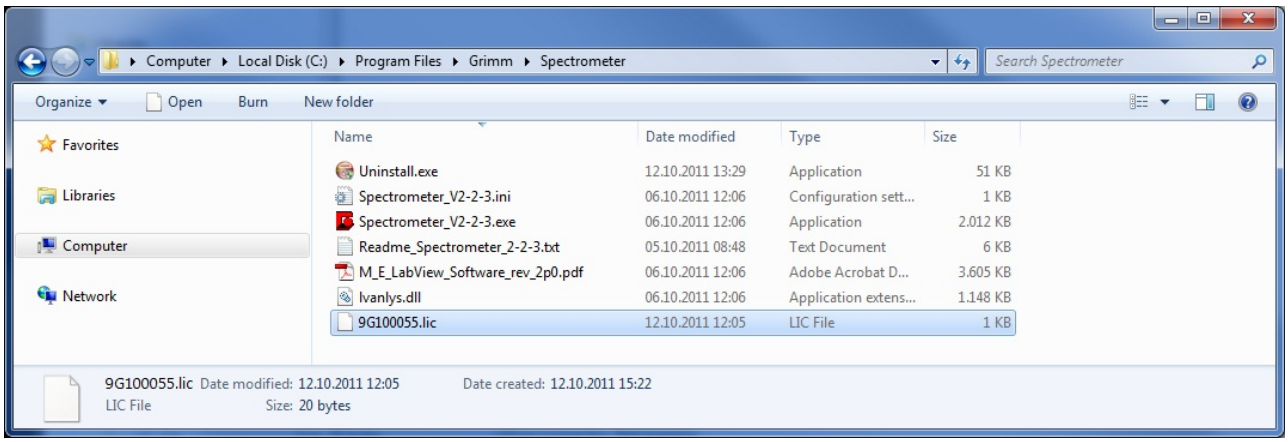


Figure 3-10: Location of the license file

When both files (*.exe and *.lic (here e.g. 9G080012.lic) are in the same directory, the demo version has been activated to the full version.

These files (*.exe and *.lic) can be moved into any other directory, for example if you operate several aerosol spectrometers, as long as you make sure, that both files remain together in the same directory. It is also possible to have several license files in one directory (together with the setup.exe file).

Step_4_USB-Driver-for-Grimm-Data-Cable

In order to enable the communication between your PC and the GRIMM aerosol spectrometer via the GRIMM data cable RS-232 to USB (catalogue number 1.141), you have to install a driver once. This device driver is on the provided USB flash drive in the directory Step_4_USB-Driver-for-Grimm-Data-Cable.

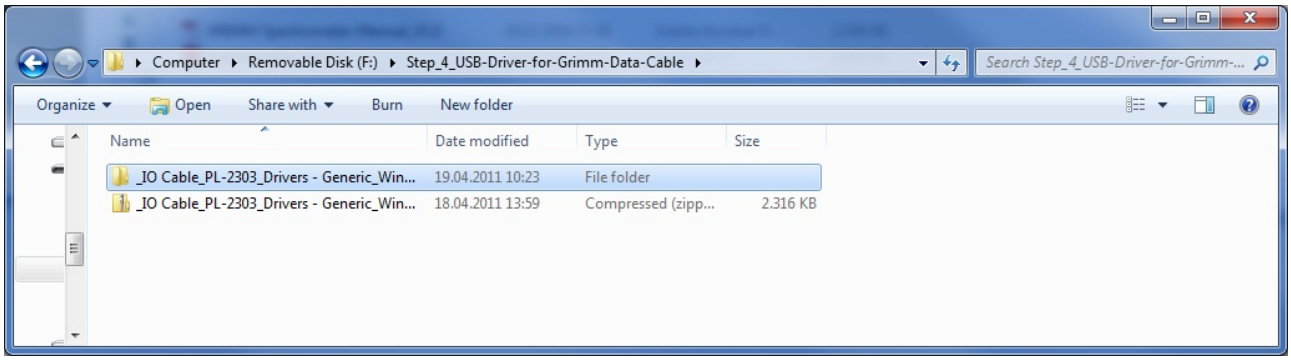


Figure 3-11: Driver file

Analogous to **Step 1** and **Step 2** extract the content of the zipped files and execute the application PL2303_Prolific-DriverInstaller_v130.

The driver will now be installed onto your PC. Your Windows operating system will recognize the GRIMM data cable automatically when connecting it to the USB port

Annotation:
Later versions of the GRIMM Spectrometer Software 1178 will be available for free on our homepage as download to upgrade your current version.

4 Connecting the Spectrometer to the PC

Connect the spectrometer to the PC either via serial-to-serial port cable or via USB-to-serial port cable. Then switch on the device. Please mind, that only a special GRIMM cable transmits data.

To guarantee a continuous operation, we recommend to hook up the instrument to the mains adapter instead of running it on battery power.

After switching on the instrument, wait for the filter test query to show up on the LCD of the spectrometer. This is a query as to whether or not the filter has been changed.

Filter changed: Key +	In case the filter was indeed replaced, respond by pressing the "+" key on the keypad of the instrument; this will reset the total sample volume and its corresponding dust mass to zero.
Filter not changed: Key -	If you have not replaced the filter, respond by pressing the "-" key on the keypad of the instrument; the instrument will continue measuring and adding up the total volume and the corresponding dust mass.

After responding to this question the spectrometer continues with its self-test. The self-test is being executed by the instrument prior to every instrument start in order to verify the proper functioning of the instrument.

The self-test takes about half a minute. After successful completion of the self-test, the instrument will display the message SELF TEST OK.

Should the LCD display “New Self Test”, please wait for the self-test to complete. If this message appears more than once in succession, the following message appears: FATAL ERROR PLEASE CHECK. In such a case please consult the instructions provided in the manual for the spectrometer.

If you are using our meteorological sensors (1153FH for temperature and relative humidity or 1154 for temperature, relative humidity, and wind speed), please make sure, that you have this sensor connected already in stand-by mode of the instrument before making all necessary settings in the program. Otherwise, if you connect the sensor afterwards, the software will not recognize the sensor and thus show no data.

5 Program features

After starting the software (C:\Program Files\Grimm\Spectrometer\Spectrometer Software V2-2-3 or by double-clicking the shortcut on the desktop) the following start window appears.

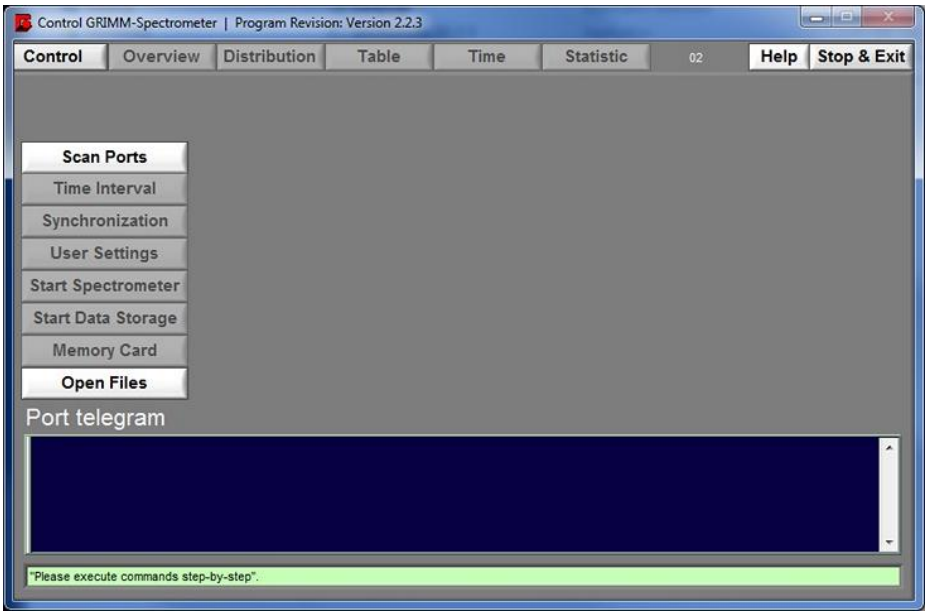


Figure 5-1: Control window

This window is the default start window. The program also indicates you, which instrument you are using by its color. After scanning the ports, the software recognizes the connected spectrometer. If you have connected a spectrometer model 1108, it remains grey; if you connected a spectrometer model 1109, it turns into red.

The software leads you through the program step by step. Buttons and features are disabled and greyed if different settings have to be made before. Information about the current program status or the next step to do is shown at the bottom of the Control window.

The measurement results are visualized by several graphs. These graphs can be modified using the context menu (press right mouse button), the plot menu (press left mouse button while pointing on a plot of the plot legend) or the zoom menu.

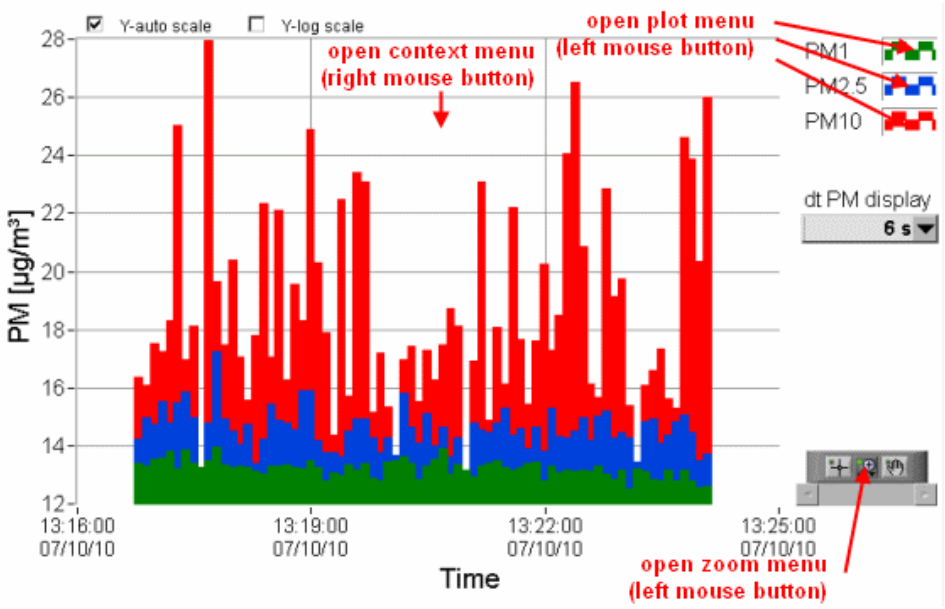


Figure 5-2: Graph menus

One of the most outstanding features are the "**AutoScale**" settings. If you disable "**AutoScale**", you can edit the minimum and maximum values of the corresponding axis to the axis values you favor. If you enable "**AutoScale**", the graph will be updated with each measurement cycle. If you change to a different tab and go back to the previous one where you changed the layout settings, the default program settings are restored.

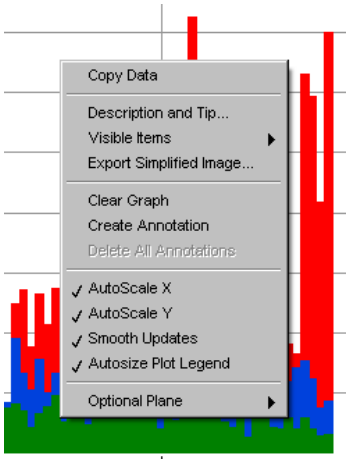


Figure 5-3: Graph context menu

You can change the view of each plot separately via the plot menu. Either you select a plot style in the sub menu “**Common Plots**”, or you can set single items of the selected plot in the other sub menus. If you restart the software, the default program settings are used.

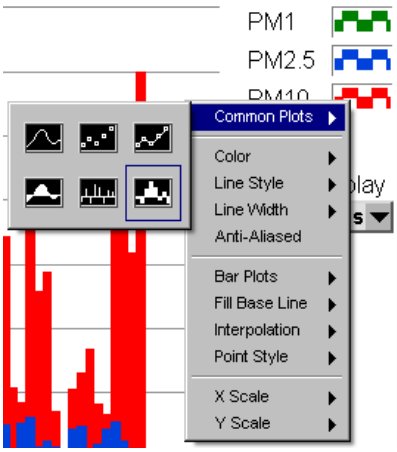


Figure 5-4: Graph plot menu

The zoom menu should be used only if you stopped the measurement or you disable “AutoScale X” and “AutoScale Y” first. Otherwise the zoom settings will be reset with each new measurement value. If you zoom in into the graph, you can use the scrollbar for horizontal scrolling only. If you restart the software, the default program settings are used.

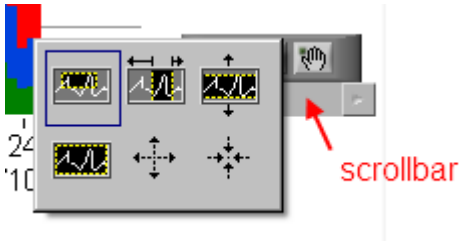


Figure 5-5: Graph zoom menu

6 Starting a Measurement

Starting a measurement

Please press Scan Ports to detect the connected devices and to check for valid licence files. If more than one spectrometer is detected, a window pops up where you can select a device. If the program does not detect any connected device, a window pops up where you can select the port manually.

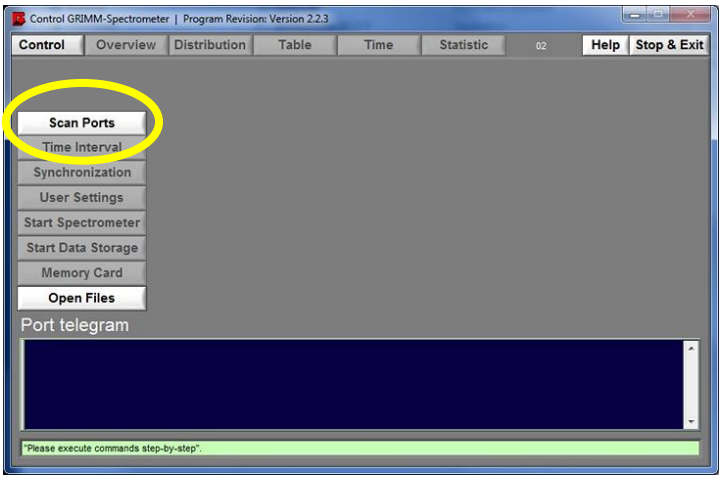


Figure 6-1: Scan Ports

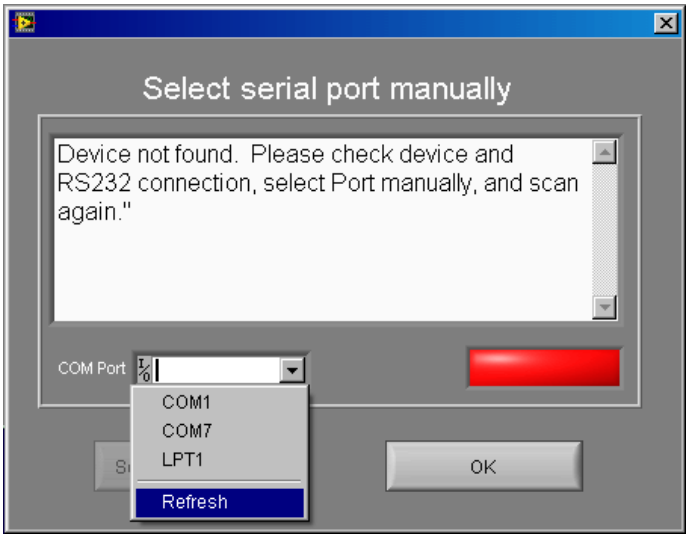


Figure 6-2: Select serial port manually

Please check the cable connection and select the port manually. If the port is not listed, select Refresh. If the port is still not listed, please check Window´s COM-port list (Device Manager → Ports)
If the program detects a device and there is no valid licence file found, you can still run the program in demo mode.

Depending on the detected device, the window colour changes and some features will remain disabled or even invisible. The device type (model) is shown in the header line. The green bottom line gives you some hints what to do next.

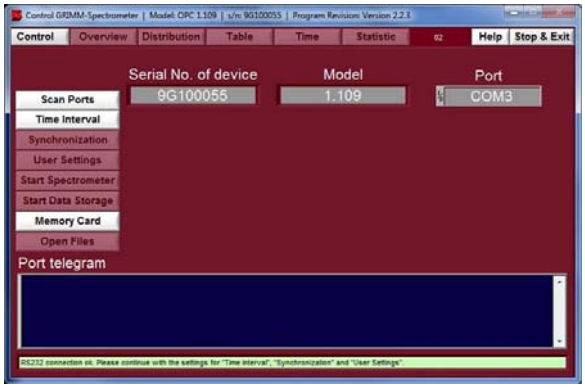


Figure 6-3: Control view

Next step is to select the time interval. If you select a time interval longer than 6 seconds, the device will still measure and show results every 6 seconds on the display, but it will send average values to the program and the memory card depending on the selected time interval.

Figure 6-4: Select time interval

The device internal timer is very accurate. You only need to synchronize the device-time with the PC-time every 3 months or when you change the time zone only. To compare the current PC and device time, please press Get Current time. If you want to synchronize the OPC and PC time, please press the button Synchronize.

Figure 6-5: Synchronize Time

In order to execute a measurement, to store the measurement results on the hard disk, and to use all visualization features, you have to specify some user settings. All user settings and some additional information about the used device and program version are stored in the header section of each result file. These files are ASCII files (spreadsheet format) and can be opened after the measurement with this Grimm software, with Excel, or a simple text editor. If you do long-term measurements, the feature create file per day allows you to let automatically separate the result data into single days. Due to the ASCII format, you can easily concatenate the files later.

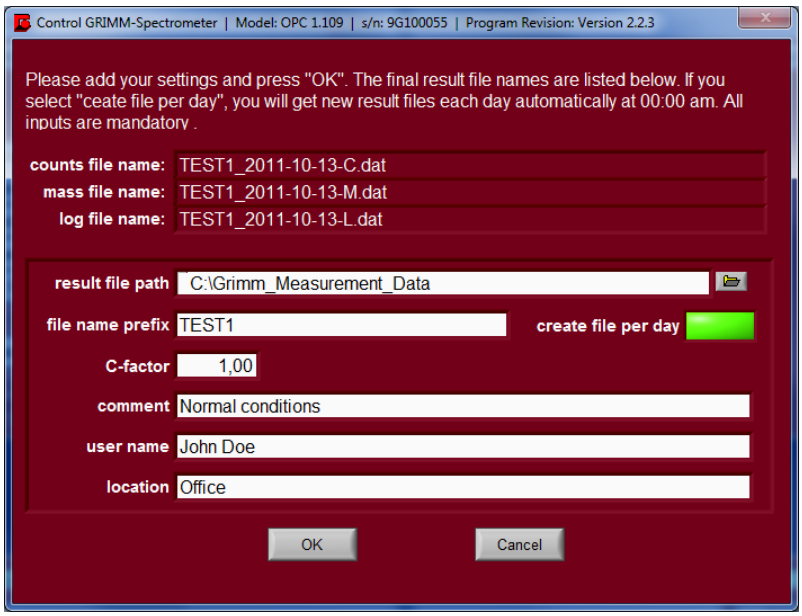


Figure 6-6: User settings

After completing the settings, all buttons of the control window should be activated. Star Data Storage will only be active after starting the measurement by clicking on Start Spectrometer.

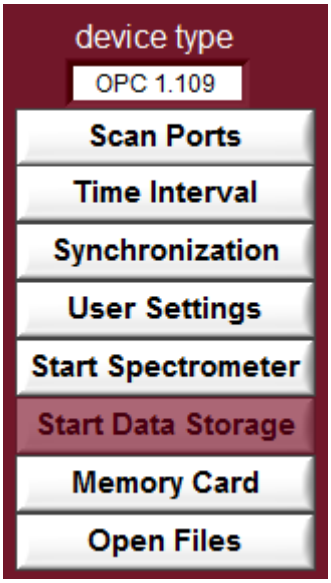


Figure 6-7: Control Buttons

To start the measurement, please press Start Spectrometer. To enable the data logging, please press Start Data Storage. If you stop the measurement, the data logging will be stopped, too. It is possible to stop the data logging only, change the result file and continue the data logging.

	If you want to get the data of the complete measurement, you either need a memory card, or you must enable the data logging. There is no internal program buffer which collects the measurement results.

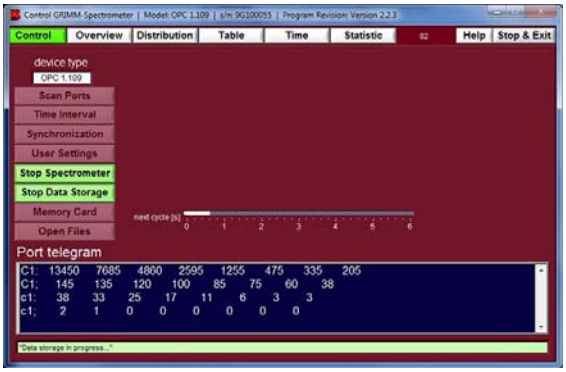


Figure 6-8: Tab Control

The picture above shows a measurement in a 6 second time interval. If you do not activate the data logging by pressing the button “Stat Data Storage”, the tabs “Distribution”, “Table”, “Time”, and “Statistic” will not be accessible. The blue window “Port telegram” shows the raw data provided at the COM-port of the device.

	Depending on the device type, some features (tabs) will remain disabled or invisible.

Tab Overview

All currently measured data is displayed here in this overview. Please mind, that all displayed data will be saved only if you activate the data storage in the tab “Control”. If you have connected a meteorological sensor (1153FH for temperature and relative humidity or 1154 for temperature, relative humidity, and wind speed), the gained data will also be displayed in the left column below the mass fractions. If no sensor is connected, it will not be displayed. All values will be updated every 6 seconds or less often depending on the selected time interval.

Figure 6-9: Tab Overview

Tab Distribution

The tab Distribution shows bar graphs for the current measurement values dN/dlog(dp), dS/dlog(dp) and dM/dlog(dp). Here you can also modifiy the x- and y-axis, and also let the program display the data as gliding mean value smoothened over 60 seconds.

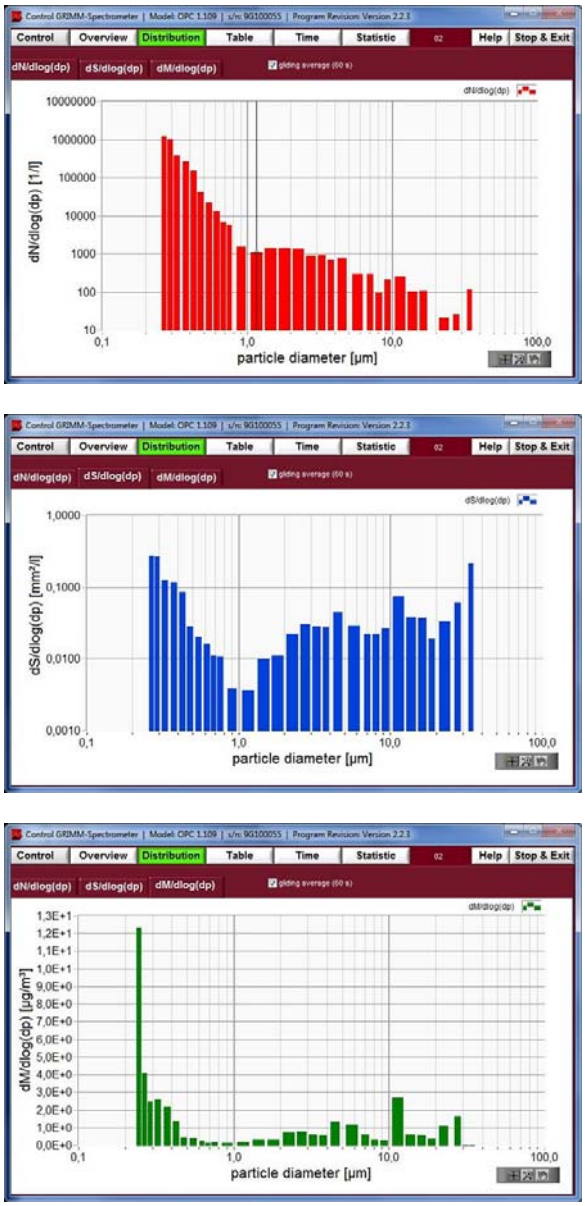


Figure 6-10: Tab Distribution

Tab Table

In this tab the software displays all measured data according to your set time interval in real-time. It gives you all information about the counts and mass of the particles, as well as in the submenu “log” all relevant device status information. If you have connected a meteorological sensor (1153FH for temperature and relative humidity or 1154 for temperature, relative humidity, and wind speed), the gained data will also be displayed in the log table.

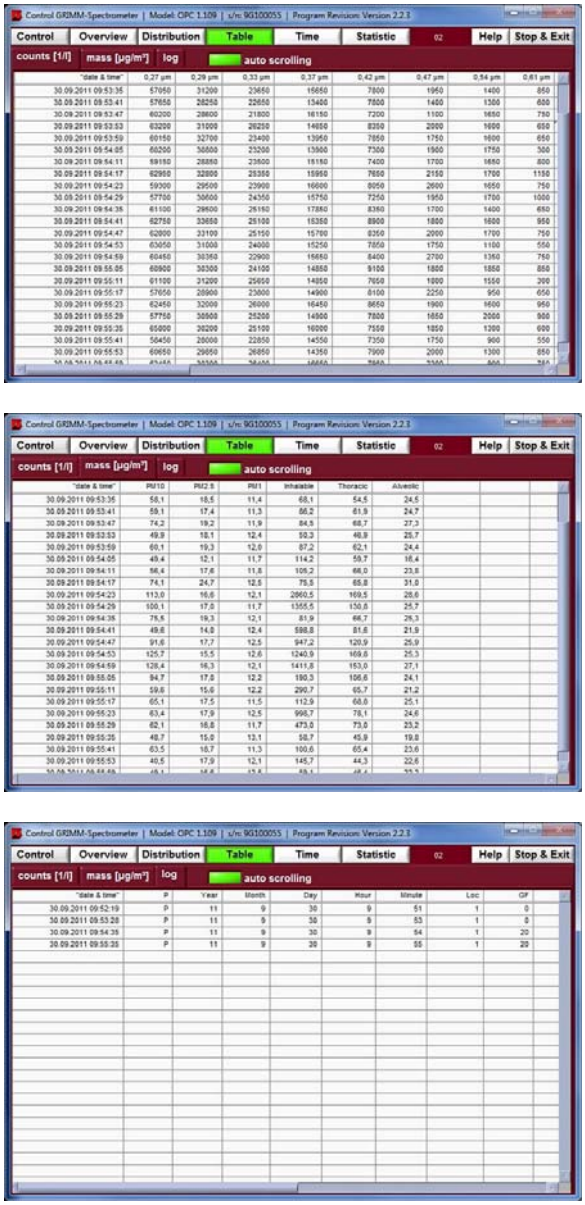


Figure 6-11: Tab Table

Tab Time

In the tab time all measured data can be illustrated as a graph. On the right side of this window, you can select up to three values (by holding the key Ctrl and clicking at the same time on the desired values). Also the time interval can be varied. Your data can be illustrated based upon counts, PM-values, or IAQ (which means the inhalable, thoracic and alveolic fraction). If you have connected a meteorological sensor (1153FH for temperature and relative humidity or 1154 for temperature, relative humidity, and wind speed), the gained data will also be displayed in two separate sub-tabs next to “IAQ”. If no sensor is connected, only the three sub-tabs “Counts”, “PM”, and “IAQ” will be displayed.

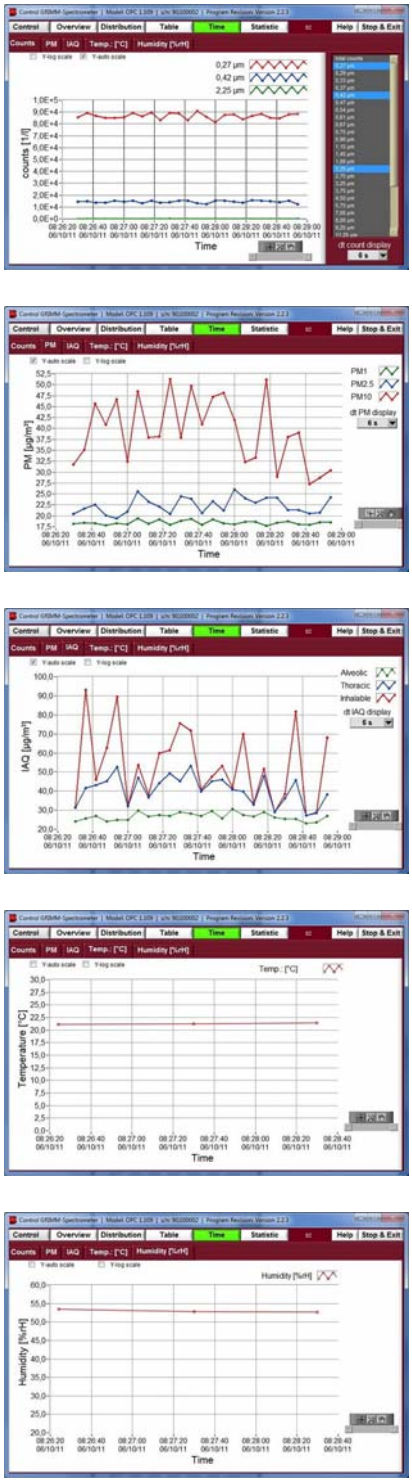


Figure 6-12: Tab Time

Tab Statistic

This feature provides information about the number of particles, as well as their masses split in various size classes (environmental PM values and occupational health fractions).
Within this tab Statistic you can enter sub-tabs and choose different possibilities to get more information about the measured particles (chart or graph).

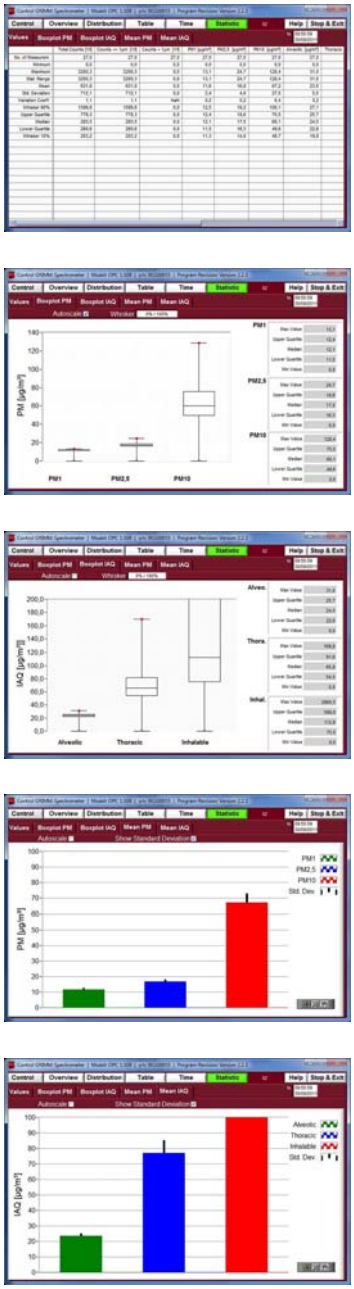


Figure 6-13: Tab Statistic

7 Save and Open Measured Data

Save Data

In the main window “Control”, you can access the button Memory Card after scanning the ports for a connected spectrometer. You do not need to make any settings before reading out the memory card.

Figure 7-1: Main window Control - Memory Card

Clicking on the button Memory Card opens a dialog where you can read the data from the memory card or the device internal buffer, which is 80kBytes only, or you can clear and reset the memory card.

Figure 7-2: Read data from memory card

Do not interrupt the download, otherwise data may get lost. After the download is completed, the button “Convert data to spreadsheet format” will be active. Please note, that the data is not saved, yet. You now have to press “Convert data to spreadsheet format”

Figure 7-3: Read data from memory card

Now please choose the folder where you want to save the data at. For this procedure you have to have full write access at you desired destination for saving the data.
Click on the icon for browsing and choosing a folder where you want to save your files.

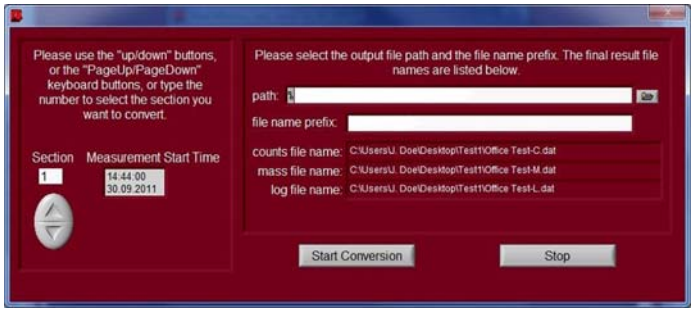


Figure 7-4: Choosing the destination for saving data at

When browsing for your desired destination, please enter the folder you want to save your files at, and then click on “Current Folder” and not on “Save”. Only by clicking on “Current Folder” you will save the data.

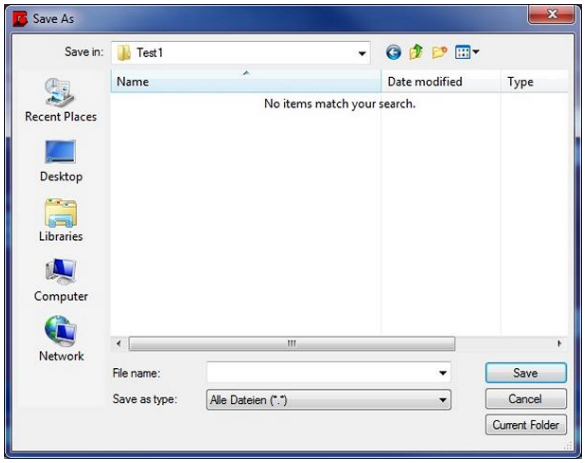


Figure 7-5: Choosing the folder for saving data at

Now the destination has been accepted and you can start your conversion. If you have more measurement sessions on your memory card, you can choose the sections you want to save by selecting them on the left side of this window. The sections have their respective numbers and according time of the measurements. Thus you can identify them by time. Press now “Start Conversion” in order to save the converted files.

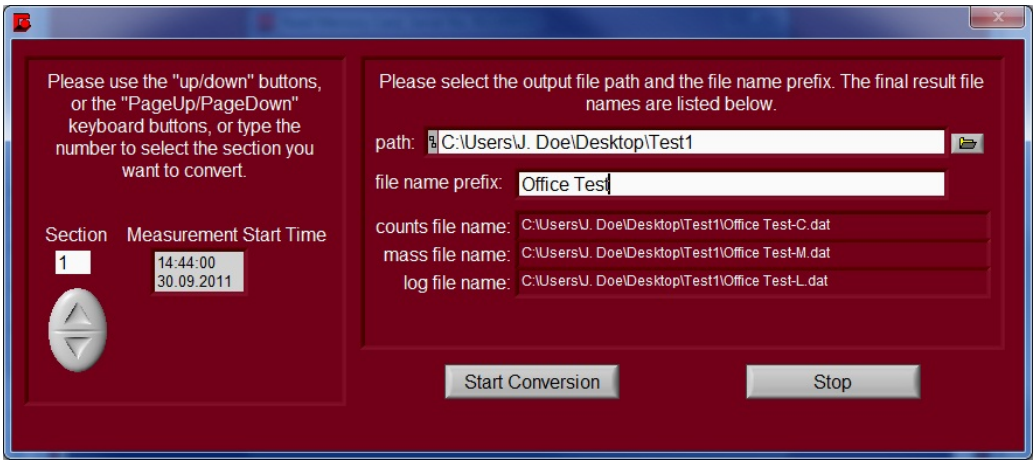


Figure 7-6: Convert and save memory card data

Open Data

You can open your saved data at any time from your PC. It is possible to open the files with “Grimm”, which means, that the file will be displayed in this software as charts and graphs, or you can open the file with Excel. This spreadsheet file can then be saved.

For opening a file, please click in the main window “Control” on “Open Files”. A window will appear asking you for choosing the file you want to open. Please browse for it by clicking on the respective icon.

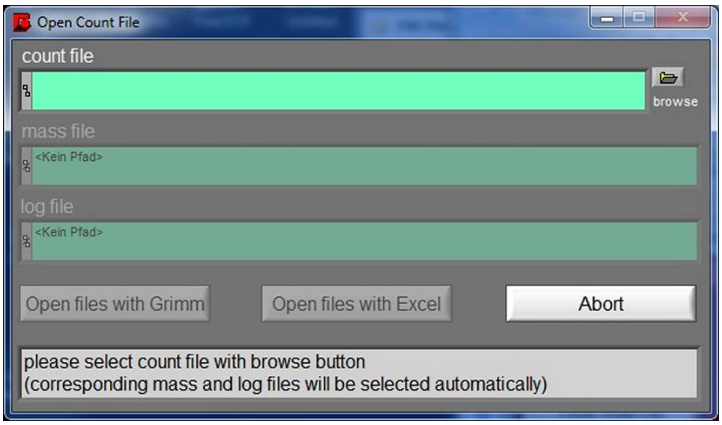


Figure 7-7: Choosing a file to open

Only one file will be displayed which you can open, although you saved three files before. This file contains all data.

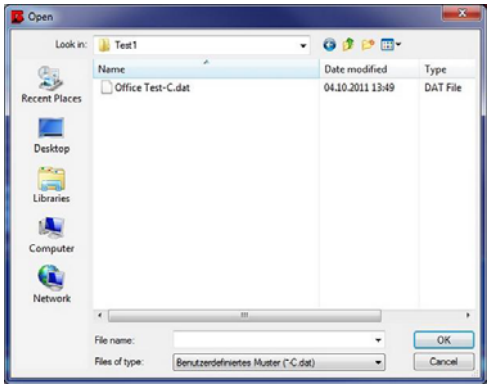


Figure 7-8: Opening the file

After selecting the file destination, please choose if you either want to open the files with the software by clicking on “Grimm”, or if you want to open them with Excel. Opening the file with Grimm will display the data in this software, and opening the file with Excel will automatically open an Excel file with all data in it.