

**IMRDATA -  
DATA AQUISITION PROGRAM FOR  
IMR COMBUSTION GAS ANALYZERS**

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## 1 Introduction

*IMRData* is a data acquisition software for portable flue gas analyzers from IMR. The software can only be used with analyzers which have a serial interface RS-232.

### 1.1 Minimum System Configurations

Following configurations are required:

Hardware:

- IBM compatible computer with Intel Pentium 233 MHz or higher
- Serial Interface RS-232
- Null modem cable
- Mouse
- 128 MB RAM or more
- SVGA or higher resolution
- Min. 4MB of HD space

Software:

- Windows 2000/XP
- Microsoft Excel XP1

To install the software administrator's rights are required in order to have full access to the program folder of the Operating system<sup>2</sup>. The program is installed in the folder IMR\IMRData, which in the following is called „program folder“. The transferred data will be placed in the folder IMRData. This folder is the application data folder.

No administrator rights are needed to run the software, i.e. a user with limited user rights can use the program, but he needs the rights to work with the application data folder. The path for the application data can be changed by the user after the installation.

### 1.2 Installation

Insert the CD to start the installation and run the file *setup.exe*.

The installation can be cancelled by clicking *cancel*.

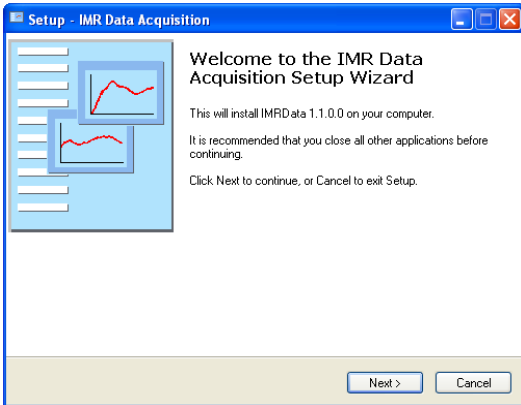
After the start of the installation the user has to select the language (English or German).

Pressing <OK> selects the chosen language and the next installation window appears.

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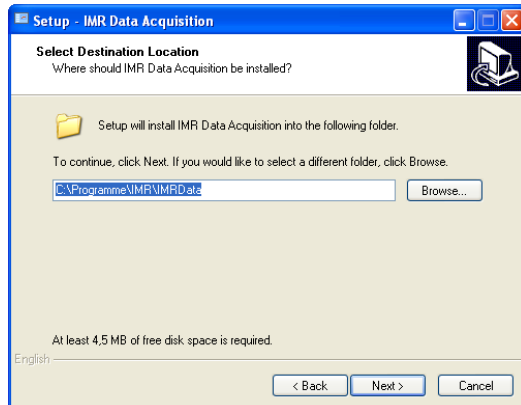
1 Only with option – Direct data transfer to Microsoft Excel

2 Usually C:\Program Files



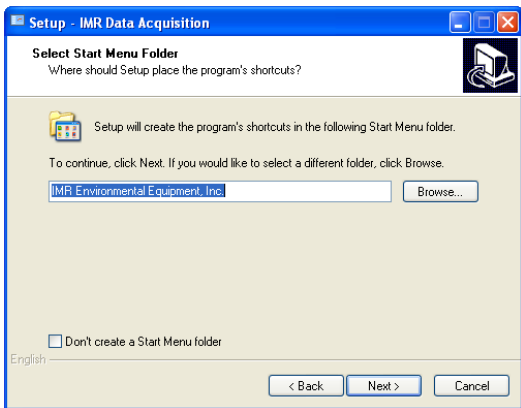
Step 1: Start

Installation begins and will be confirmed by clicking **<Next>**.



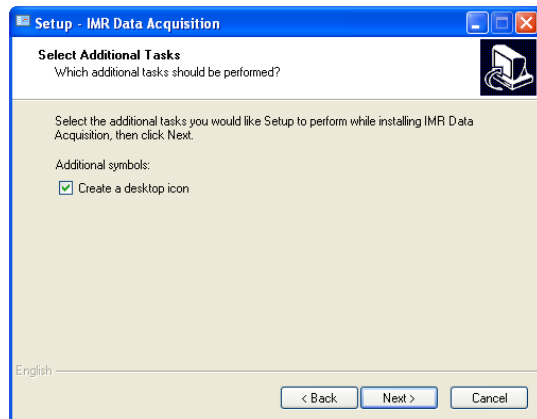
Step 2: File Folder

The program will be installed in the selected folder (*Program Files*). The path can be changed. Click **<Next>** to confirm the selection and to move on.



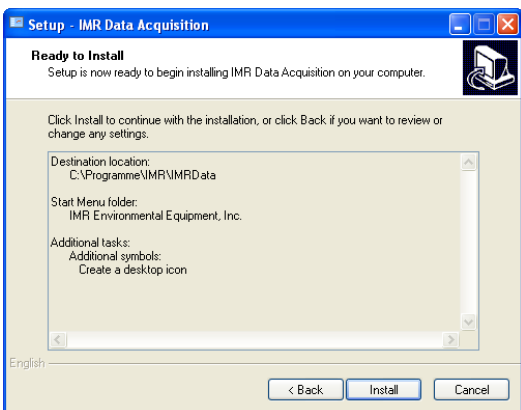
Step 3: Start menu

The name of the Start Menu-Folder can be changed. Click **<Next>** to confirm the selection and to move on.



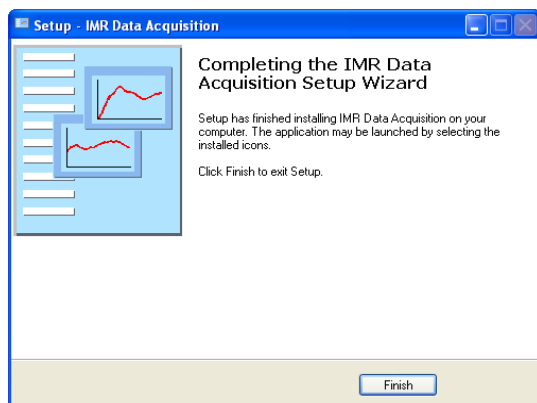
Step 4: Desktop Icon

Check the box to create a desktop icon. Click **<Next>** to confirm the selection and to move on.



Step 5: Summary

This window shows the summary of the installation data. Clicking **<Install>** starts the installation process.



Step 6: Installation finished

The installation has been finished. Clicking **<Finish>** ends the installation screen.

## 2 Communication

This software receives the data from the IMR combustion gas analyzers. The transferred data can be displayed and stored. The IMR analyzers have a RS232 serial interface which transfers the data (ASCII) in real-time to the software.

### 2.1 Connecting the Analyzer

The analyzer has 9-pos female D-Sub connector installed. The computer needs a RS232-serial interface as well to communicate with the analyzer. The computer connector can be a 9-pos or 25-pos connector. The needed communication cable is a so called „Null modem“-cable which can be bought at IMR. Some newer computers might not have a serial interface anymore but they usually do have a USB-interface. In this case a USB-To-Serial-Adapter will help by transferring the data. IMR does not guarantee though the functionality of the program by use of an USB-To-Serial-Adapter.

### 2.2 Connection-Parameter

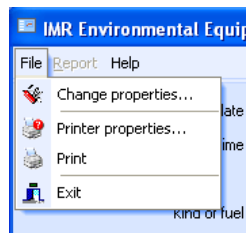
The parameters are already configured, but the COM-port which communicates with the analyzer, must be selected.

Parameters:

- Baud rate: 9600 Baud
- Data bits: 8
- Stop bits: 2
- Parity: none
- Flow control: Hardware

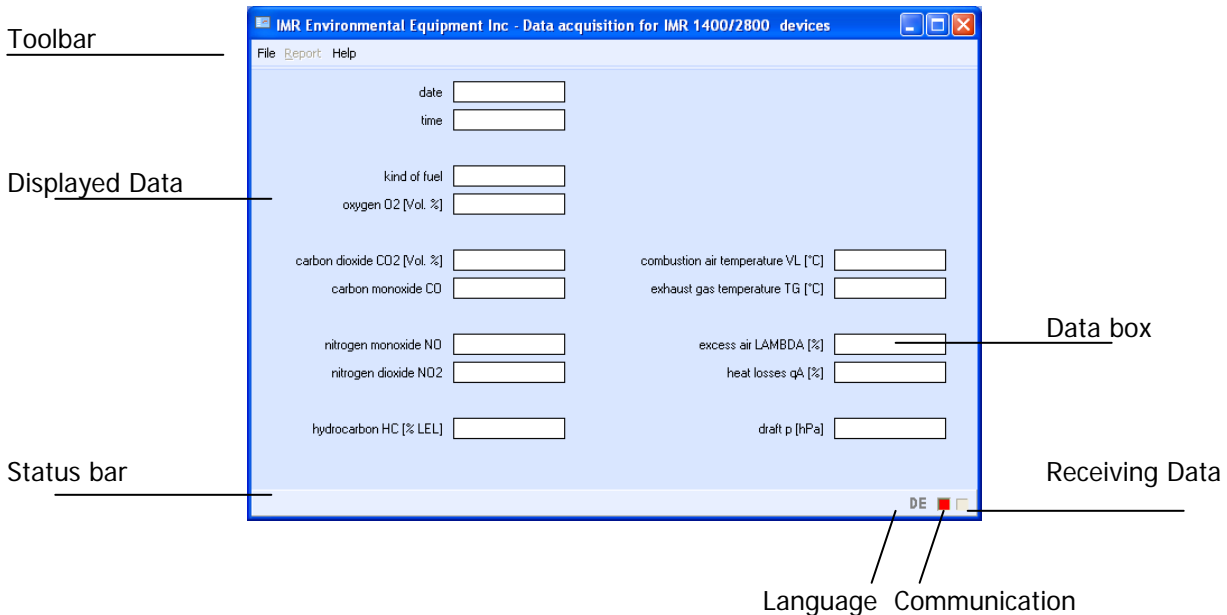
These parameters can be changed in the following menu:

*File > Change properties > Communication*



### 3 Configuration

The software has to be configured to work with the analyzer. See above to select the correct parameters. If the application runs without an analyzer connected to the computer or with wrong parameters, then the following screen appears.



- **Toolbar:**  
Selection and change of all program functions.
- **Status bar:**  
Shows information regarding the communication with the analyzer.  
Language selection.
- **Displayed data / Data box:**  
Shows the actual measuring data of the selected parameters. The data boxes can be dropped & dragged with the mouse to a different position.
- **Communication with the analyzer:**  
A red LED shows that the analyzer is not connected to the computer. Double-click the LED to try to connect again.  
A green LED shows that the analyzer is connected to the computer.
- **Receiving data:**  
The light blinks green when the computer receives data from the analyzer. If no data is received then the light stays grey.
- **Language selection:**  
The language bar shows the language which will be available after clicking the bar. Clicking the language bar selects the new language immediately (English or German).

If data is received then the screen looks like this:

IMR Environmental Equipment Inc. - Data acquisition for IMR 1400/2800 analyzers

File Report Help

Date

Time

Fuel

Oxygen O2 [Vol. %]

Carbon Dioxide CO2 [Vol. %]

Carbon Monoxide CO [ppm]

Nitric Oxide NO [ppm]

Nitrogen Dioxide NO2 [ppm]

Sulfur Dioxide SO2 [ppm]

Ambient Air Temperature TA [°C]

Flue-Gas Temperature TG [°C]

Excess Air [%]

Losses [%]

Draft p [hPa]

DE

### 3.1 General Settings

A new window opens by clicking *File > Change Properties*. This window shows two tabs. One is the *General* tab and the other the *Communication* tab. Following changes can be made in the *General* menu:

Properties

General Communication

Application

Save application size and position on application exit

Save the visibility of each text box on application exit

Save the visibility of each chart on application exit

Application language

English

Paths

Path for local data, e.g. report

C:\Dokumente und Einstellungen\All Users\Anwendungsdaten

OK Cancel Apply

- Save position and size after closing the program:

The coordinates of the top left corner and the size of the window will be stored after closing the program and the window will appear in the same size and position when it is opened again.

- Save the visibility of the data boxes after closing the program:

The data boxes can be displayed or hidden. This feature can be selected within the main window by clicking the right-mouse button while on the specific data box. And these settings will be stored.

- Save the visibility of the charts:

A chart can be selected for each value. This feature can be selected within the main window by clicking the right-mouse button while on the specific data box. And these settings will be stored.

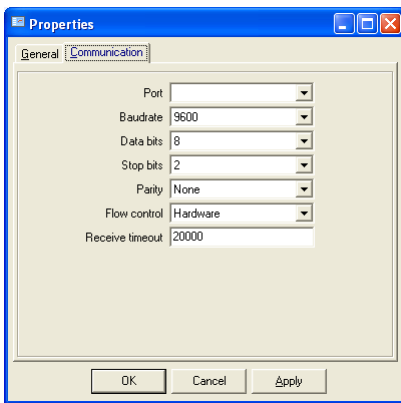
- Language:

The language can be selected.

- Path for data files:

This is the path where the data files will be stored.

## 3.2 Communication settings



The communication settings can be set in *communication* menu:

- Port:  
COM-Port for the data transfer.
- Baud rate:  
Baud rate
- Data bits:  
Number of data bits
- Stop bits:  
Number of stop bits
  
- Flow control:  
Data control between sender and receiver
- Receiver Timeout (Time in milliseconds):  
This is the time the software waits to see if data is still transferred or not. If the time expires, then the software finishes the measurement.

## 4 Storing the transferred data

*IMRData* has the possibility to store the data in two different ways. The manufacturer configures the software before delivery to the user.

The first kind is to store the data as a CSV-file. In this case the charts will be displayed inside the program itself.

The second kind is to store the data as a Microsoft Excel-File<sup>3</sup>. In this case the charts will be displayed by the created table.

### 4.1 CSV-File

The standard version of the software saves the data in a so-called CSV-file (*Character* or *Comma Separated Values*, see: <http://de.wikipedia.org/wiki/CSV-Datei>). The transferred values are stored in a text file. The single values are separated by a defined sign, e.g., comma, and the records of one data batch are separated by a „carriage return“ and a line feed.

If a data transfer begins, a new CSV file is created in the application data folder. In the first line the names of the single values are written, all other lines contain the measuring data. Such a file could look as follows:

<sup>3</sup> only Microsoft Excel XP

```

Station number;Fuel;Unit;NOx;Date;Time;Number of Samples;Time of Samples;Ambient Air Temperature TA;Oxygen O2;Hydrogen Sulphide H2S;Carbon monoxide CO;Hydrocarbons HC;Nitrogen dioxide NO2;Nitric oxide NO;Draft p;Flue-Gas Temperature TG;Carbon dioxide CO2;Losses qA;Excess Air LAMBDA
815;Oil Light;ppm;1;13.11.2005;21:05:52;7;4;0,71;1,71;75,51;122,61;150,51;4,91;153,41;2,41;13,91;0,31;3,81;0,81
815;Oil Light;ppm;1;13.11.2005;21:05:54;2;7;9,51;0,41;117,21;112,81;312,31;5,61;112,71;1,11;28,71;0,71;9,11;0,01
815;Oil Light;ppm;1;13.11.2005;21:05:58;3;8;6,71;0,41;98,21;68,11;43,71;6,31;59,81;0,51;61,41;0,61;9,01;0,61
815;Oil Light;ppm;1;13.11.2005;21:05:58;7;2;11,91;0,11;69,01;199,61;64,81;1,21;34,31;1,11;59,41;0,21;7,01;0,01
815;Oil Light;ppm;1;13.11.2005;21:06:00;3;2;1,91;0,91;77,91;166,41;383,81;3,01;94,41;3,01;74,51;1,11;6,61;0,11
815;Oil Light;ppm;1;13.11.2005;21:06:02;4;0;10,31;1,41;10,71;62,71;106,91;1,01;183,51;2,31;55,41;1,11;3,01;0,71
815;Oil Light;ppm;1;13.11.2005;21:06:04;5;8;3,81;1,01;160,01;193,81;393,51;4,81;66,51;1,91;99,81;0,21;5,71;0,71
815;Oil Light;ppm;1;13.11.2005;21:06:06;7;7;9,51;1,41;3,61;110,01;234,91;9,41;67,21;0,01;40,51;0,51;9,11;0,61
815;Oil Light;ppm;1;13.11.2005;21:06:08;3;6;7,91;1,21;43,41;113,31;169,61;3,61;50,81;4,91;30,91;0,01;7,41;0,91
815;Oil Light;ppm;1;13.11.2005;21:06:10;2;4;4,51;0,31;193,91;43,81;54,11;9,41;168,91;1,61;86,71;0,91;8,71;0,41
815;Oil Light;ppm;1;13.11.2005;21:06:12;8;1;11,61;0,11;91,41;164,41;22,71;7,11;177,01;3,41;52,11;1,21;9,41;0,51
815;Oil Light;ppm;1;13.11.2005;21:06:14;3;1;6,41;0,51;76,11;71,31;63,91;1,31;140,91;0,51;112,11;0,01;7,81;0,01
815;Oil Light;ppm;1;13.11.2005;21:06:16;1;2;4,31;1,81;97,41;92,31;110,11;5,31;86,51;2,91;100,51;1,11;1,61;0,21
815;Oil Light;ppm;1;13.11.2005;21:06:18;7;5;11,81;0,41;20,31;40,31;333,61;0,01;183,21;4,01;116,81;1,01;6,81;0,51
815;Oil Light;ppm;1;13.11.2005;21:06:20;5;5;1,71;1,91;20,31;90,01;371,81;2,91;128,81;2,21;94,41;1,41;8,91;0,71
815;Oil Light;ppm;1;13.11.2005;21:06:22;9;1;10,61;0,01;22,81;45,61;237,71;4,81;167,41;2,61;80,71;0,31;4,11;0,71
    
```

It is easy to recognize that the single values are separated by a semicolon. This makes it easier to import the data in other applications, e.g., in Microsoft Excel or in OpenOffice.org Calc. A semicolon is a usual separator beside comma and tabulator. The semicolon was chosen instead of the comma, so that numerical values must not be enclosed in "x.x"; thus a record looks like

```
815;Oil Light;ppm;1;13.11.2005;21:06:16;1;2;4,31;1,81;97,41;92,31;110,11;5,31;86,51;2,91;100,51;1,11;1,61;0,21
```

If there are problems importing the data into an application, then the following information will be needed:

The first line includes the name of the value and therefore the header for the column. The individual values are separated by a semicolon and one data batch is separated by a „carriage return“ and a line feed.

Examples:

If the CSV file is opened with OpenOffice.org 2.0 Calc a dialog appears. Usually the comma is marked automatically. Now the semicolon must be marked to import the data correctly. Press **OK** to start the import.

Microsoft Excel XP opens the CSV file exactly like an Excel file and imports the data in a table sheet. Should this not be done automatically, then the dialog can be opened by clicking:

„data> external data import> import ... and the choice of the CSV file to the following 3 dialogs:

## 4.2 EXCEL-File

The second and optional version of the software saves the data in an EXCEL-file. Only Microsoft Excel XP-Files4 are supported by the program. In this case the transferred data is written right into an EXCEL spread sheet.

	A	B	C	D	E	F	G	H	I	J	L	M	N	O	P	Q	R	S	T	U	V	
	Device Number	Fuel	Engineering Unit	NOx	Date	Time	Number of Samples	Ambient Air Temp.		O <sub>2</sub>	CO	SO <sub>2</sub>	NO <sub>2</sub>	NO	Draft	Flue-Gas Temp.	CO <sub>2</sub>	Losses	Excess Air			
1																						
2	0	Natural Gas	ppm	0	23.05.2006	09:03:16	0	1	21	20,9	0	0	21	0	0	21	0	0	0			
3	0	Natural Gas	ppm	0	23.05.2006	09:03:17	0	1	21	20,9	0	0	21	0	0	21	0	0	0			
4	0	Natural Gas	ppm	0	23.05.2006	09:03:18	0	1	21	20,9	0	0	21	0	0	21	0	0	0			
5	0	Natural Gas	ppm	0	23.05.2006	09:03:19	0	1	21	20,9	0	0	21	0	0	21	0	0	0			
6	0	Natural Gas	ppm	0	23.05.2006	09:03:20	0	1	21	20,9	0	0	21	0	0	21	0	0	0			
7	0	Natural Gas	ppm	0	23.05.2006	09:03:21	0	1	21	20,9	0	0	21	0	0	21	0	0	0			
8	0	Natural Gas	ppm	0	23.05.2006	09:03:22	0	1	21	20,9	0	0	21	0	0	21	0	0	0			

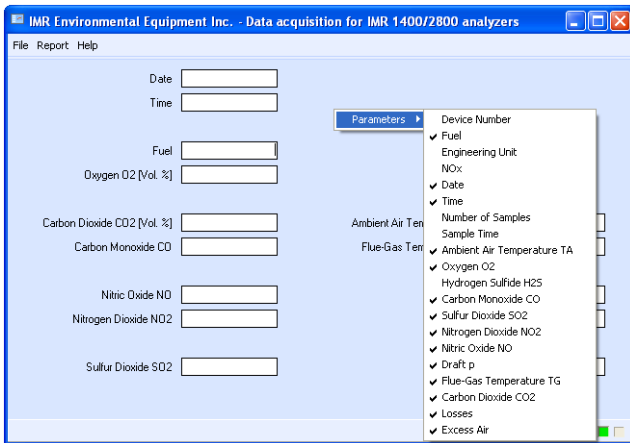
4 Microsoft Excel XP must be installed and working

## 5 Display of the data

The measured values can be shown as a number (text), as a chart or in a report.

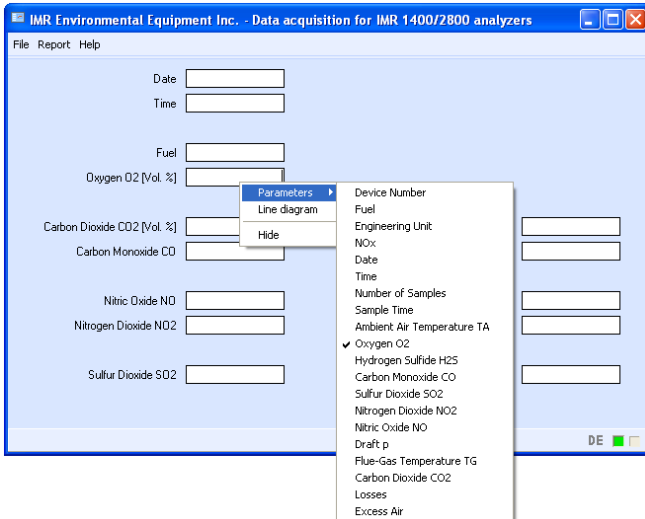
### 5.1 Display as a number

Within the main window the measuring values are displayed as numbers (text). The application is configured to show the most important measuring values. With the help of a pop-up menu (right mouse click within the main window) other values can be chosen to be displayed or to be hidden:



Checkmarks in front of the parameters show that this parameter is displayed.

By clicking the value the checkmark is either removed or appears.

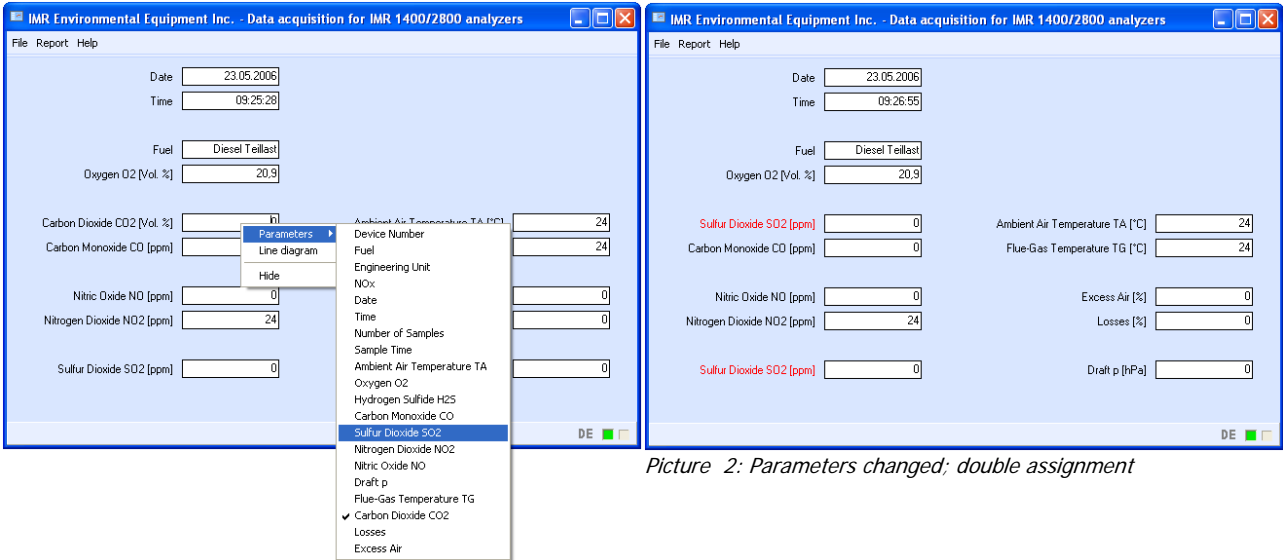


A right mouse click within the text box opens the pop-up window for this parameter. Now the displayed data can be hidden or a chart can be opened for this parameter.

The text boxes can be dragged & dropped to other places.

- Mouse cursor over the text box
- Click the left button and keep it pressed
- Move the mouse cursor to the desired spot
- Release left button

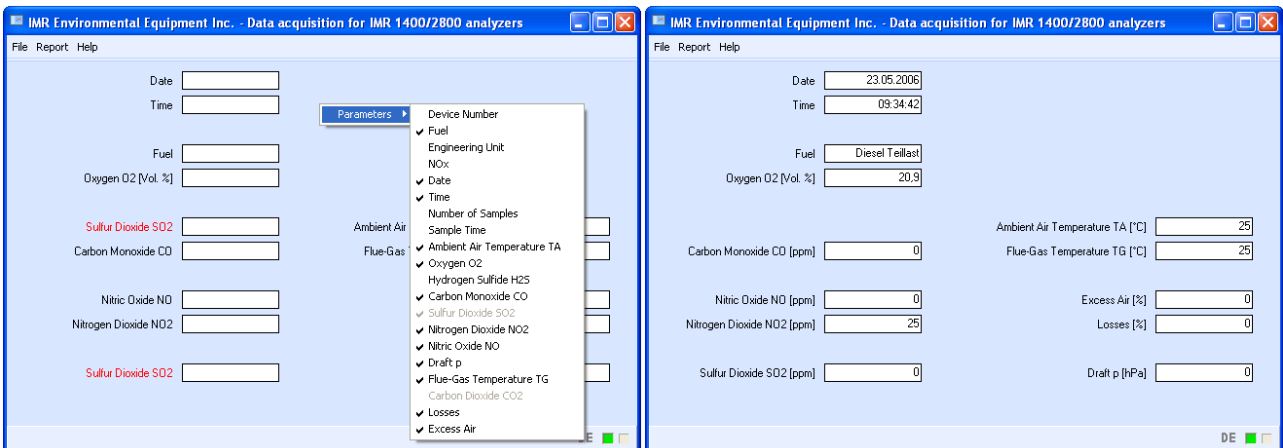
Instead of re-positioning all values it might be easier to assign other parameters to the existing spots. Picture 1 shows that the parameter SO2 should be assigned to the spot which shows at the moment the value of CO2. Picture 2 shows the window after the change. The name of the chosen value might be red after the change. This means that this parameter was already assigned to another text box and this should be avoided. Nevertheless, at first sight a double allocation is not recognized.



Picture 2: Parameters changed; double assignment

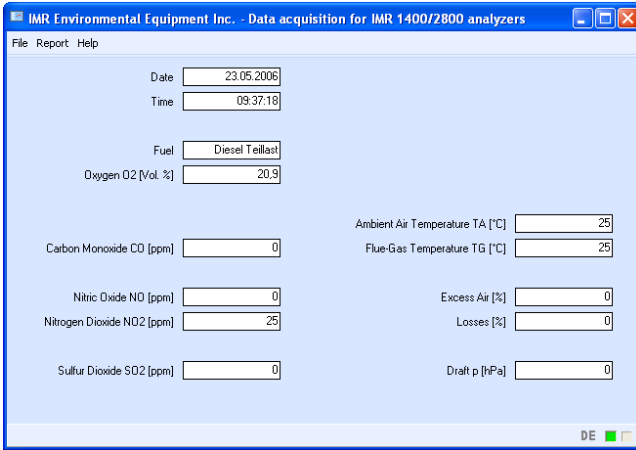
Picture 1: Assignment of another parameter

This is due to the fact that SO2 was already assigned, though the text box was hidden. If the pop-up menu is opened then two entries are shown in grey, these are the entries which are no more unequivocal (picture 3). In this case it is advisable to cancel the new assignment and to hide, instead, the text box for CO2 and to show SO2 instead, see picture 4. Afterwards the text box can be dropped & dragged to the desired position.

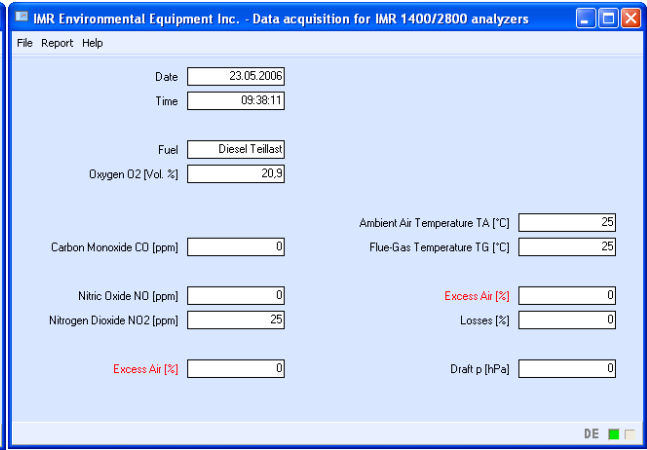


Picture 3: Check for double assignments

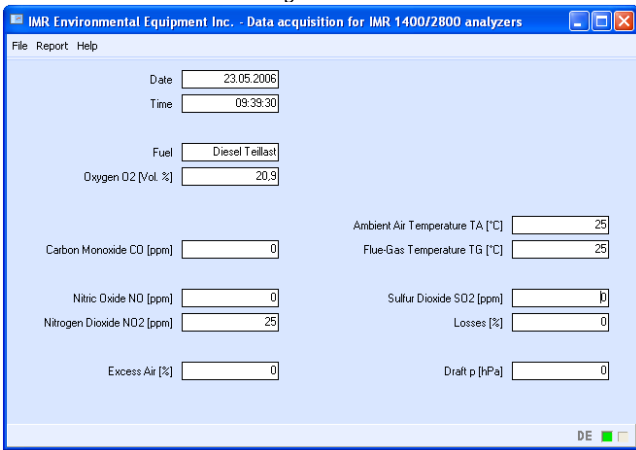
Picture 4: Change of displayed and hidden values



Picture 5: Before the new assignments



Picture 6: After the new assignment, double assignment



Picture 7: After the re-assignment

Here is another example of a double assignment. The Excess Air value text box was assigned originally to SO2 (pictures 5 and 6). Now the names of the double assignments both are shown red, and the double assignment is easy to recognize. Now one of the two text boxes should be differently assigned, e.g., the right text box could show SO2 (picture 7).

If the original layout of the text boxes is not satisfactory then it might be better to display all parameters and then the re-arrangement is easier.

## 5.2 Line diagrams

Line diagrams can be displayed to (almost) each value. The charts can be displayed by opening the pop-menu of the desired parameter.

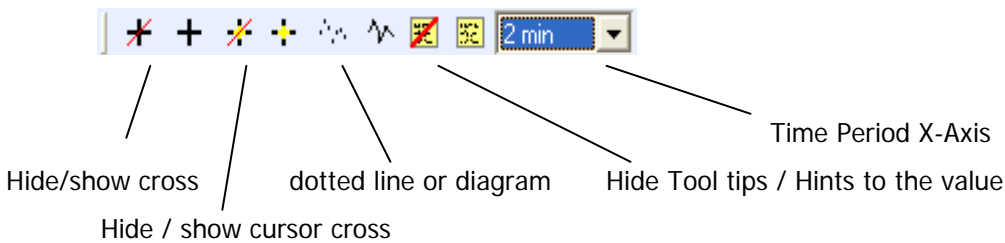
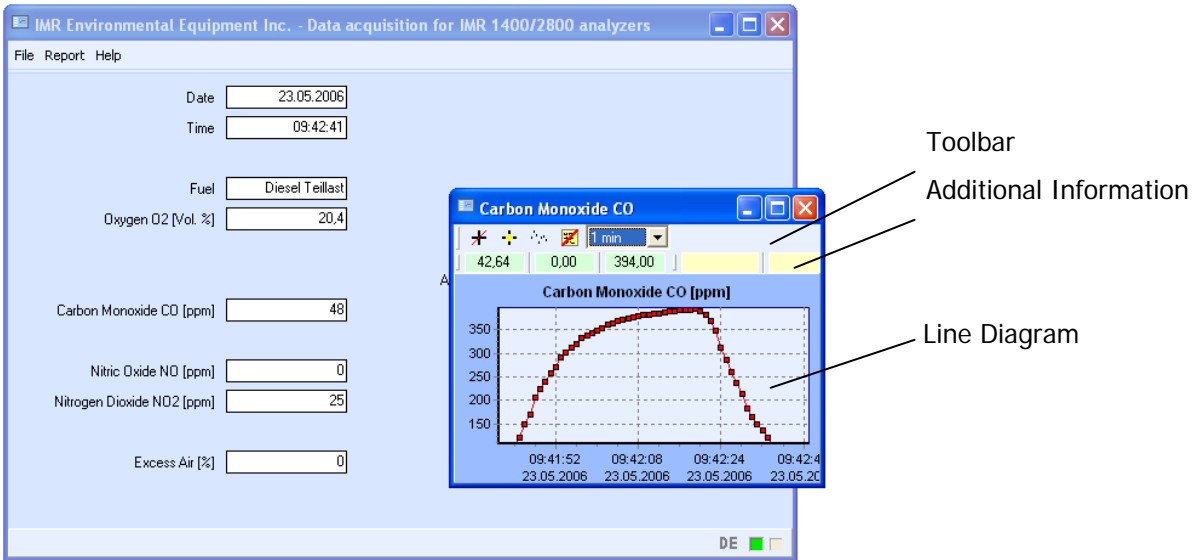
**IMRData** can show line diagrams in two different kinds, dependent of the software version. If the data is stored in a CSV file, then line diagrams are shown within the application. If the data is stored in Microsoft Excel-Files5, then the line diagrams are displayed within the table in which the data is stored.

### 5.2.1 Line diagrams within the application

It is easy to recognize in the following picture that the line diagrams are adjustable and can be placed therefore on the whole desktop. The size of the line diagram windows is changeable, also the position.

If the line diagram is closed, then it can be made visible by opening the pop-up menu of the specific text box.

Line diagrams can be configured and show additional information.



As shown on top, the tool bar is never as above, because to explain the different configuration possibilities all possible icons are listed. They form in each case one group. If, e.g., in the diagram a mark cross is visible, only the icon to hide the mark cross is indicated.

A marked cross helps to navigate within the diagram (zooming, scrolling, marking).

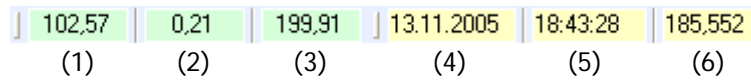
A cursor cross will only be shown when the mark cross is visible. The cursor cross shows the middle of the mark cross.

The transferred values are shown in the diagram with small red squares which can be connected by a line. It is also possible to show only the measuring points. In this case the „dotted line“ icon must be chosen. If the values should be shown as a line diagram then the „line diagram“ icon should be checked.

Move the mouse cursor over a measuring point then the date, the time and the value is indicated and in a special area, the tool tip or hint, provided that tool tips / Hints was activated.

The box at the end is always indicated. This box selects how big the visible area of the X axis should be. If more measuring values exist than within the desired area can be shown, the diagram scrolls automatically.

Below the tool bar there is an other strip in which the following values are shown:



Green is (1) Average value, (2) Minimum, (3) Maximum value of the total measurement, yellow is (4) date, (5) time, (6) value of the actual value (mouse over measuring point).

If the time period is longer than the chosen area of the X axis, then the display scrolls automatically. Nevertheless a manual scroll is possible too. Press and hold the right mouse key while on the diagram and then move the mouse then in the desired direction.

The indicated area can be zoomed. Press and hold the left mouse key within the diagram and move from the top left to the bottom right around the area to be zoomed in. To reduce it back to the original resolution the mouse has to be moved from the bottom right to the top left.

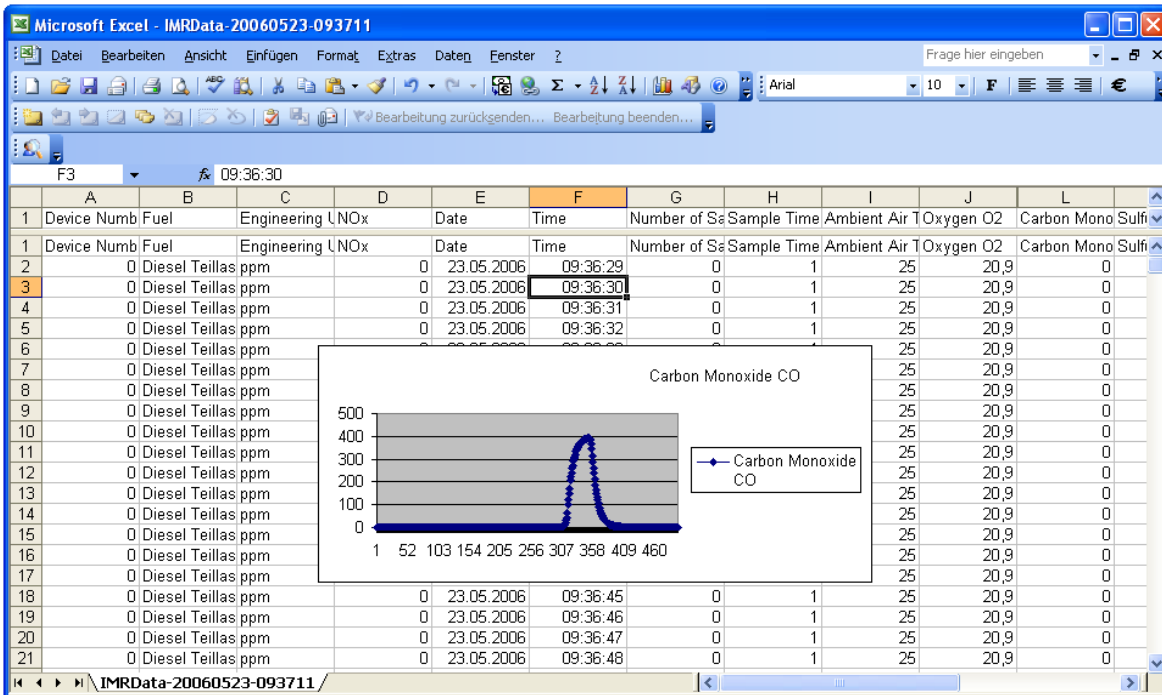
### 5.2.2 Line diagrams in Microsoft EXCEL

The creation of line diagrams in Excel occurs in a very easy way. The automatically generated line diagram indicates always all values which were transferred since the beginning of the measurement. Automatic scrolling and zooming is not realized at the moment. If the application was configured correctly then it notices the cell position of the upper left corner and the size of the line diagram while finishing the application.

During a data transfer and data storage the configuration of the line diagrams should not be changed, because it might block the diagrams for the application *IMRData*. Because the application must adapt the measuring area with every record which comes in. In addition, the application blocks the manual exiting of the Excel file during a data transfer and data storage.

If the data transfer is finished, the Excel table and the diagrams contained in it can be formatted as desired.

An example of an Excel file with line diagram:



## 6 Reports

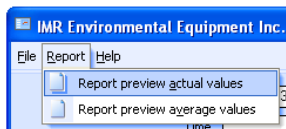
Reports can be created only if the software communicates with the measuring instrument.

Two different reports can be shown:

A report with momentary values which indicates the values of the last received data batch.

A report with average values which calculates all statistical values (Mean value and Min-/Max-value and beginning values and final values) of all transferred values.

Both reports are nearly the same in the construction.



The report file has to be opened to view a momentary report (report > preview actual values). To view an average value report the file report > preview average values has to be opened. The preview offers the possibility to print out the report.

To print the report without a preview select file> print.

### 6.1 Momentary values

A report for momentary values looks like this:

<b>Combustion analysis for IMR 1400/2800 analyzers</b> actual data
---

Date	23.05.2006
Time	09:49:52
Number of Samples	0
Fuel	Diesel Teillast
CO2max	%
Ref. O2	%
Flue-Gas Temperature TG	26 °C
Ambient Air Temperature TA	25 °C
Oxygen O2	20,9 Vol. %
Carbon Dioxide CO2	0,0 Vol. %
Carbon Monoxide CO	0 ppm
Carbon Monoxide CO (0%O2)	ppm
Carbon Monoxide CO (0%O2)	mg/kWh
Carbon Monoxide CO (Rel.)	mg/m3
Nitric Oxide NO	0 ppm
Nitric Oxide NO (0%O2)	ppm
Nitric Oxide NO (0%O2)	mg/kWh
Nitric Oxide NO (Rel.)	mg/m3
Excess Air	0,00 %
Losses	0 %
Combustion Efficiency	100 %
Ratio CO/CO2	
NOx (0%O2)	ppm
NOx (0%O2)	mg/kWh
NOx (Rel.)	mg/m3

6 Note: The values in the report are not only transferred values, but also calculated values.

## 6.2 Average values

A report for average values looks like this:

Combustion analysis for IMR 1400/2800 analyzers			
average values			
	<i>average</i>	<i>min</i>	<i>max</i>
Date	23.05.2006	23.05.2006	
Time	09:49:47	09:52:31	
Number of Samples	0		
Fuel	Diesel Teillast		
CO2max			
Ref. O2			
Flue-Gas Temperature TG	26	25	26 °C
Ambient Air Temperature TA	25	25	26 °C
Oxygen O2	20,9	20,9	20,9 Vol. %
Carbon Dioxide CO2	0,0	0,0	Vol. %
Carbon Monoxide CO	0	0	0 ppm
Carbon Monoxide CO (0%O2)			ppm
Carbon Monoxide CO (0%O2)			mg/kWh
Carbon Monoxide CO (Rel.)			mg/m3
Nitric Oxide NO	0	0	0 ppm
Nitric Oxide NO (0%O2)			ppm
Nitric Oxide NO (0%O2)			mg/kWh
Nitric Oxide NO (Rel.)			mg/m3
Excess Air	0,00	0,00	%
Losses	0	0	%
Combustion Efficiency	100	100	100 %
Ratio CO/CO2			
NOx (0%O2)			ppm
NOx (0%O2)			mg/kWh
NOx (Rel.)			mg/m3

## 7 Miscellaneous

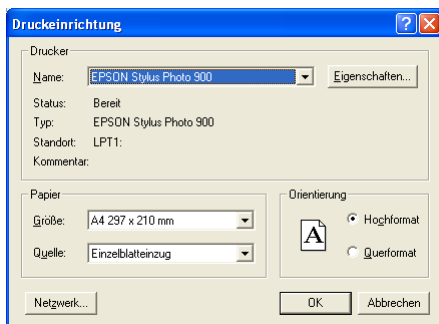
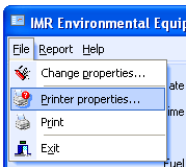
### 7.1 Language

The application is laid out in several languages, at the moment the choice exists between German and English.

The language can be changed without having to restart the program. This is possible by choosing the language in the settings menu or by clicking on the language symbol within the status line.

### 7.2 Printer

To select and configure a printer the menu *File > Printer properties* has to be opened.



The language in this dialog is always the same as the language of the operating system.

### 7.3 Program information

An information window opens through the menu point *Help> Info*. Within this window the name of the application, a short description, the installed version, the name of the operating system, the copyright and the contact address of the manufacturer is shown.

