

# COMPUTER PROGRAMME FGAplus

**Operating manual**  
03/2004

**madur**<sup>®</sup>  
E L E C T R O N I C S



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# 1 Installation of the programme

## 1.1 Hardware

The hardware should have the following minimum configuration:

- 🔗 PC computer with Windows 98 or higher,
- 🔗 Free serial port COM1 or COM2,
- 🔗 Madur flue gas analyser with communication cable.

## 1.2 Software

The software packet consists of the file:


- 🔗 FGAplus\_GB.exe

Start this file to install the programme.

# 2 Starting the programme

Connect the madur flue gas analyser to the computer using the cable supplied and switch it on before starting the programme.



Double click on the icon  or on the file FGAplus.exe to start the programme.

The following information will appear automatically:

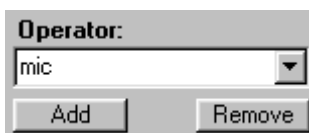
- Type and serial number of the instrument
- Gas sensors installed
- Software version

If the instrument is not recognised correctly, then the settings under *Communication/Options* should be checked(see section 5.2.5) . Then use the function **Restart transmission** under **Communication**.

# 3 Sidebar

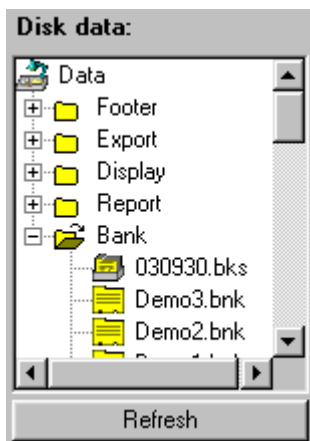
There is a sidebar with the following functions on the left of the screen:

## 3.1 Operator

A screenshot of the 'Operator' sidebar in the software. It has a title bar 'Operator:' and a dropdown menu containing the text 'mic'. Below the dropdown are two buttons: 'Add' and 'Remove'.

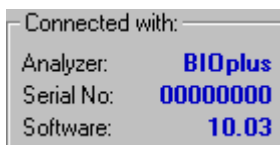
in the operator field it is possible to add or remove a name. This name will be stored with the data bank or report.

### 3.2 Disk data



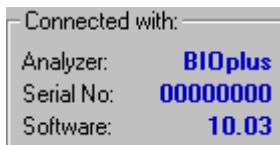
The field disk data shows the content of the directory Data on the PC. It shows all files that have been stored by the programme. The **Refresh** button will allow new files to be seen.

### 3.3 Connected with:



This field shows information about the analyser that is connected.

### 3.4 Bank stored with:



This field will show data about the analyser that stored the bank data.

## 4 Function keys



The function keys give quick access to the following functions:

**Open, Store, Restart communication, Read banks from analyser, Read reports from analyser, Online operation, Edit footer, Fuels, Standard conditions.**

These are all described below.

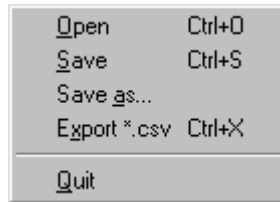
## 5 Menu options



### 5.1 File

This option can be used to load stored files from FGA that are in the computer for further calculations. All data files are to be found in the directory **Data**, where the programme is installed.

The files that have been used in the FGA programme can be stored in their own format or as \*.csv files.



### 5.1.1 Open

There are 5 different types of data that are used by the FGA programme:

📁 Banks.

The banks are stored automatically in a format that can only be read by this programme under **Data/Banks** after being read from the analyser. The file suffix will depend on the type of analyser as follows:

- 📁 \*.bks – for GA-20plus, GA-21plus, GA-40plus, GA40Tplus and CMS6,
- 📁 \*.bk6 – for GA-60 and Sensonic 5000,
- 📁 \*.bk5 – for Sensonic 2000,
- 📁 \*.bk2 – for GA-20 and Sensonic 2500.

Banks opened in the FGA programme can be processed and stored on the hard disk under a chosen name using the command **Save as...** The data file will have the extension \*.bnk.

📁 Reports

The reports read from the analyser will be stored in a format that is only readable with the FGA programme under **Data/reports**. This file has the extension \*.rps.

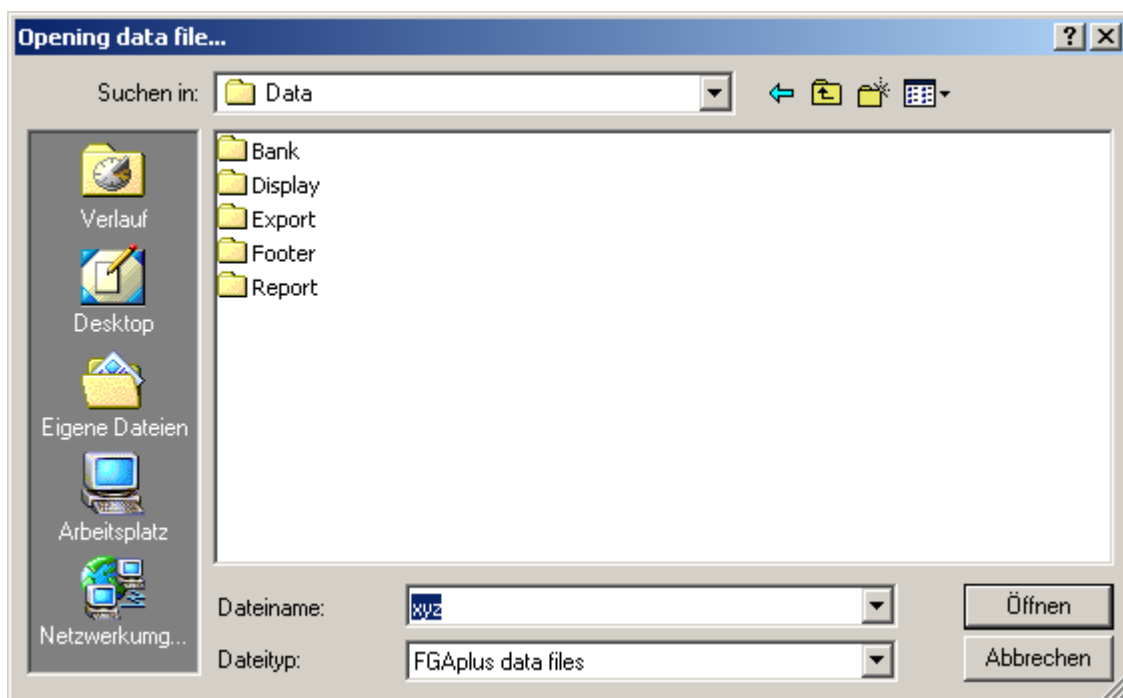
Reports that have been read from an analyser or from a \*.rps file can be added to a new or existing databank. This databank has the ending \*.mdb.

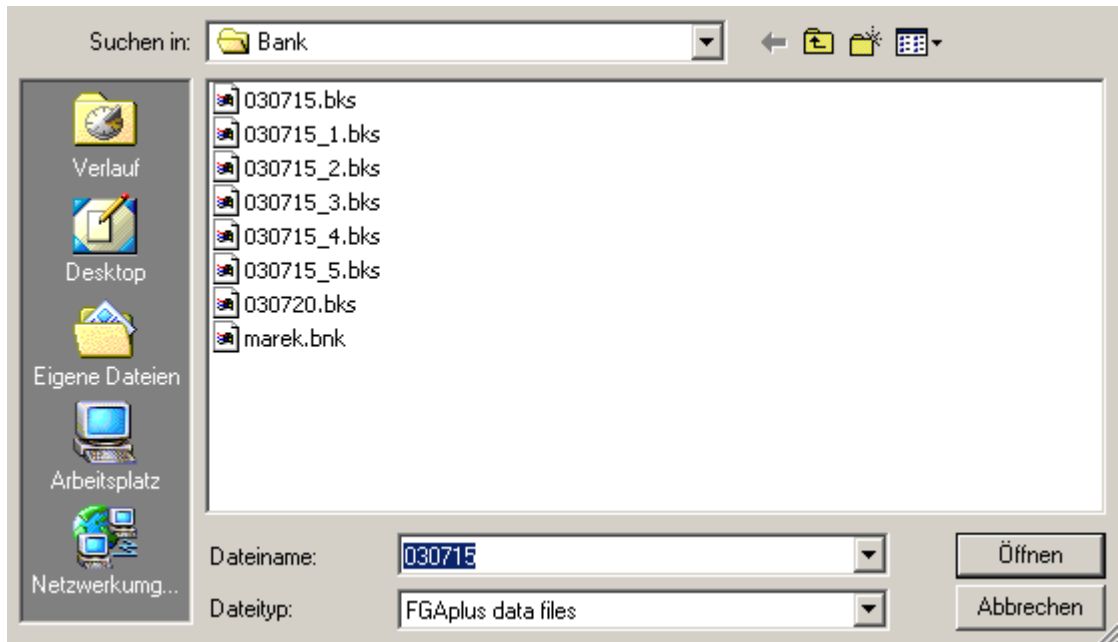
📁 Displays

(\* .bmp)– Displays of the analysers which are stored under the option REMOTE CONTROL.

📁 Exported files (\*.csv) – These are files stored in the format \*.csv.

📁 Footers (\*.ftr)– Footer texts that are stored under the option FOOTER.

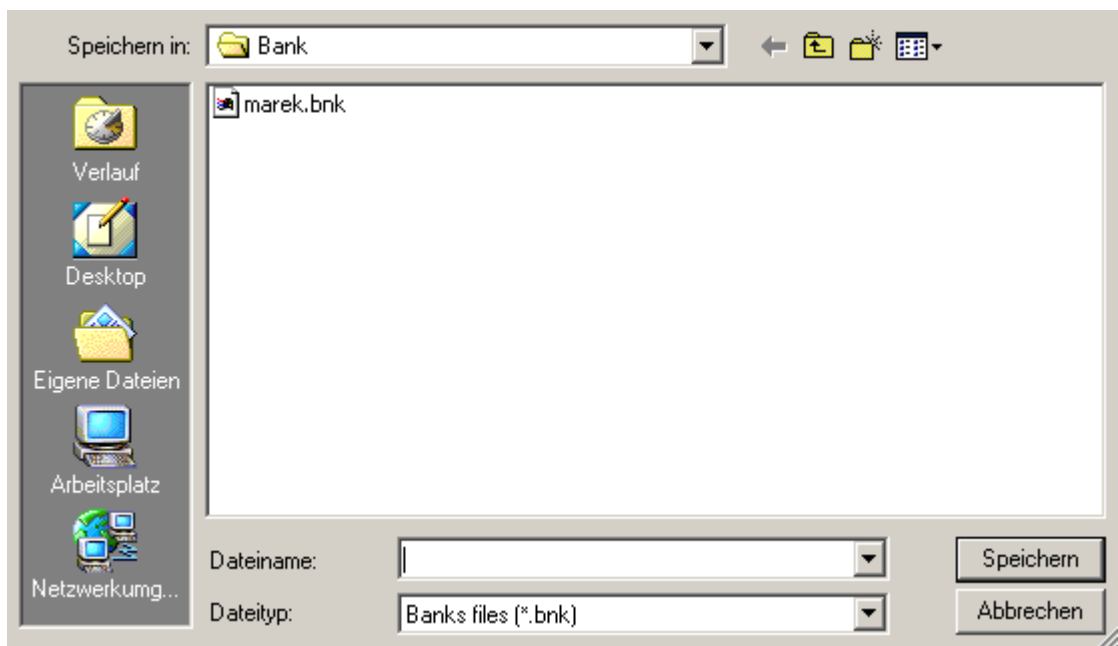




### 5.1.2 Store

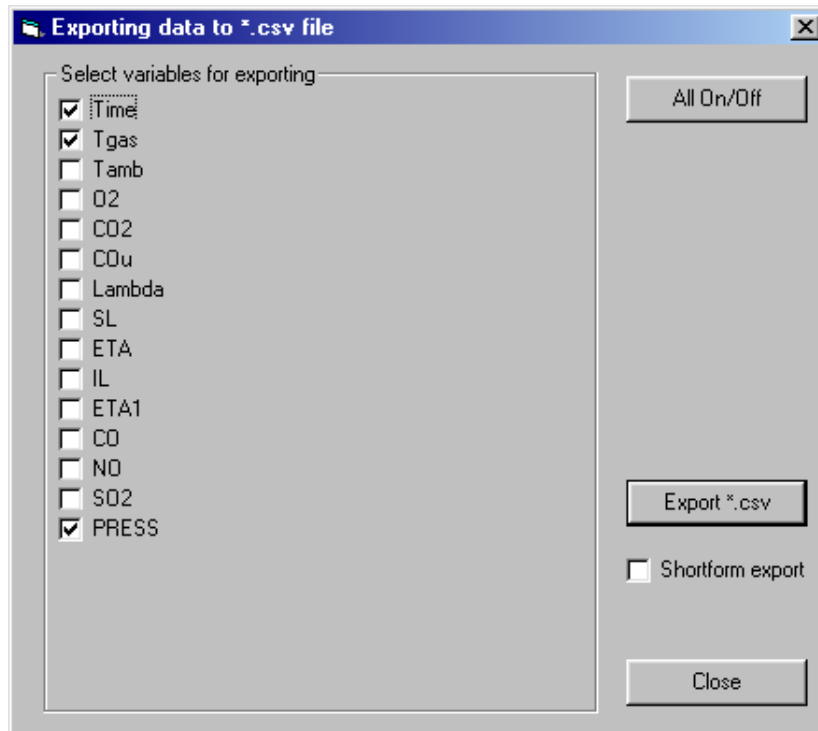
A databank can be stored again after opening.

### 5.1.3 Store as...



An open databank can be stored under any name.

## 5.1.4 Export \*.csv

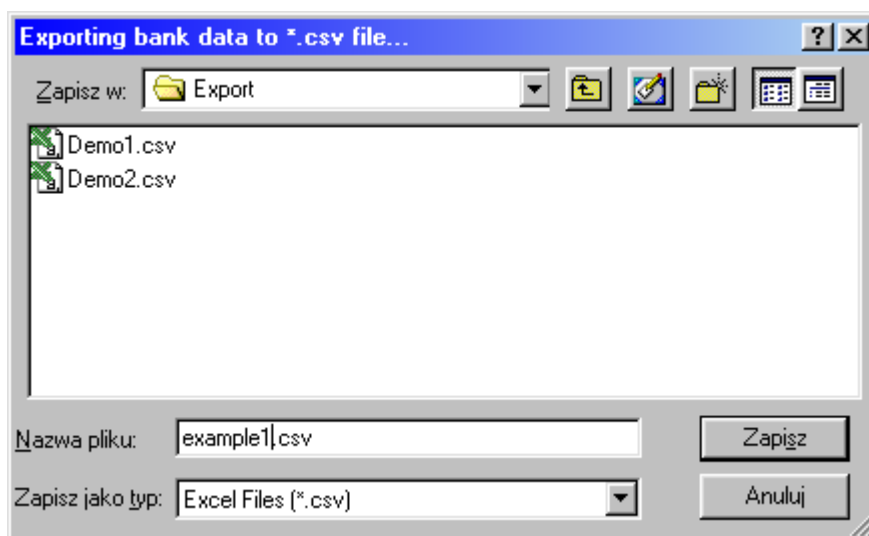


The key **Export** will cause the data to be stored in the format \*.csv. Most of the spreadsheet programmes such as Microsoft Excel can read and process this format.

It is possible to export both the \*.bnk and the \*.bks files in \*.csv format to the computer hard drive.

The button **All On/Off** has the effect of marking or removing the marking from all the values. Checking the option **Shortform export** will ensure that only measurement values, not the extra information such as user, instrument type, fuel and measurement parameters are stored.

After pressing the key **Export \*.csv** the following window will appear, showing the file name and where it will be stored.



## 5.1.5 Close programme (Quit)

The programme will close.

## 5.2 Communication

|                            |     |
|----------------------------|-----|
| Restart transmission       | F8  |
| Read banks from analyzer   | F9  |
| Read reports from analyzer | F11 |
| Read On-Line               | F12 |
| Options...                 |     |

### 5.2.1 Restart transmission

The communication with the analyser will be restarted. The instrument data will be requested and displayed in the programme.

### 5.2.2 Read banks from analyser

This command is available after communication with the analyser has been established successfully. This command will read out all databanks from the analyser. These will be shown on the computer screen and automatically saved under a default name (generated from the date). The file extension is dependent on the instrument type (\*.bks, \*.bk6, \*.bk5 or \*.bk2).

The screenshot shows a software window titled "C:\aroboczy\tymczas\FGAplus\Data\Bank\031127\_5.bks (Bank #1)". Below it, another window titled "C:\aroboczy\tymczas\FGAplus\Data\Bank\031127\_5.bks (Bank #2)" is active. This window displays the following information:

**Bank Info:**  
 Date: 01-01-1951  
 Time: 20:14:46  
 Period: 10 sec  
 Total: 6  
 Selected: 6

**Bank name:** [Empty field]  
**Fuel:** Info: Data read from analyzer No 00000000 on 27-11-2003 as bank #2  
 Fuel: GAZ MIEJSKI (R)  
 Original Fuel  
 O2R: 3 %  
 Original O2R  
 View:  Chart,  Single,  Averaged  
 Print

|                     | CO  | NO  | SO2 | NO2 |
|---------------------|-----|-----|-----|-----|
| Abs. volume con.    | 1   | 1   | ... | ... |
| Mass concentr.      | 1   | 1   | ... | ... |
| Rel. mass concentr. | ... | ... | ... | ... |
| Relative emission   | 0   | 0   | ... | ... |

**Combustion parameters:**  
 T gas: ... °C  
 T amb: ... °C  
 Stack loss: ... %  
 Efficiency: ... %  
 Loss by inc. comb.: 0,0 %  
 Reduced efficiency: ... %  
 Excess air (Lambda): 0,76

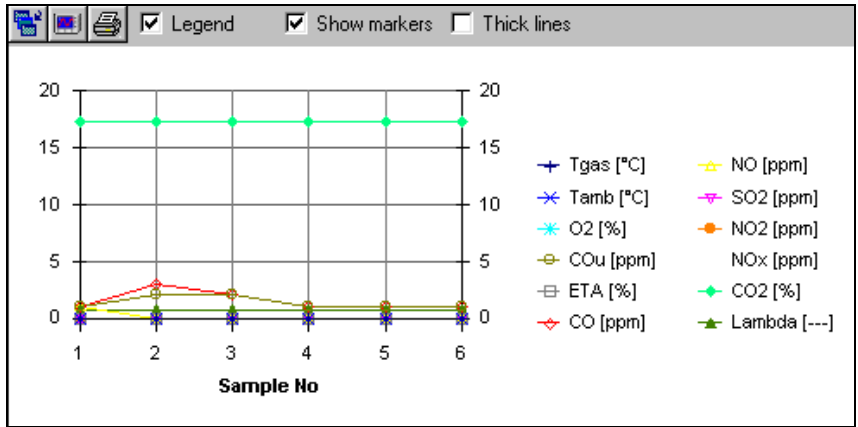
| Time       | Tgas | Tamb | O2  | CO2   | COu | Lambda | SL  | ETA | I   |
|------------|------|------|-----|-------|-----|--------|-----|-----|-----|
| [hh:mm:ss] | °C   | °C   | %   | %     | ppm | ...    | %   | %   | ... |
| 1 20:14:56 | ...  | ...  | ... | 17,26 | 1   | 0,76   | ... | ... | 0   |
| 2 20:15:06 | ...  | ...  | ... | 17,26 | 2   | 0,76   | ... | ... | 0   |
| 3 20:15:16 | ...  | ...  | ... | 17,26 | 2   | 0,76   | ... | ... | 0   |
| 4 20:15:26 | ...  | ...  | ... | 17,26 | 1   | 0,76   | ... | ... | 0   |
| 5 20:15:36 | ...  | ...  | ... | 17,26 | 1   | 0,76   | ... | ... | 0   |
| 6 20:15:46 | ...  | ...  | ... | 17,26 | 1   | 0,76   | ... | ... | 0   |

The computer screen now shows windows with the contents of each bank. The command **Save As** will store the contents of the bank in the directory \*.bnk. This window also contains fields where comments can be attached to the banks.

The field **Fuel** will choose the fuel that should be used for the calculations.

The field **view** will allow changes to the appearance of the results.

Activating the option **Chart** will change the display, as shown in the window below:



The appearance of the display, colours, type of line and size of window can easily be changed with the functions in the upper menu bar.

- ☞ Single – The upper right section will show results from the marked line in the table.
- ☞ Averaged – The averages of all the marked lines in the table will be shown.

Measurements are marked by either a double click or using the space bar.

The contents of the banks can also be printed. The **print** key calls up the following window:

**Print preview** [Close]

Printer properties: Kyocera FS-800 KX [Printer Setup] [Refresh Preview] [Print]  Fit to page  Selected rows only  Averaged values [Close]

Analyzer Type: BIOplus  
 Analyzer No: 00000000  
 Software Version: 10.03  
 Printed: 03-11-27 by: mic

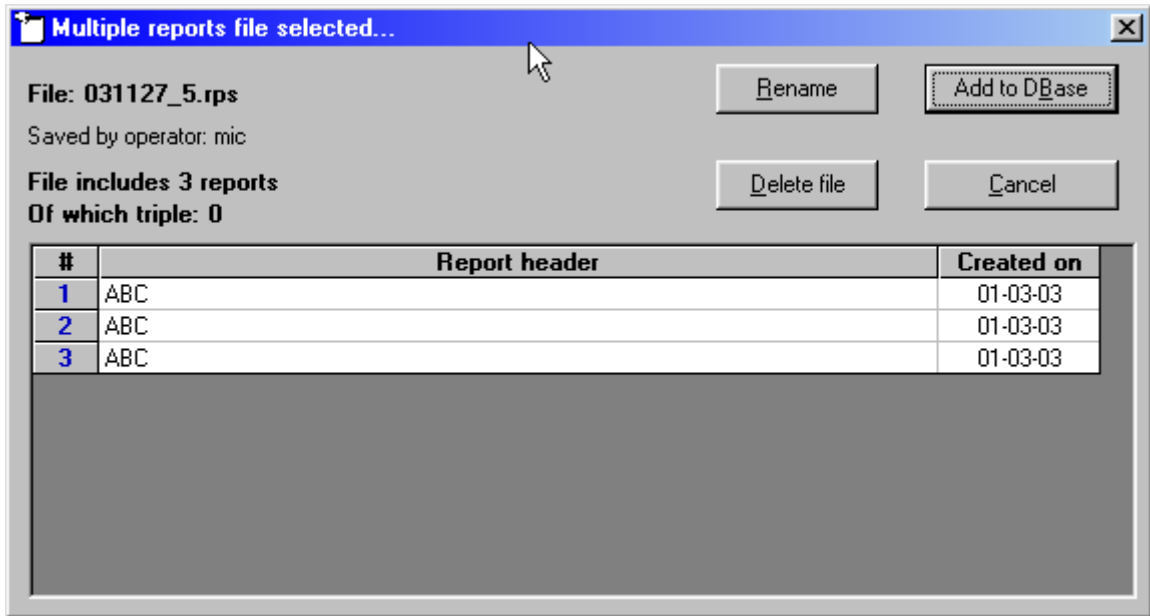
**Bank properties:**  
 Data read from analyzer No 00000000 on 27-11-2003 as bank #2  
 Date: 51-01-01 20:14:46      Measurements: 6  
 Period: 10 sec      Fuel: GAZ MIEJSKI  
 Reference oxygen O2R: 3%

**Measurement results table**

|   | Time     | Tgas | Tamb | O2  | CO2   | COu | lambda | SL  | ETA | IL  | CO  | NO  | SO2 | NO2 | NOx | PRESS |
|---|----------|------|------|-----|-------|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-------|
|   | hh:mm:ss | °C   | °C   | %   | %     | ppm | ---    | %   | %   | %   | ppm | ppm | ppm | ppm | ppm | hPa   |
| 1 | 20:14:58 | ---  | ---  | --- | 17.26 | 1   | 0.76   | --- | --- | 0.0 | 1   | 1   | --- | --- | --- | 0.00  |
| 2 | 20:15:06 | ---  | ---  | --- | 17.26 | 2   | 0.76   | --- | --- | 0.0 | 3   | 0   | --- | --- | --- | 0.00  |
| 3 | 20:15:16 | ---  | ---  | --- | 17.26 | 2   | 0.76   | --- | --- | 0.0 | 2   | 0   | --- | --- | --- | 0.00  |
| 4 | 20:15:26 | ---  | ---  | --- | 17.26 | 1   | 0.76   | --- | --- | 0.0 | 1   | 0   | --- | --- | --- | 0.01  |
| 5 | 20:15:36 | ---  | ---  | --- | 17.26 | 1   | 0.76   | --- | --- | 0.0 | 1   | 0   | --- | --- | --- | 0.01  |

### 5.2.3 Read reports from analyzer

This command is only available when a connection to the analyser exists. If there are reports stored in the analyser, then this window will open:



This window allows the data such as description of the report or report date to be viewed. If these are to be added to the stored data, then the Add to DBase button will insert them in the database for reports.

### 5.2.3.1 Opening the Database

The field **Disk Data** shows the databases stored on the computer.

A single click with the mouse on a database will open the window below:

| #  | SourceFile  | Operator     | Analyzer | Serial No | Header | Date        | Fuel         | Avr Time | Tgas | Tamb | O2  |
|----|-------------|--------------|----------|-----------|--------|-------------|--------------|----------|------|------|-----|
| 1  | 030522_1.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-19 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 2  | 030522_1.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-19 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 3  | 030522_1.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-19 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 4  | 030522_2.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-02 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 5  | 030522_2.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-02 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 6  | 030522_2.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-02 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 7  | 030522_2.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-19 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 8  | 030522_2.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-19 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 9  | 030522_2.rp | J. Wielogórs | CMS6     | 80001071  |        | 01-19 22:39 | Standard fue | 2        | 70   | 70   | ... |
| 10 | 031127.rps  | mic          | BIOplus  | 00000000  | qwerty | 01-01 21:26 | Standard fue | 2        | ...  | ...  | ... |
| 11 | 031127_5.rp | mic          | BIOplus  | 00000000  | ABC    | 03-03 21:36 | Standard fue | 2        | ...  | ...  | ... |
| 12 | 031127_5.rp | mic          | BIOplus  | 00000000  | ABC    | 03-03 21:36 | Standard fue | 2        | ...  | ...  | ... |
| 13 | 031127_5.rp | mic          | BIOplus  | 00000000  | ABC    | 03-03 21:35 | Standard fue | 2        | ...  | ...  | ... |

The lower table shows

Zusätzlich lassen sich die Inhalte der gespeicherten Datenbanken ausdrucken (mit aktivierten Spalten), veränderung der Bankennamen sowie dessen löschen.

## 5.2.4 Daten on-line leses (Read on-line)

Aktiviert die on line Betrieb. Die Messdaten werden in der vorgewählten Zeitabständen vom Analysator gelesen und einstellungsabhängig auf dem Harddisk des Computers gespeichert. Die Einstellungen des on line Betriebes werden im P-kt 5.2.5 genauer erläutert.

The screenshot displays a software interface for online data reading. At the top left, it shows the date (27-11-2003), time (12:54:27), and period (5 sec). A 'Total' section shows 'Total: 5' and 'Selected: 5'. Below this, there are fields for 'Bank name', 'Info' (Data read from analyzer No 00000000 on 27-11-2003 as online bank), 'Fuel' (LIGHT OIL (R)), and 'O2R' (3 %). A 'View' section offers 'Chart', 'Single', and 'Averaged' options. A 'Print' button is also present.

The main data area is divided into several sections:

- Summary Table:**

|                     | CO | NO | SO2 | NO2 | NOx |         |
|---------------------|----|----|-----|-----|-----|---------|
| Abs. volume con.    | 0  | 0  | 0   | 0   | 0   | [ppm]   |
| Mass concentr.      | 0  | 0  | 0   | 0   | 0   | [mg/m3] |
| Rel. mass concentr. | 0  | 0  | 0   | 0   | 0   | [mg/m3] |
| Relative emission   | 0  | 0  | 0   | 0   | 0   | [g/GJ]  |
- Combustion parameters:**
  - T gas: 0 °C
  - T amb: 0 °C
  - Stack loss: 100.0 %
  - Efficiency: 0.0 %
  - Loss by inc. comb.: 0.0 %
  - Reduced efficiency: 0.0 %
  - Excess air (Lambda): 1.00
- Data logger:**
  - T1 Ext.: ... °C
  - T2 Ext.: ... °C
  - T3 Ext.: ... °C
  - T4 Ext.: ... °C
  - Pressure: ... hPa
  - U/I 1: ...
  - U/I 2: ...

Below these sections is a table with 13 columns: Time, Tgas, Tamb, O2, CO2, COu, Lambda, SL, ETA, IL, CO, NO, and SO2. The table contains 5 rows of data, with the first row showing values for 12:54:27.

## 5.2.5 Options

The 'Communication Settings' dialog box contains the following options:

- Port:** Current port: COM1. A warning states: "Selecting mouse COM can cause its inactivity!".
- Speed limit:** Radio buttons for 38400 (selected), 19200, and 9600.
- Online measurements:**
  - Interval between measurements: 5 (with up/down arrows), with radio buttons for sec (selected) and min.
  - Lock analyzer keyboard while online
  - Maximum size of online bank: 5 samples
  - Store online samples in file
- Check for presence:**
  - Automatically detect analyzer after start
  - Check for GA-20 presence
  - Check for GA-60 presence
  - Check for Sononic 2000 presence

Buttons for 'Cancel' and 'OK' are located at the bottom right.

Unter Optionen sind die Einstellungen der Kommunikation zwischen Computer und Analysator zu finden.

Die Bedeutung der einzelnen Punkte:

- Port – es ist der COM Port ihres Computers zu wählen an dem der Analysator angeschlossen wurde.
- Speed limit – die Geschwindigkeit der Kommunikation (Baud rate) ist entsprechend dem angeschlossenen Analysator zu wählen. Nicht alle Geschwindigkeiten werden von allen madur Analysatoren unterstützt.

| Analysator  | 9600 | 19200 | 38400 |
|-------------|------|-------|-------|
| GA-20 plus  |      | x     |       |
| GA-21 plus  |      |       | x     |
| GA-40 plus  |      |       | x     |
| GA-40T plus |      |       | x     |
| GA-60       |      |       |       |
| CMS-6       |      |       | x     |

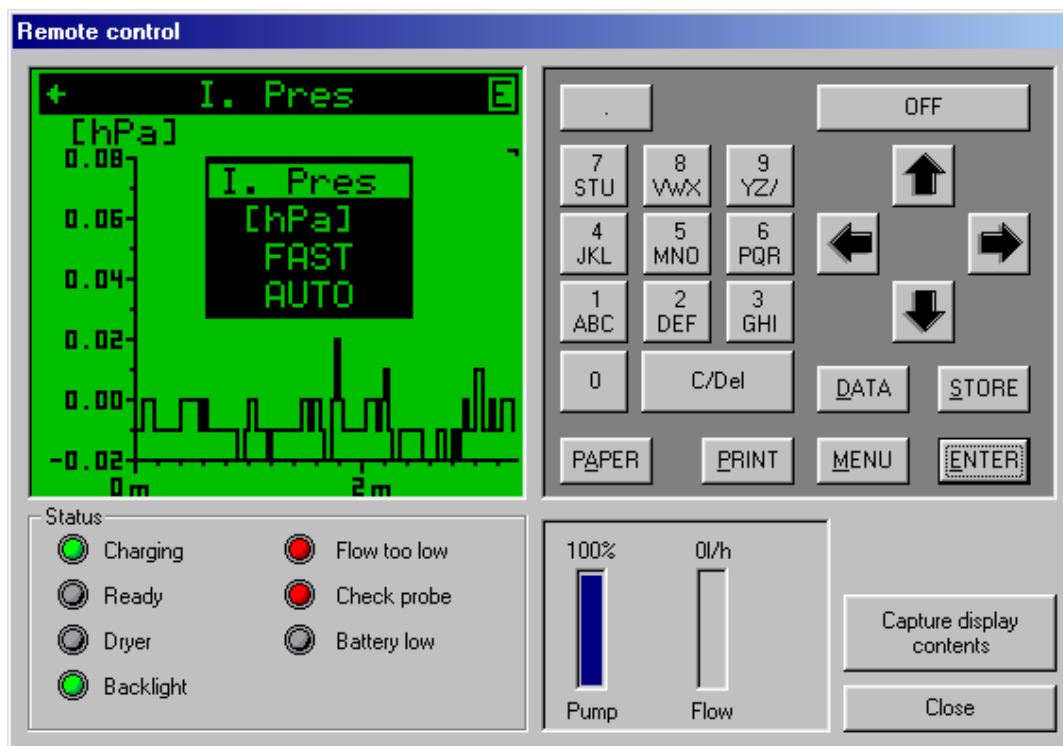
In der weiteren Folge sind die Bedienungen der on line Kommunikation zu bestimmen:

- ☞ Die Zeitabstände in den die Daten on line gelesen werden
- ☞ Während des on line Betrieb besteht die Möglichkeit die Wirksamkeit der Gerätetastatur abzuschalten.
- ☞ Maximale Anzahl von on line gelesenen Datensätze kann definiert werden und damit die Länge des on line Betriebs. Danach wird die Funktion automatisch gestopt.
- ☞ Die on line gelesene Daten könne automatisch in einer Datei des Computers gespeichert werden. Diese Option darf erst nach der Aktivierung und Stoppen der on line Kommunikation eingeschaltet werden, damit der Computer die Datenkonfiguration des Analysator richtig erkennt.

Geräteerkennung – bei der Auswahlmöglichkeiten im unterem Teil des Fenster sollten nur die zutreffenden Punkte markiert werden.

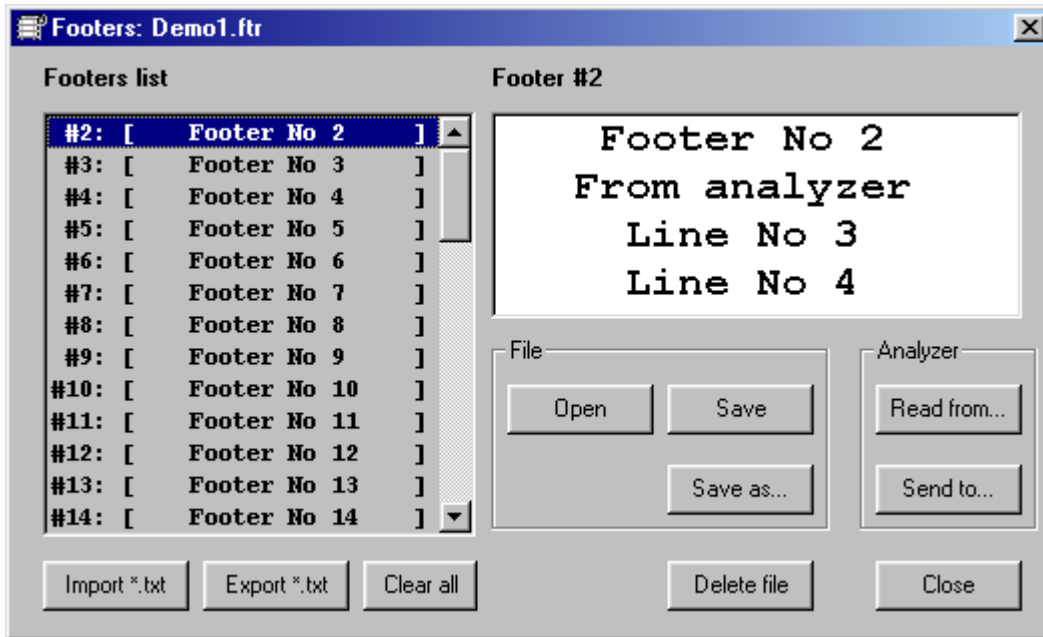
### 5.3 Fernbedienung (Remote)

Es erscheint das folgende Fenster:



Dieses Fenster ermöglicht Fernsteuern des Analysators. Ausführbar sind alle Funktionen die am Gerät möglich sind. Mit der Taste Capture display contents werden die aktuellen Displayanzeigen \*.bmp übernommen. Diese Fenster werden im Verzeichniss \Data\Display gespeichert.

## 5.4 Fusszeilen (Footers)



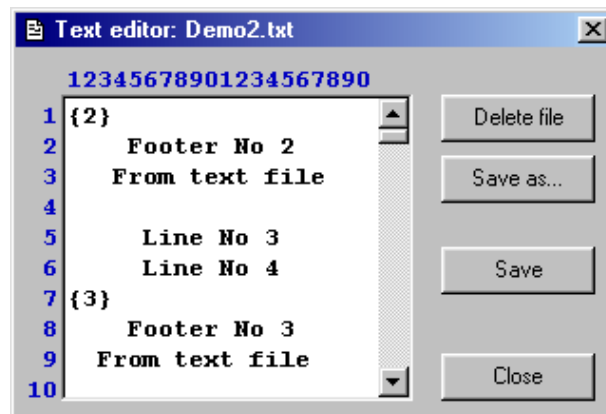
In diesem Fenster wird die Fusszeile für den Ausdruck eingegeben und editiert.

Dieses Fenster lässt sich auch aufrufen vom Fenster Disk data und beinhaltet folgendes:

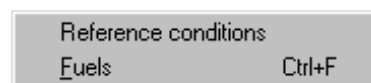
- Open – öffnet Datei die auf der Fstplatte gespeichert ist
- Save – speichert Änderungen in aktuell offenen Fusszeile
- Save as – speichert die Änderungen unter anderem Nahmen
- Read from – liess die Fusszeilen vom Analysator
- Send to – sendet die Fusszeilen zum Analysator
- Delete file – löscht aktuelle Datei
- Clear all – löscht alle Fusszeilentexte in Aktuelldatei

Tasten Import \*.txt sowie Export \*.txt ermöglichen Import und Export der Textdateien.

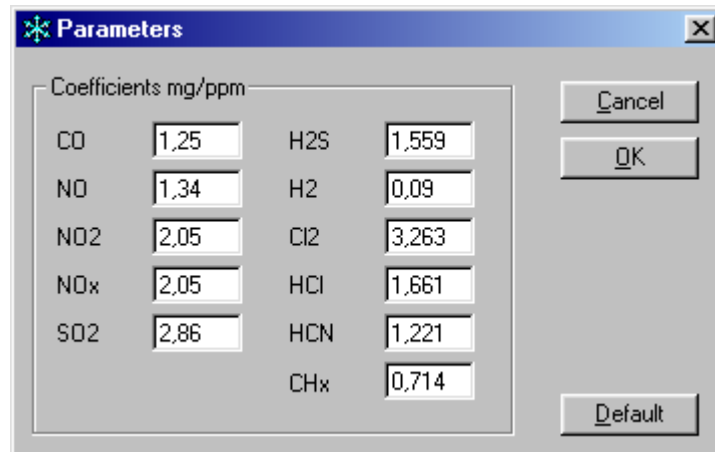
En doppelklick auf die Textdateien vom Verzeichniss \Data\Footer im Fenster Disk Data, öffnet nächstes Texteditorsfenster und ermöglicht editierung der Texte in der Datei.



## 5.5 Einstellungen (Settings)



### 5.5.1 Messparameter (Reference conditions)



In diesem Fenster lassen sich die Werte der Faktoren die für umrechnung der Einheiten von *ppm* auf *mg* ändern. Die Taste Default gibt die Anfangswerte wieder zurück.

### 5.5.2 Brennstoffe (Fuels)



Diese Option erlaubt die Änderung des Brennstoffes, der für die Richtigkeit der Berechnung von Verbrennungsparametern verantwortlich ist.

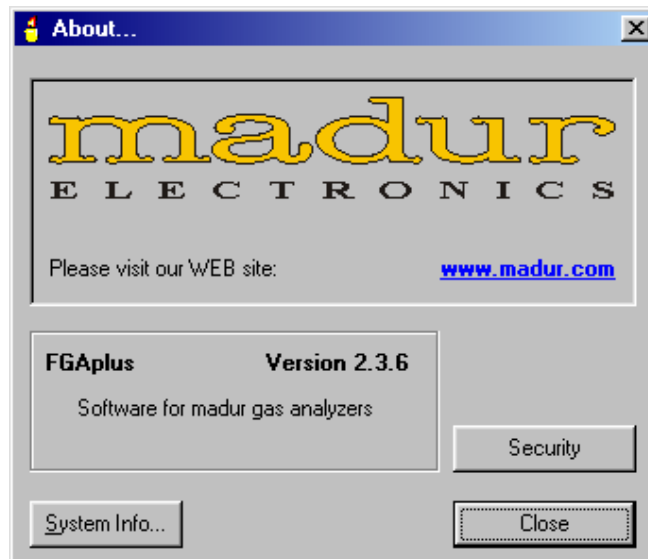
Die Taste Edit ermöglicht änderung von Brennstoffparametern. Default stellt sie wieder auf die ursprünglichen Werte ein.

### 5.6 Fenster (Window)



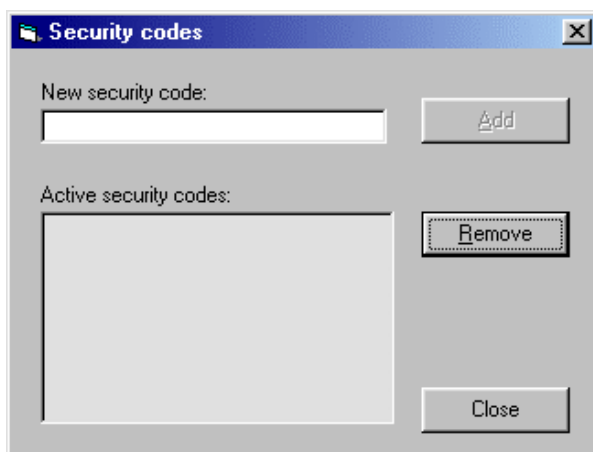
Dieses Menü verwaltet die Fenster des Programmes FGApus.

## 5.7 Über Programm (About...)



### 5.7.1 Sicherheit (Security)

FGAPLUS wird anfänglich als Demoversion installiert wo sämtliche Funktionen deaktiviert sind. Nach der Aufruf des Befehls **About** im Abrollmenü öffnet sich das Fenster in dem unter anderem eine Security-taste vorhanden ist. Nach dem Anklicken des Befehls öffnet sich noch ein Fenster:



- ☞ Wenn du Software direkt vom Distributor gekauft hast, sollst du auch security code bekommen.
- ☞ Security code hebt alle deaktivierten Funktionen auf und ist für jeder Analysator anders.
- ☞ Wenn du mehrere Geräte besitzt, muss du für jedes ein separates Security code verwenden.
- ☞ Nach der Eintragung der Code im Feld New security code und aktivierung mit der Add-Taste, wird dieses in FGAPLUS eingetragen.
- ☞ Durch das Speichern und Schliessen des Fenster wird Eintrag gespeichert.
- ☞ Neustarten von FGAPLUS gibt alle blockierten Funktionen frei.

### 5.7.2 System info (System info)

Aktivieren der System info Taste, ruft eine Eigenschaftsliste der Microsoft systems auf.

**madur**<sup>®</sup>  
E L E C T R O N I C S

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