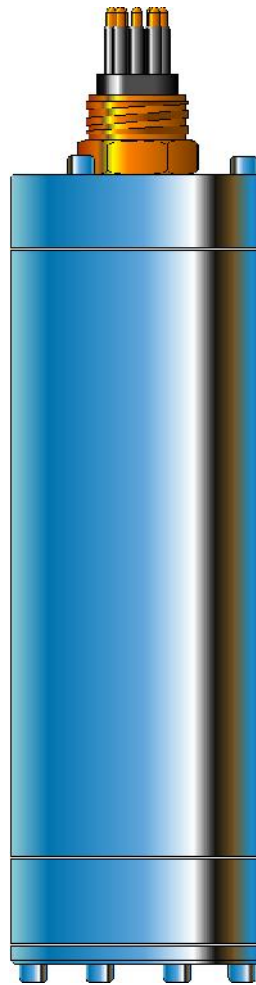


METS methane sensor
SOFTWARE MANUAL



FRANATECH

UNDERWATER SENSORS FOR DISSOLVED GASES

- METS - Software Manual

Release: Software v4.1.3, August 2006

Manual v4.1.5, July 2014

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1 Software System requirements

- WINDOWS95 ® or higher - WINDOWS NT 4.0 ® service release 3 or higher

2 Installing the METS program

Keep the original CD-ROM as safety copy.

- Start the operating system.
- Insert the CD
- Launch the installation software *Setup.exe*. Follow the instructions.

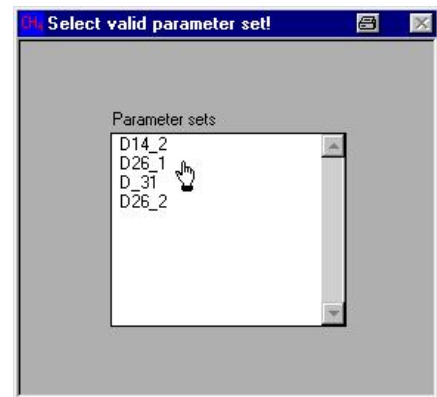
The default target directory is *C:\Program files\Franatech*. It is possible to choose any other directory to install the METS software.

- Leave the Setup program by quitting the success message.
- It is not mandatory to reboot the system, but this can be done as safety if some system instability is known on your PC

3 Starting the METS program

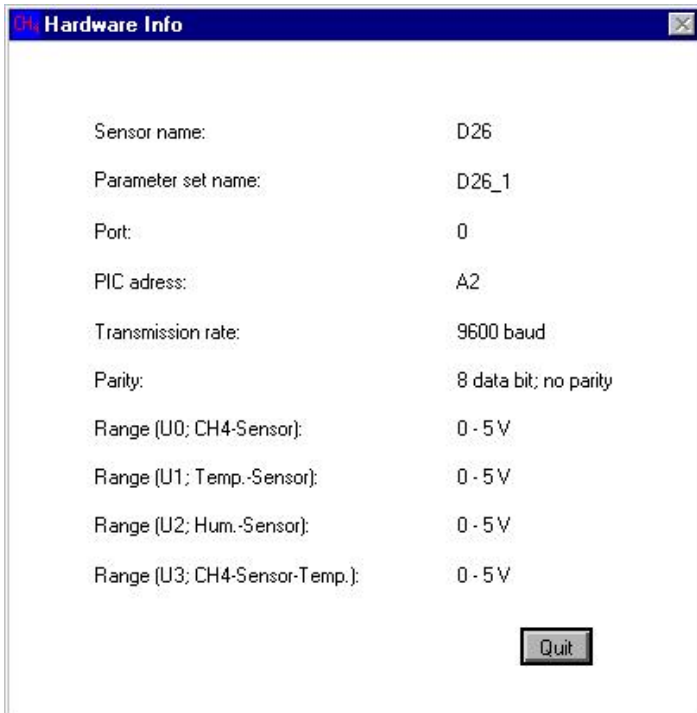
- Launch METS program by double-clicking the METS413 icon in the folder in which you have installed the program or use the WINDOWS ® start menu.

The software searches automatically for the connected sensor. The program compares the logical address of the sensor which answers first with a list of logical addresses saved in the *Sensorparameter* file. If only one address matches the address of the answering sensor the parameters of this detector will be loaded automatically. Otherwise the window *Select valid parameter set* appears. You only can select one item of the list (see fig.). Beware of the correct spelling of the set name! The selected parameters will be loaded immediately. To change the parameter set later click the ticked item in the Port pull-down-menu (compare paragraph 1.11).



The name of the supported detector and the name of the current parameter set are displayed in the upper right corner of the METS window. (See fig. on the next page also.)



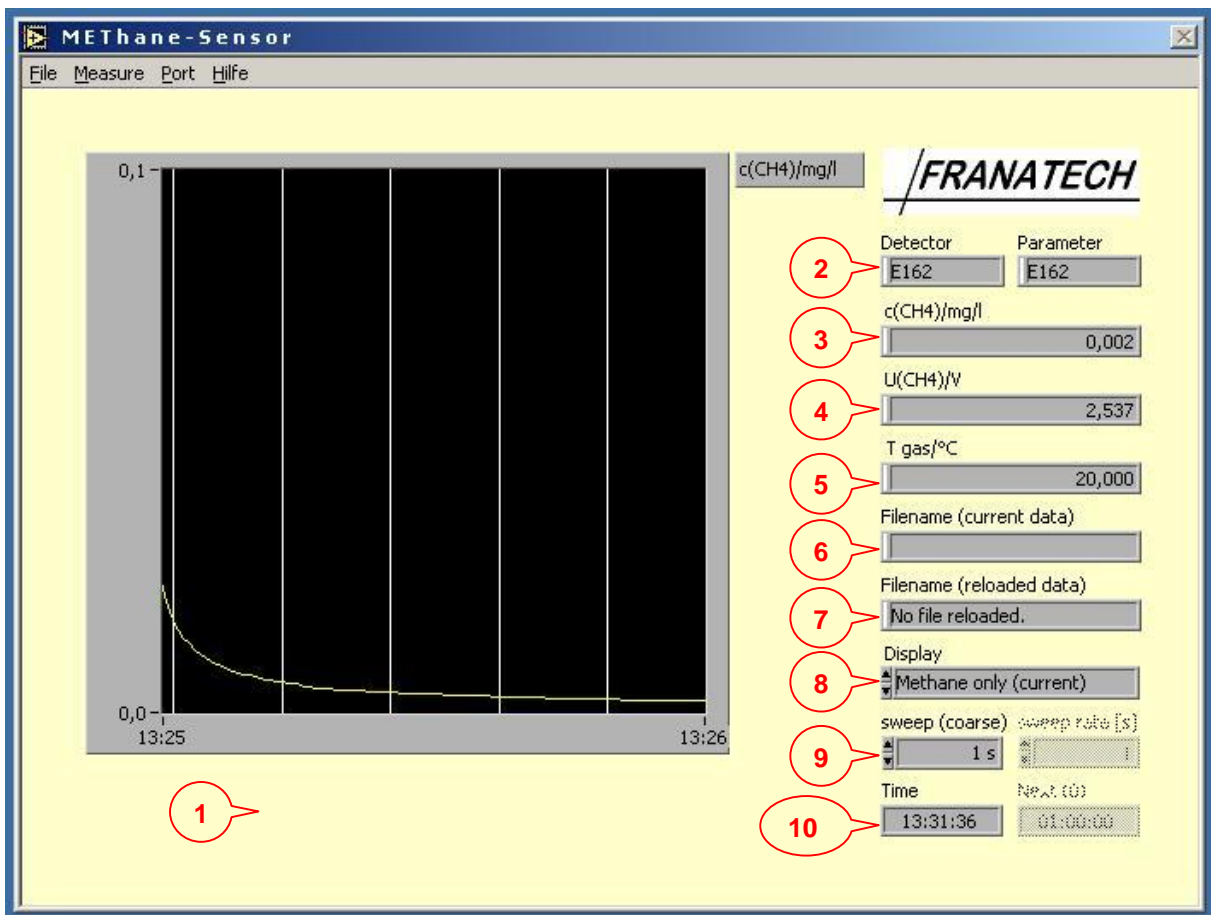


After loading the parameters the window *Hardware Info* appears. The current hardware adjustment is displayed.

Use the *Quit* button to close the window.

The window closes otherwise automatically after 30 seconds.

When the start routine is successful completed the user interface of the METS program will appear in the following display.



4 Elements of the METS window

- ① As soon as you start the measurement (see paragraph 1.7) the graphic indicator displays the methane concentration depending on time. It is possible to change the display mode (see paragraph 1.5).
- ② Name of the supported detector and of the current parameter set (see paragraph 1.3).
- ③ Current value of the methane concentration. Methane concentration is calculated and displayed as equivalent under standard (25°C, 1 atm).

Units can be changed in the menu bar

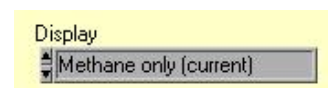
- ④ Current value of the sensor output voltage in V.
Displaying the sensor output voltage enables to monitor the stability of the whole detector system.
- ⑤ Current value of the temperature inside the detector volume.
Displaying the gas temperature enables to monitor the stability of the whole detector system.

Notice: The gas temperature is slightly higher than the temperature of the water.

- ⑥ The name of the current data file is displayed here when the program works in the *save* mode (see paragraph 1.7).
- ⑦ The name of the reloaded data file is displayed here when older data are reloaded (see paragraph 1.9).
- ⑧ To change the display mode (see paragraph 1.5).
- ⑨ Select a storage rate independent from the update rate of the graphic display (see paragraph 1.8).
- ⑩ The left indicator displays the system time. The right indicator shows the time when the next value will be added to the current data file (see paragraph 1.7).

5 Display modes

The METS program offers several display modes. Select the mode by clicking the arrows of the *Display* control in the lower right corner.



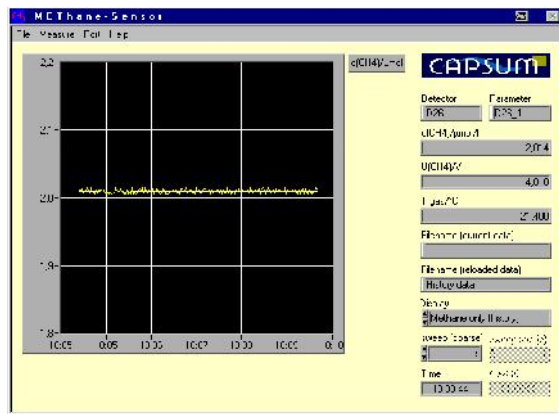
It is possible to change the type of the displayed data.

- Current [c]** The current mode displays the measured values of the last 100 seconds. The values are updated every second.
- History [h]** The history mode displays the measured values of the last 3600 seconds. The values are updated every second. In addition a smoothed regression function is displayed in white color.
- Reloaded [r]** The reloaded mode displays the values from a reloaded data file (see paragraph 1.9). It is possible to reload the previous saved data of a running measurement.

It is also possible to vary the number of the displayed parameters.

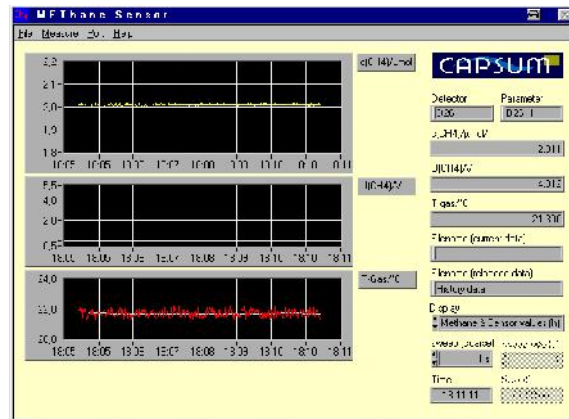
Methane only:

The *Methane only* mode displays only the methane concentration calculated according to the measured sensor values.



Methane & sensor values:

The *Methane & Sensor values* mode displays the methane concentration, the methane sensor voltage [V] and the temperature [°C] of the detector volume.



The combination of the options leads to six variants on displaying data:

- Methane only (current)
- Methane only (history)
- Methane only (reloaded)
- Methane & Sensor Values ®
- Methane & Sensor Values (h)
- Methane & Sensor Values ®

The additional item “table: reloaded data” allows to display reloaded data as a table.

6 Additional Display options

Click the right mouse key within the diagram and a context menu will appear.

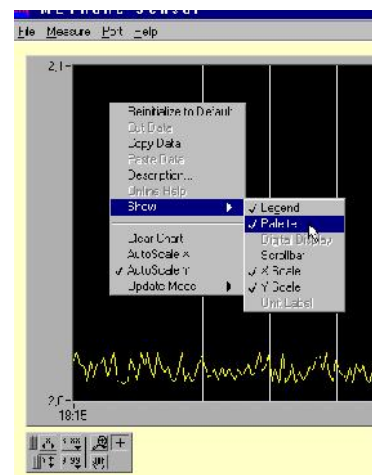
The *Reinitialize to default* command is unimportant in this application.

The *Copy Data* command copies the whole indicator as a graphic into the WINDOWS ® clipboard.

The *Description* command opens a window which contains a short description of the graphic indicator.

The *Show* command opens another context menu (see below).

The *Clear Chart* command removes all graphical data from the indicator.

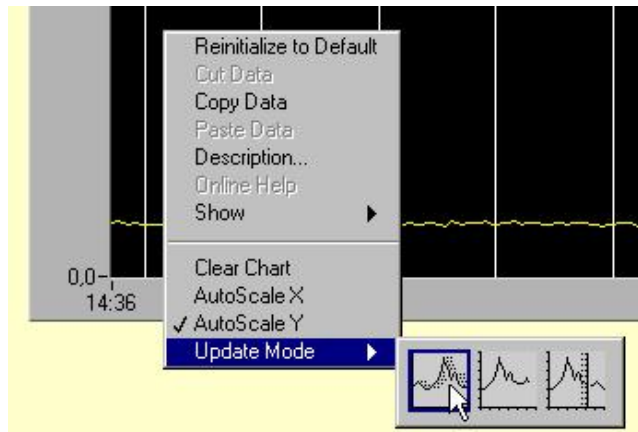


If the *Autoscale X* command is not ticked (default), the current time is displayed at the right site of the indicator. The last 100 seconds are displayed. Unfortunately the execution of the *Autoscale X* command will change the length of the displayed period of time irreversibly as a result of to the applied programming language. Therefore it is urgently recommended not to execute this command.

If the *Autoscale Y* command is ticked (default), the Y-axis scale adjust automatically to the actual range of the displayed values. Switching off the *Autoscale Y* command enables to adjust manually the y-axis scales by clicking the upper resp. lower range values and typing numbers directly into the highlighted areas.

The *Update Mode* command opens another context menu that offers three display modes:

The *strip chart mode* (first icon under Update Mode) has a scaling display similar to a paper tape strip chart recorder. As each new value is received, it is plotted at the right margin and old values shift to the left.

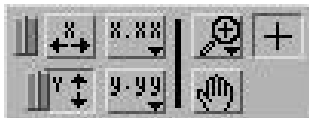


The *scope chart mode* (second icon) has a retracing display similar to an oscilloscope. Each new value is plotted to the right of the preceding. When the plot reaches the right border of the plotting area, the screen is refreshed and the plot start again. The scope chart is significantly faster than the strip chart because it is free of the processing overhead involved in scrolling.

The *sweep chart mode* (third icon) acts much like the scope chart, but it does not go blank when the data hits the right border. Instead, a moving vertical line marks the beginning of new data and moves across the display as the VI adds new data.

The commands *Legend*, *X Scale* and *Y Scale* offered by the *Show* context menu are unimportant in this application. As a result of to the applied programming language the execution of the *Scrollbar* command will disturb shortly the panel order (for less than a second). The command will be disabled automatically and the order will be rearranged.

The *Palette* command offered by the *Show* context menu switches the Display set-up tool box.



Display set-up tool box



Click on the switcher left of the axis-button to set the manual mode.



Scales: Given ranges can also be selected by clicking repeatedly the buttons corresponding to the x- or y-axis, until the required range is obtained.



axis labels: Click the corresponding button (x.xx resp. y.yy). A dialog box allows to choose between several alternatives.



Zoom: A pop-up box presents several predefined alternatives. Click on the chosen option, and use the cursor to select the area to be zoomed. Use scaling buttons to resume to the initial setting.

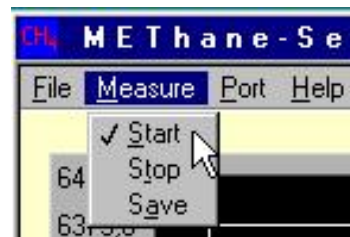


Move: Allows to drag the displayed curves in order to position them at your convenience. The x- and y-axis scales adjust automatically.

7 Starting, Stopping and Recording measurements

Select the pull-down-menu Measure. Clicking on Start allows to carry out measurements without saving data. The displayed data will be updated every second.

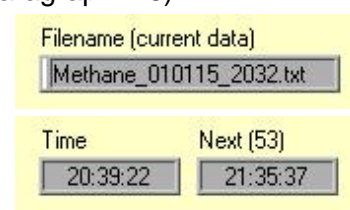
If you want to record data, you have to start the measurement first. Then click on Save in the same menu. A self-explaining dialog box pops up and allows to choose the filename.



The proposed filename has the structure *Methane_year / month / day / time of day* and can accordingly be changed.

Afterwards the measurements are automatically resumed. You can choose the frequency of the storage independently from the graphic update interval (see paragraph 1.8).

The name of the file where data are presently stored is displayed by the *Filename (current data)* indicator.



The *Next(#)* indicator will be enabled and displays the time of the next storage. The number # represents the number of the next storage.

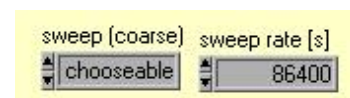
To stop recording data without stopping the measurement click Save in the menu Measure again. The tick of the item will be automatically removed. The actual data file will be closed. The *Next(#)* indicator will be disabled.

To stop data acquisition select Stop in the menu Measure. The ticks for the other options of this menu will be removed automatically.

Stop during recording interrupts the data storage and closes the actual data file. The *Next(#)* indicator will be disabled. When resuming data acquisition (Start) and clicking Save, a new file will be created following the above procedure.

8 Storage intervals

You can select the storage intervals by clicking the arrows of the *sweep (coarse)* control in the lower right corner.



If you select 1, 3, 10, 30 [s] or 1, 3, 10, 30, 60 [min] the *sweep rate* control is disabled.

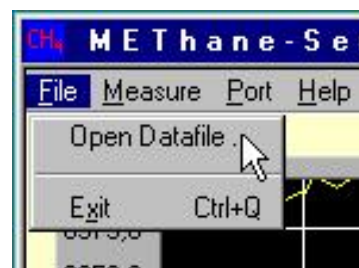
When you select the item *chooseable* the *sweep rate* control on the right side is activated. The METS program accepts every value between 1 and 86400 seconds.

9 Reading data files

Select option Open Datafile in the pull-down-menu File. A self-explaining dialog box pops up and allows to select the filename.

To read another data file select Open Datafile again. The former reloaded data will be overwritten by the now reloaded data.

To display the reloaded data as a graph select *Methane only (reloaded)* or *Methane & Sensor Values (r)* using the *Display* control. To display them as a table select *table: reloaded data* (see paragraph 1.5).



10 Data file format

NOTE: the software stores the analog output in V and the calculated concentration in $\mu\text{mol/l}$

Data files have typical ASCII-format. The default file name extension is *txt*. Files can be read with different software (e.g. Microsoft-Excel®, Microsoft-Wordpad®, Corel-QuattroPro®, SUN-StarOffice®, DeltaPoint-Deltagraph®, Microcal-Origin®).

To analyse your data, launch the data analysis program first and then open the data file. Depending on the software version, you may have to use the option *read all data types*.

For example the MS-Excel® spread sheet program displays the data recorded with the METS program according to the following structure:

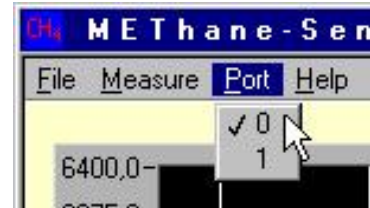
	A	B	C	D
1	Detector:	D26		
2	Parameter set:	D26_1		
3	Program version:	4.1.1		
4	Update:	20.01.01		
5	Response:	!A206300000000FFFFFFFF42		
6	#	date	time	length [s]
7	1	20.01.01	20:30:31	0
8	2	20.01.01	20:30:33	2
9	3	20.01.01	20:30:35	4
10	4	20.01.01	20:30:37	6
11	5	20.01.01	20:30:39	8

E	F	G	H
T-Gas [°C]	rel. humidity [%]	abs. humidity [g ³ cm ⁻³]	Sensor temperature (CH4) [°C]
21,812	99,072	19,037988	0
21,468	98,904	18,632159	This column is
22,055	98,656	19,225509	unimportant in
21,639	99,110	18,855764	this release!
22,050	98,993	19,285050	0

I	J	K	L
Temperature rate (CH4) [K/s]	Methane sensor voltage [V]	Voltage rate [V/s]	Methane concentration [mg/l]
0	4,015	0	2,012
This column is	0	4,003	This column is
unimportant in	0	4,017	unimportant in
this release!	0	4,009	this release!
0	4,016	0	2,012

11 Selecting the communication port

During start up procedure METS program checks the serial ports installed in your system. The number of all available serial ports is registered in the pull-down-menu **Port** indifferent to connected detectors. METS reads data from the first port which is connected with a detector. The number of this port is ticked in the menu.



Every time you tick a port number in the **Port** menu the METS program selects and configures the port automatically. Afterwards program starts searching for connected detectors at this selected port similar to start up procedure.

The program compares the logical address of the sensor which answers first with a list of logical addresses saved in the *Sensorparameter* file. If only one address matches the address of the answering sensor the parameters of this detector will be loaded automatically. Otherwise the window *Select valid parameter set* appears. You only can select one item of the list (see fig. in paragraph 1.3). Beware of the correct spelling of the set name! The selected parameters will be loaded immediately.

If no sensor answers, the METS program still access to the former selected port. The port number in the pull-down-menu will be ticked according to the result of searching. Anyway the name of the supported detector and the name of the current parameter set are displayed in the indicators in the upper right corner of the METS window.

Clicking the ticked item will launch the comparison of the detected logical address of the connected sensor system and the logical addresses saved in the *Sensorparameter* file.

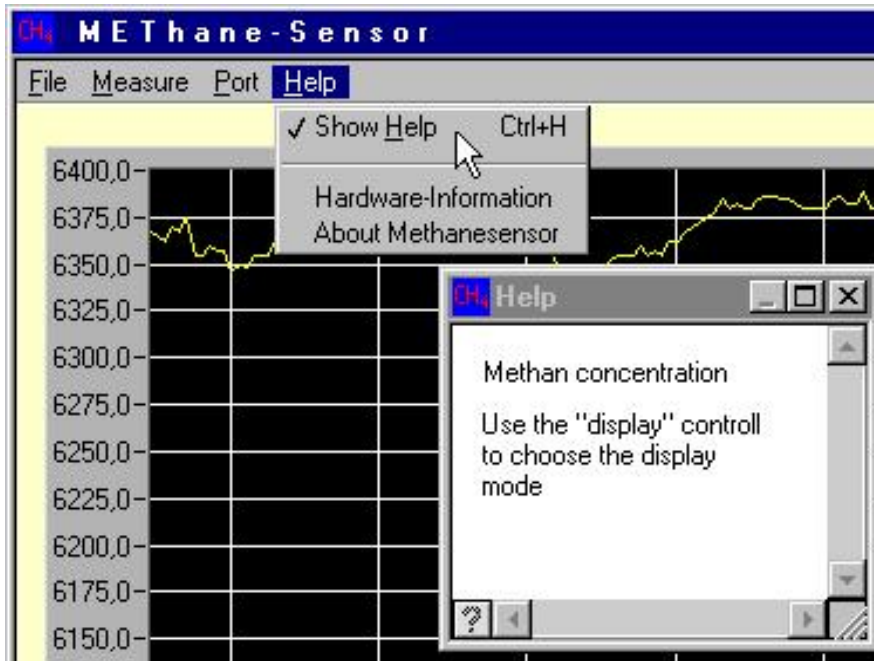
12 Getting help

Select the **Show Help** at the **Help** pull-down-menu and a new window opens. Move the cursor on that place on the screen where information is needed.

Selected items are ticked!

Switch off Help by clicking the **Show Help** item again or by clicking the close button of the pop up window.

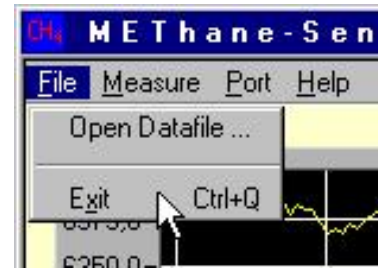
Clicking the **Hardware-Information** let the window *Hardware Info* appear (compare figure in paragraph 1.3).



Clicking the **About Methanesensor** let the window *About Methanesensor* appear. Software release and version information are displayed.

13 Stop program run

Select item Exit in menu File to quit the program.



14 Trouble Shooting

- you started a measurement and nothing happens: no curves displayed, no actual values appearing in the signal-legend window
- the system reports communication failure with the sensor

Your system may have difficulties managing the COM ports

A possible solution consists in:

- deactivate every COM port other than 0 and 1
- close all software using COM port 0 or 1
- try again *Measure/Start*

Data transmission problem through the RS485/RS232 desktop converter: the red LED should flash when the transmission runs. If no transmissions happens, the LED is glowing continuously and the sensor gives a signal (voltage output measured at the connector), check for loose connections, eventually pull out the energy supply cable and connect it after a few seconds. This will reset the system.

15 Uninstalling the METS program

- Launch the Uninstall program by double-clicking the Uninstall icon in the folder in which you have installed the METS program. Follow the instructions.
- Leave the Uninstall program by quitting the success message.
- Alternative: The item Software in the WINDOWS 9x/ME System folder menu opens the dialog box to uninstall programs.
- Alternative: The item ADD/Remove Programs in the WINDOWS ® NT/2000 System folder menu opens the dialog box to uninstall programs.
- You have to uninstall *NI LabVIEW Run-Time Engine* separately using the system routine.