MEAC2000 EU
Measuring Data Computer Europe

Hardware components
System configuration
Software usage

SICK
Sensor Intelligence.

Document Information

Product
Product name: MEAC2000 EU

Manufacturer
SICK MAIHAK GmbH
Poppenbuetteler Bogen 9 b · D-22399 Hamburg · Germany

> *Please note:*
> The right to use the MEAC Software will be granted after acknowledgement of the Software License Agreement (→ page 101, §8).

Document ID
Title:	Operating Instructions MEAC2000 EU
Order No.:	8015074
Version:	1.0
Release:	2012-05

Publisher
SICK MAIHAK GmbH
Nimburger Str. 11 · D-79276 Reute · Germany

Tel.:	+49 7641 469-0
Fax:	+49 7641 469-11 49
E-mail:	info.pa@sick.de

Trademarks
Windows XP and Windows 7 are registered trademarks of Microsoft Corporation.
This manual refers to several protected registered trademarks. These trademarks are not explicitly identified as such in the text. The lack of identification of a registered trademark name cannot be construed to mean that the trademark registration of the product does not apply.

Guarantee Information
Specified product characteristics and technical data do not serve as guarantee declarations.

Glossary

AC	Alternating Current
BImSchV	Bundes-Immissionsschutzverordnung ("Federal Emission Protection Regulation", German anti-pollution standard)
DAU	Data Acquisition Unit
DC	Direct Current
FM	I/O Field Module
HDD	Hard Disk Drive
ISDN	Integrated Services Digital Network
LAN	Local Area Network
LED	Light emitting diode (small indicator lamp)
PC	Personal Computer
PCI	Peripheral Component Interconnect (PC internal interface)
RAID	Redundant Array of Independent Disks
TFT	Thin-Film Transistor (PC display technology)

Information Symbols

Important technical information for this product

Supplementary information

MEAC2000 EU

1   Product description

Product Scope
System Design
Hardware Components
Input/Output
Data Transmission
Software Features

1.1 Acquisition System

Purpose

The MEAC2000 EU is an emission data acquisition system designed to:

- Analyze emission data in accordance with old 13./17. BlmSchV (German antipollution standards before 2003/2004)
- Analyze emission data at production facilities in accordance with European standards 2000/76/EC (waste incineration) and 2001/80/EC (large combustion plants)
- Display emission data and service data
- Transmit emission data to remote access system (ERT)
- Integrate emission data with the local area network (LAN) and the process control systems (PLS)

System components

- 1 to 16 decentralised Data Acquisition Units (DAU)
- 1 Emission PC (EPC) with Windows XP / Windows 7
- 1 user-friendly software with Windows interface

Data Acquisition Units (DAU)

The DAU collects the data, processes them, and makes them available to the MEAC2000 Emission PC. The MEAC2000 Emission PC operates under Windows XP and Windows 7, and it can run on a network. The DAUs are not the only data source of the MEAC2000 Emission PC; it can also obtain data from a process control system (process control loop) or transmit data to it.

The DAUs are microprocessors driven data receivers. They can be installed in a decentralized manner and process the following tasks:

- Generating one-minute average (current) values
- Saving status signals
- Posting analog and status signals

The transmission to the Emission PC of the one-minute average values, and the status signal changes occurs through cable, fiber optics or modem depending on the site. Synchronisation of the connected DAUs is accomplished via the radio controlled clock of the Emission PC.

MEAC2000 Emission PC

All the system functions are performed on the MEAC2000 Emission PC:

- Configuration of the entire system
- Configuration of all DAUs and FMs (I/O field modules)
- Analysis of all data collected by DAUs/FMs
- Classification according to the legal requirements
- Classification is clearly laid out, it can be sent to a central protocol printer. It is possible to process the classifications of alternative or multi-fuel heatings in accordance with old 13./17. BImSchV and 2000/76/EC or 2001/80/EC.
- Saving all emission data (one-minute average values included; for security, data is backed-up on redundant drives or external RAID arrays)
- Emission data remote transmission (ERT) by modem to the regulating agency *(optional)*
- Remote maintenance and support by SICK MAIHAK Customer Service
- Displaying all acquired data (current or historical) in customized graphs or tables
- Entering fault reports *(optional)*
- Printing graphs or tables on a connected color printer

The MEAC2000 Emission PC can handle up to:

- 800 analog inputs
- 400 analog outputs
- 2000 digital inputs (status)
- 1000 digital outputs (status)

MEAC2000 Workstation PC

Each MEAC2000 workstation has full MEAC2000 functionality.

System Requirements

MEAC2000 runs under Windows XP and Windows 7 allowing for easy integration with networks.

1.2 **System Structure**
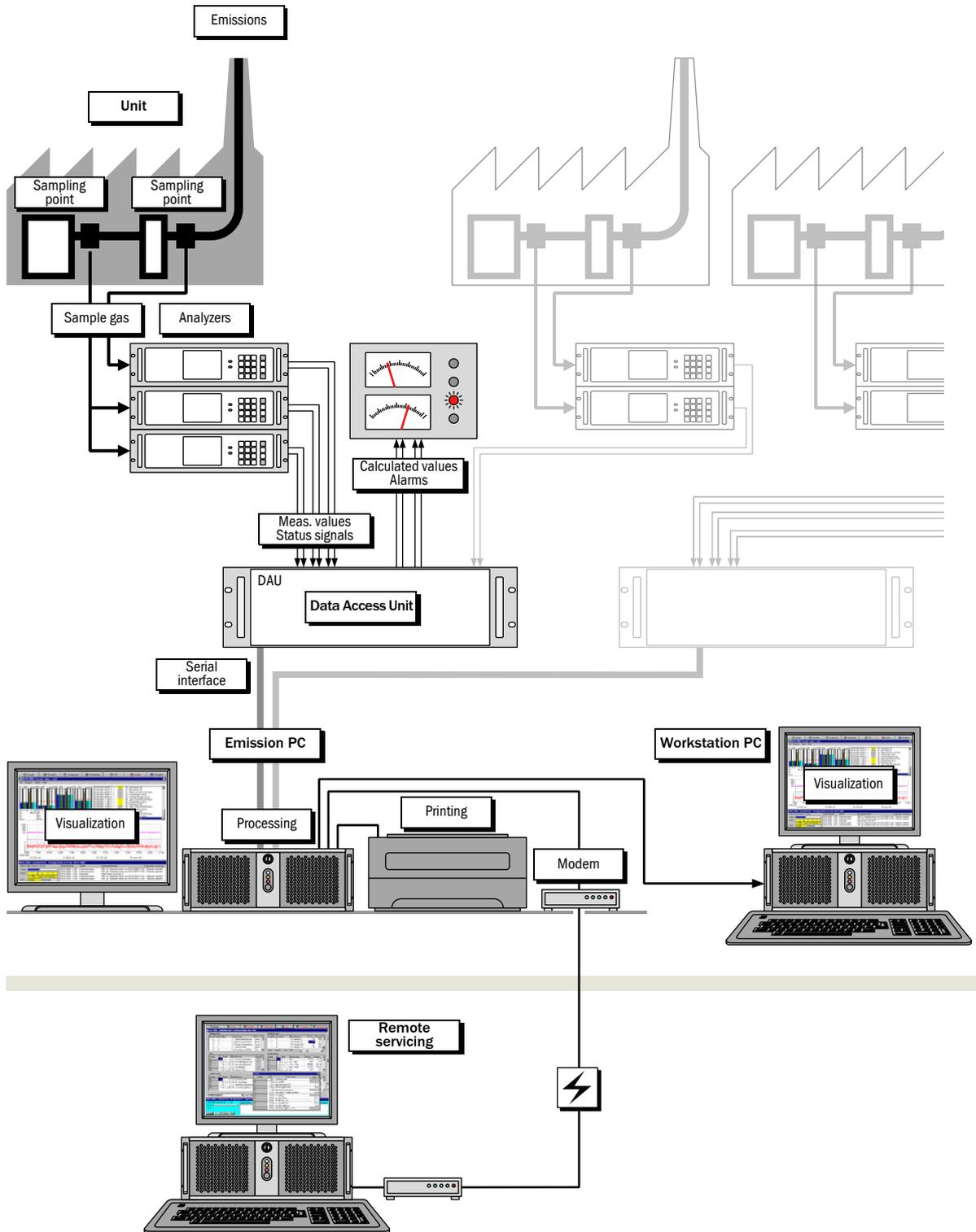
1.3 **Hardware Components**

1.3.1 **Emission PC**

Basic components
- Intel Pentium processor
- 2048 MB RAM
- HDD controller
- 2 Hard Disks for data and daily backup
- DVD burner
- Serial interface card (4 channel) for connecting DAU or FM
- GPS / DCF77 radio controlled clock with external antenna
- Windows XP / 7 operating system (Workstation)
- TFT monitor
- Keyboard and mouse
- Protocol graphic printer

Optional components
- Industrial PC
- Industrial monitor and keyboard
- Internal RAID array
- PCI network interface cards

Optional accessories
- Power failure backup system that controls program closing in the event of main power failure
- Color laser printer
- Analog or ISDN modem for remote maintenance

Subject to change without notice

1.3.2 Workstation PC

Basic components
- Intel Pentium processor
- 1024 MB RAM
- Hard Disk
- Windows XP / 7 operating system
- TFT Monitor
- Keyboard and Mouse

Optional components
- Industrial PC
- Industrial monitor and keyboard
- Second Hard Disk
- PCI network card

Optional accessories
- Color inkjet printer / laser printer

1.3.3 Data Acquisition Unit (DAU)

1.3.3.1 DAU general features

CPU	80C188, 10 MHz
Data storage buffer:	Depends on the configuration, for example, storage buffer for one-minute average values from 16 analog inputs for up to 14 days.
Interface:	RS232 for transmitting data to the Emission PC
Number of free slots:	16
Power connection:	115 V AC or 230 V AC (+10 %/–15 %), switchable
	48 ... 62 Hz
Power consumption:	maximum 100 VA; normal 40 VA [1]
Operating ambient temperature:	0 ... +50 °C
Shipping and storage temperature:	–20 ... +70 °C
Relative humidity:	Non condensing
Construction type:	19 " 3 HU rack unit
Weight:	12 kg [2]
Dimensions (H x L x D)	135 x 450 x 240 [mm]
Protection class:	IP 20 (DIN 40050)
Mains plug:	CEE-22 standard

[1] Equipment with 2 AE cards, 2 SE cards, 1 SA card, 1 AA card.
[2] Equipment with 2 AE cards, 2 SE cards, 1 SA card, 1 AA card.

Product ID:	1202638

1.3.3.2   **DAU cards specifications**

16-channel Analog Input Card

Resolution:	14 bit, 1 bit = 3.66 mA
Input current range:	–5 ... +30 mA
Sweep rate:	10 Hz / channel
Input Mode:	Differential (floating positive and negative terminals)
Power surge treatment:	RC circuit (RC = 100 ms) and software filter
Maximum Error:	±0.1 %
Load:	100 Ω
Current consumption:	none
Signal connections:	multiple D-Sub 37-pin connectors
Galvanic isolation:	Yes (up to ± 10 V)
Maximum number / DAU:	5 cards = 80 analog inputs
Pin assignment:	→ page 14, Figure 1
Product ID:	2028426

12-channel Status Output Card

Allowable load per contact:	500 mA, 48 V
Response / bound time:	< 10 ms
Current consumption:	3.6 W
Signal connections:	multiple D-Sub 37-pin connectors
Maximum number / DAU:	8 cards
Pin assignment:	→ page 15, Figure 2
Product ID:	2028429

32-channel Input Status Card (with optocouplers)

Power supply:	24 V internal or from 5 VDC up to 48 VDC external
Response / bounce time:	< 10 ms
Current consumption:	3.8 W
Signal connections:	multiple D-Sub 37-pin female connectors
Galvanic isolation:	Yes, with external power supply
Maximum number / DAU:	8 cards = 256 status inputs
Pin assignment:	→ page 16, Figure 3
Product ID:	2028430

8-channel Analog Output Card

Resolution:	12.3 bit effective, 1 bit = 5.0 mA
Output current:	0 mA ... 25 mA (freely programmable)
Maximum error:	± 0.1 %
Maximum load:	500 Ω
Current consumption:	3.8 W
Signal connections:	multiple D-Sub 37 female connectors
Galvanic isolation:	no
Maximum number / DAU:	4 cards = 32 analog outputs
Pin assignment:	→ page 17, Figure 4
Product ID:	2028425

1.3.3.3 DAU cards pin assignments

Figure 1   16-channel Analog Input Card
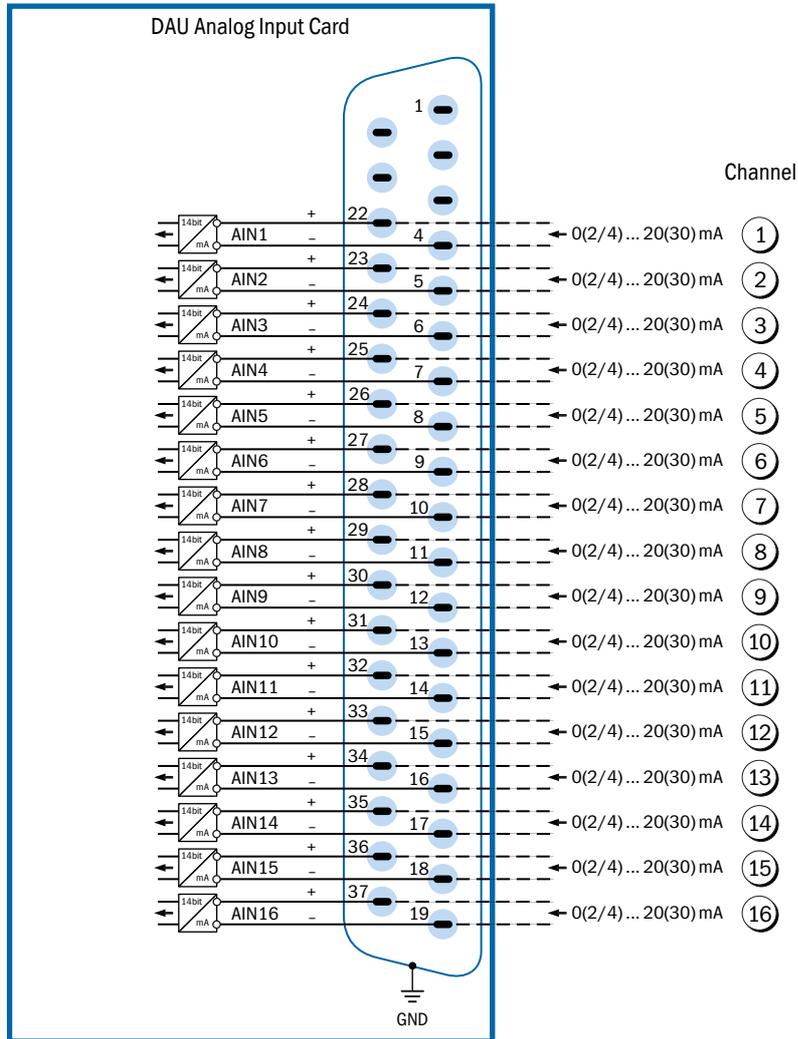
Channel	+	–
1	22	4
2	23	5
3	24	6
4	25	7
5	26	8
6	27	9
7	28	10
8	29	11

Channel	+	–
9	30	12
10	31	13
11	32	14
12	33	15
13	34	16
14	35	17
15	36	18
16	37	19

Figure 2   12-channel Status Output Card
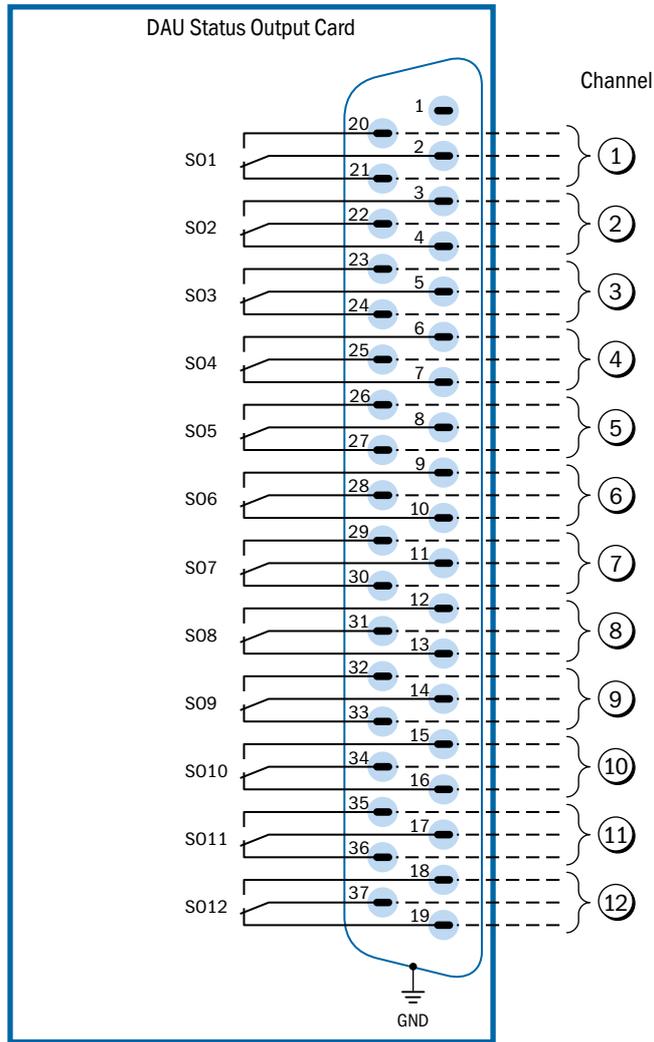
Channel	Common	Normally Open (NO)	Normally Closed (NC)
1	2	20	21
2	22	3	4
3	5	23	24
4	25	6	7
5	8	26	27
6	28	9	10
7	11	29	30
8	31	12	13
9	14	32	33
10	34	15	16
11	17	35	36
12	37	18	19

Figure 3   32-channel Input Status Card
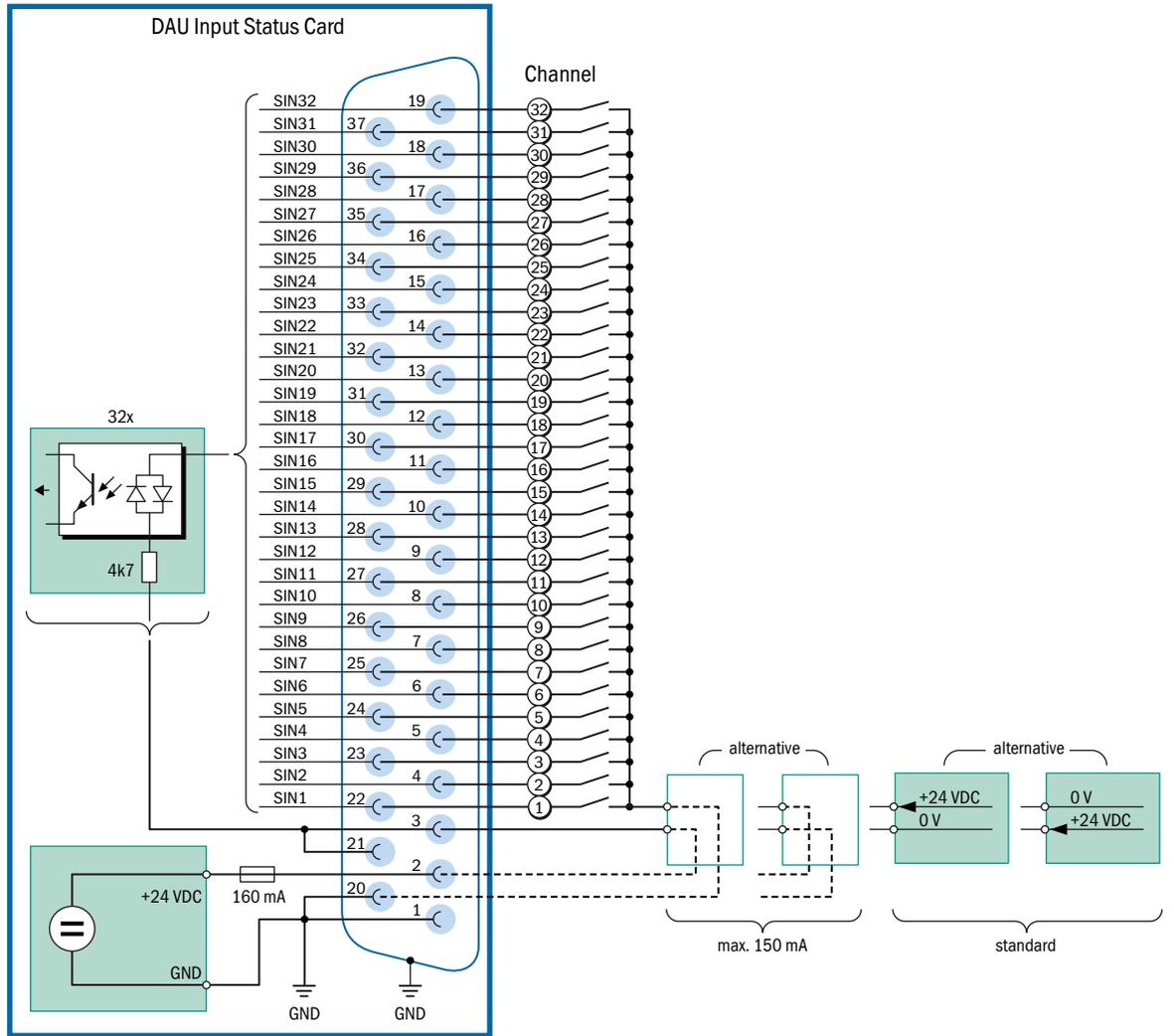
Channel	–	+
1	22	
2	4	
3	23	
4	5	
5	24	
6	6	
7	25	
8	7	
9	26	3, 21
10	8	
11	27	
12	9	
13	28	
14	10	
15	29	
16	11	

Channel	–	+
17	30	
18	12	
19	31	
20	13	
21	32	
22	14	
23	33	
24	15	
25	34	3, 21
26	16	
27	35	
28	17	
29	36	
30	18	
31	29	
32	11	

Figure 4   8-channel Analog Output Card
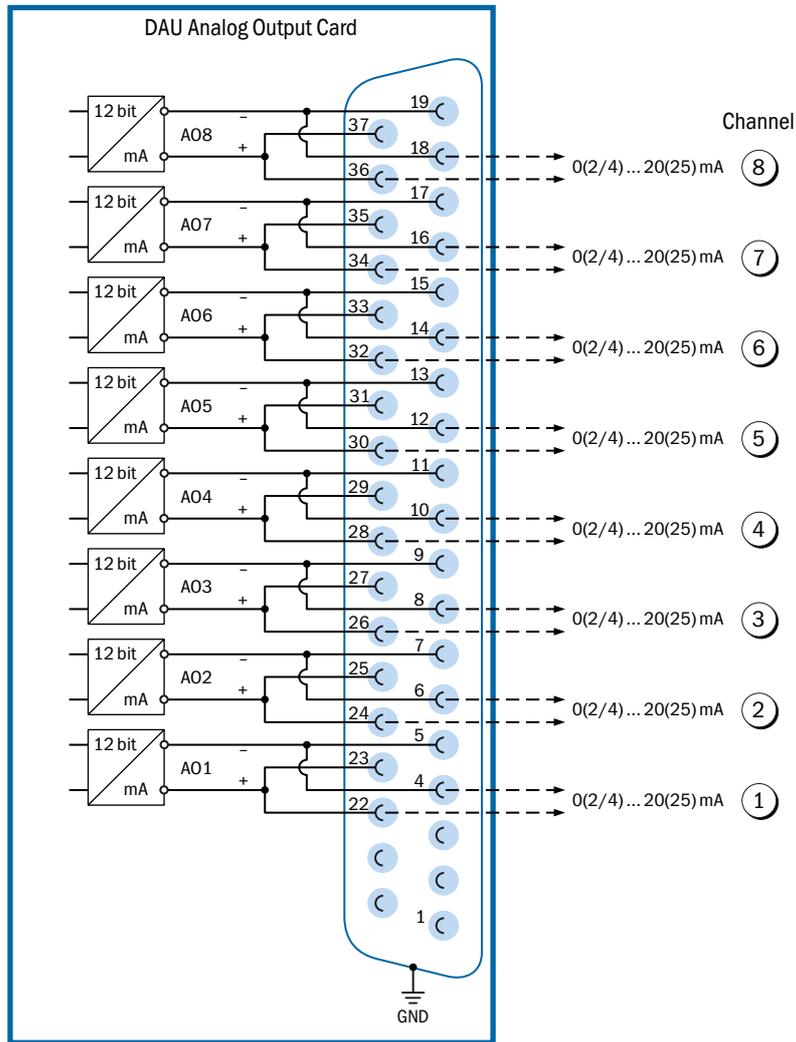
Channel	+	–		Channel	+	–
1	22, 23	4, 5		5	30, 31	12, 13
2	24, 25	6, 7		6	32, 33	14, 15
3	26, 27	8, 9		7	34, 35	16, 17
4	28, 29	10, 11		8	36, 37	18, 19

1.3.4 Connection of DAU and Emission PC

There are several possibilities, all using serial data transmission:

- RS232 (→ Figure 5/Figure 6)
- RS485/422
- TTY (4 … 20 mA)
- Fiber optics
- Ethernet

Figure 5   RS232 connection: DB-9 male connector / DB-25 female connector
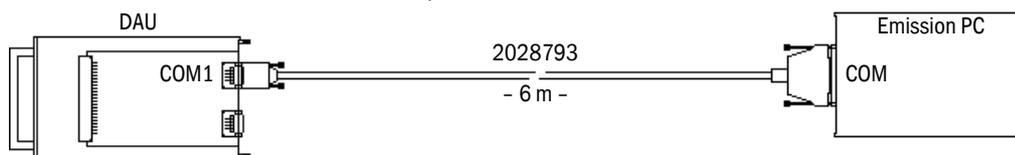
Figure 6   RS232 connection: DB-9 male connector / DB-9 female connector
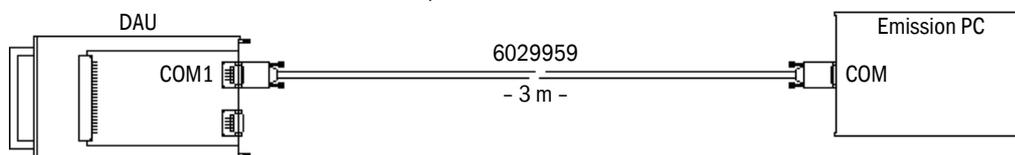
1.4 Software features

1.4.1 General features

The MEAC2000 software is a 32-bit program for Windows XP/7 operating systems, and offers the highest level of operational and data security.

A state of the art Windows interface includes mouse commands, pull down menus and simple buttons.

Access authorization with passwords enables different levels of data protection for different users.

The MEAC2000 software modular system allows a user to customize the screen layout (both graphic and alphanumerical boxes) according to his preferences.

1.4.2 Configuration

- Possible configuration settings in MEAC2000 (information for local authorities):
  - Plant definition
  - Measured values calculation
  - Limit definition (all possible limit calculation methods are already programmed in the software)
  - Plant special states (start, stop, etc.)
- Configuration modifications are documented in daily files (log files).
- Definition of operations not intended for local authorities, such as:
  - Alarms (preliminary)
  - Display and inclusion of process parameters

Each new system configuration can be fully tested using a simulation menu before it is validated by the user. During new configuration and testing, analysis, and classification continues to run under the configuration currently in force.

1.4.3 Classification

Classification of daily and integrated averages every 3, 10, 20, 30, 60, 120, 240, or 480 minutes is done in accordance with the requirements for analysis of continuous emissions monitoring according to old 13./17. BlmSchV and European standards 2000/76/EC (waste incineration) and 2001/80/EC (large combustion plants).

The daily, monthly, and yearly EC reports are presented in clear tables.

1.4.4 Emission data

The following data are collected and computed:

● Minute value (raw)	From analog inputs
● Minute value (corrected)	Standardised with the oxygen reference value normalized at 0°C, normal pressure, dry
● Average value at 10, 30, 60 min. (raw)	Averages over 10, 30, or 60 min.
● Average value at 10, 30, 60 min. (corrected)	Standardised according to oxygen reference value calculation
● Average value at 10, 30, 60 min. (validated)	Calculated from the normalized values and after subtracting the confidence interval (I_{95})
● Trend for the average value	Extrapolated on the presumption that the plant will continue to operate as it currently does
● Free loads for average values	For monitoring a process in progress
● Limits for average values	As required by regulations
● Daily averages (corrected)	Average of the current average values at 10, 30, or 60 min.
● Daily averages (validated)	Average of the current validated values at 10, 30, or 60 min.
● Trend for the daily average	Daily value extrapolated on the presumption that the plant will continue to operate as it currently does
● Free loads for daily averages	For current process control
● Limit value for the daily average	As required by regulations
● Monthly and annual averages	
● Daily, monthly and annual loads (if configured)	
● Daily, monthly and annual classifications	
● Status changes	

1.4.5 Data backup

Data is backed up on the hard disk. For increased security, a redundant hard disk is suggested.

Tape backup units and magneto-optical reader units are available for external backup.

1.4.6 Internal documentation

All name assignments for measured quantities, sampling points and plants are freely chosen (for example KKS). Pin assignments for DAU plug-in boards are printed directly from the program. If channels have been swapped over during cabling, it will be easy to correct the error using the software.

The formulas and constants used are documented at the time of their definition; this helps clarify the configuration for the user, the regulating authority and the customer service department.

1.4.7 Alarms

The regulatory advisories concerning larger sites with numerous emission sources often set a limit (limit value) for the total of all loads (for example the famous SO_2 alarm in many refineries. Such an analysis is easily done with MEAC2000.

1.4.8 Events search

The MEAC2000 allows events searches within chosen plants and/or components, for example:

- Exceeding limits
- Smoke processing / discharge gas purification failure
- Status of a specific operation
- Lockout timing

1.4.9 Fault reports

To document exceeded limits, faults and all other events requiring an explanation, it is possible to issue fault reports.

1.4.10 Remote transmission of emission data (ERT)

Data can be transmitted to remote access PC for plant supervisor or authority.

1.4.11 Data display

The user can choose to display data in real time or as historical records.

The user can choose to display data as a linear diagram, a beam diagram or a table.

Mixed forms are also possible. Each of the previously discussed values can be selected in any combination and displayed.

Using zoom, a user can select a window with the mouse to display a detailed view of a selected time period.

Filters created by individual users can be stored so that each user can load his/her preferences whenever desired. Even an inexperienced user can quickly learn how to create filters.

MEAC2000 also offers the possibility of creating and display a process graphic illustration. The illustration can be of an existing process, or of one yet to be designed. Values and text can then be added to the illustration as desired using the mouse.

1.4.12 Data export

A data export function is provided for exporting data to common spreadsheets (such as excel) in order to allow additional data treatment. Tables can also be exported in ASCII format for review.

MEAC2000 EU

2 Starting the software

Auto-Start

Screen overview

Starting the program

2.1 **Auto-Start**

MEAC 2000 automatically launches when the PC is turned on. On the upper edge of the screen there is a selection bar; the selected button is available for the programs which will subsequently be called (multi-tasking).

On the Emission PC there is also a system window on the lower edge of the screen.

2.2 **Basic screen elements**

The selection bar provides access to the sub-programs of the software.

The title bar indicates the current configuration and the activation date.

The software establishes a protocol for the values measured and calculated each minute. The *State* bar indicates whether the data is being collected and calculated (blue), or if the analysis is already finished for the minute (green).

The window also displays an overview of the DAUs currently connected to the system. 'Status of each DAU can be viewed by selecting it in the bar appearing just below.

If the plant is undergoing a performance verification, the status will be displayed in the *Fct. ctrl* window. This updates at regular intervals by sampling points in accordance with §26 to ensure perfect operation of the plant. The resulting measured values do not need to be included in the analysis because during that, calibration gases are flowing through the plant sampling points. No classification takes place for any plant during the performance verification. The number of plants currently undergoing a performance verification (yellow) is displayed in the *Fct. ctrl* window.

Messages concerning the system are also displayed, they are kept in the log file. A list of the possible message is located at:

    System – Log Files – System

The window also shows the current date and the time (*s*) in summer and (*w*) in winter.

2.3 Starting the program

A system login is required in order to use the analysis software.

| ⏻ Current | ↻ Retrospect | ↻ Configuration | ↻ Reports of fault | ↻ ERT | ⏻ Login | ↻ Simulation |

On the selection bar, click on the *Login* button. When the program starts, *Login* and *Current* are the only functions available.

After selecting *Login*, the user enters his identification in the window that opens:
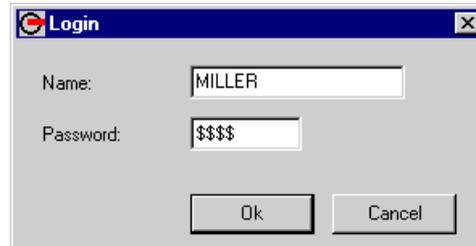
● *Login* occurs when the user enters a name and confidential *Password*.

The confidential password is assigned by the system administrator. Please refer to him or her to obtain a confidential password.

If the confidential password does not correspond to the user registered in the system, access to the program will be denied.

● After login, the user can use the software with his/her access authorizations (→ page 30, §3.3.3).

● Every successful login is recorded in the log file as a system message, and the *Login* button changes the record in the system.

MEAC2000 EU

3 "System" functions

Login/Logout
Passwords/User ID
Autologin
Data models
Software set-up

+**i** The *System* functions include definitions and information on the MEAC2000 EU software. The *System* button shows up after a successful *Login*.

3.1   **Login**

If another user wants to work with the software, he can authenticate directly using *System–Login* without the previous user having to close his session. Once a new user is identified, it is this user's rights which will govern the system (→ page 30, §3.3.3).
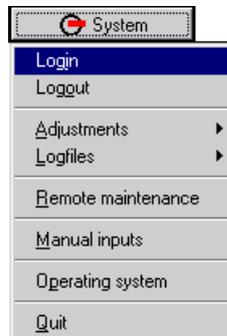
Access rights are established by the system administrator. These rights are linked to the user name and password which are saved in a data base administered by the system administrator.

Once the user has been authenticated, the software launches with the rights which have been assigned to that user; it is thus possible that certain options will not be available to the user (→ page 30, §3.3.3).

The system administrator can make changes.

3.2   **Logout**

When the user wants to stop working in the software, he can close his session using *Logout*.

All active windows will close and the program will return to its initial status.

To resume working with the program, a new login is required.

> **!** Users with greater rights must close their session when they finish working with MEAC2000. This ensures that other users cannot avail themselves of rights which were not assigned to them.

3.3 Adjustments
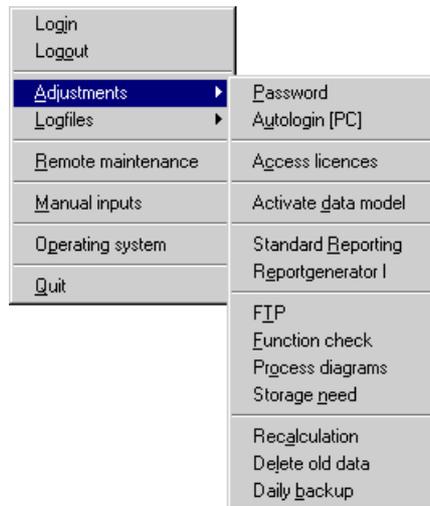
3.3.1 Password

The current user can change his password at this option if he has been assigned the right (→ page 30, §3.3.3). He must first enter his current password. If the entry is correct, he can enter a new password which will be requested a second time for confirmation. *Ok* will confirm the change in the program.

3.3.2 Autologin

A list appears of all users without supervisor status excluding the system administrator. It is possible to select a user in this list who will be automatically identified with the rights assigned to him whenever the program is launched. This option is activated by exiting the dialog using *Save* and confirming the record.

If an automatic session has been opened, the user concerned will be posted in the field at the top of the list of names. It is possible to cancel an Autologin with *Cancel* then *Save*.

3.3.3 Access licences (user authorizations)
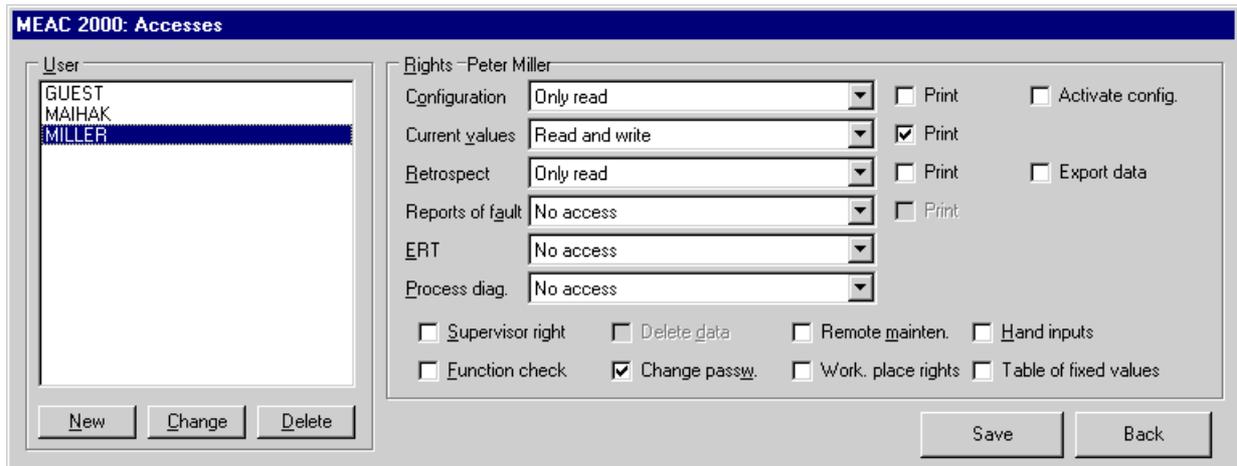
User rights are administered in this window. It is possible to add new users (*New*), to change information (*Change*) or to remove a user from the list of people having access rights (*Delete*).

New

To add a new user, press the button *New*. In the new window enter the user name, confidential password and the full name of the new user. After confirming with *Ok*, the information will be recorded in the program and the new user will have access to the software.

> **!** If access rights of the new user are not individually selected, he will have the rights of the user previously selected in the window.

Change

To change the user information, select the name in the users window and click on the field *Change*. The user information is displayed in the window and can be changed. The data modifications will be recorded in the program after confirming with *Ok*.

Delete

To cancel a user, select the user name in the user window and click on the field *Delete*. The selected user will be removed from the list of people having access to the software.

Authorization

After selecting a name in the list of users, the rights assigned to this user will display and can be modified. The following authorizations can be assigned or denied:

Supervisor right	This option activates all rights to the program independent of the definition of other rights. Only the system administrator should have these rights.
Function check	Allows the user to remove the chosen plant from classification during a performance verification. In the protocol, the note "Function check" appears in place of the value.
Delete data	Recorded data can be deleted Requires supervisor rights.
Change passw.	The user has the right to modify his confidential password.
Remote mainten.	Allows access to the remote maintenance software which can be installed as an option.
Work. place rights	This option currently has no function.
Hand inputs	Allows the definition of manual conditions and values in the manual mode in the optional functions "Manual entries"

This right also applies to manual entries obtained through the auxiliary receipt module.

The extent of authorization can be complete, or limited to a part of the options. Some of the options can be defined as to whether or not the user has the right to print data.

Read and write	The user can display data in a selected element of the program and save modifications.
Read only	The user can only display data, modifications are not possible or cannot be saved.
Access denied	Access to the designated element of the program is refused to the user.

Supplemental information is intended for the following *options*:

Configuration

Change user configuration	The user can make configuration changes for all facilities.
Change order conformed configuration	The user can make changes only for facilities that are ordinance compliant, labeled "order conformed".

Print	The user may print the configuration data in the *Configuration* program section.
Activate config.	The user may carry out classification of the facility with the selected or changed configuration. (Configuration changes must be made in the *Simulation* program section

Retrospect

Export data	Allows moving data to other elements of the program and copying them to external data objects.

3.3.4 Activate data model

Activation of a new or modified data model. This option is only accessible on the Emission PC.

3.3.5 Standard Reporting

Configures daily/monthly printouts of average values at 10, 30, or 60 minutes daily intervals, or printouts of the daily/monthly classes of the previous day/month for any number of components of all the plants.
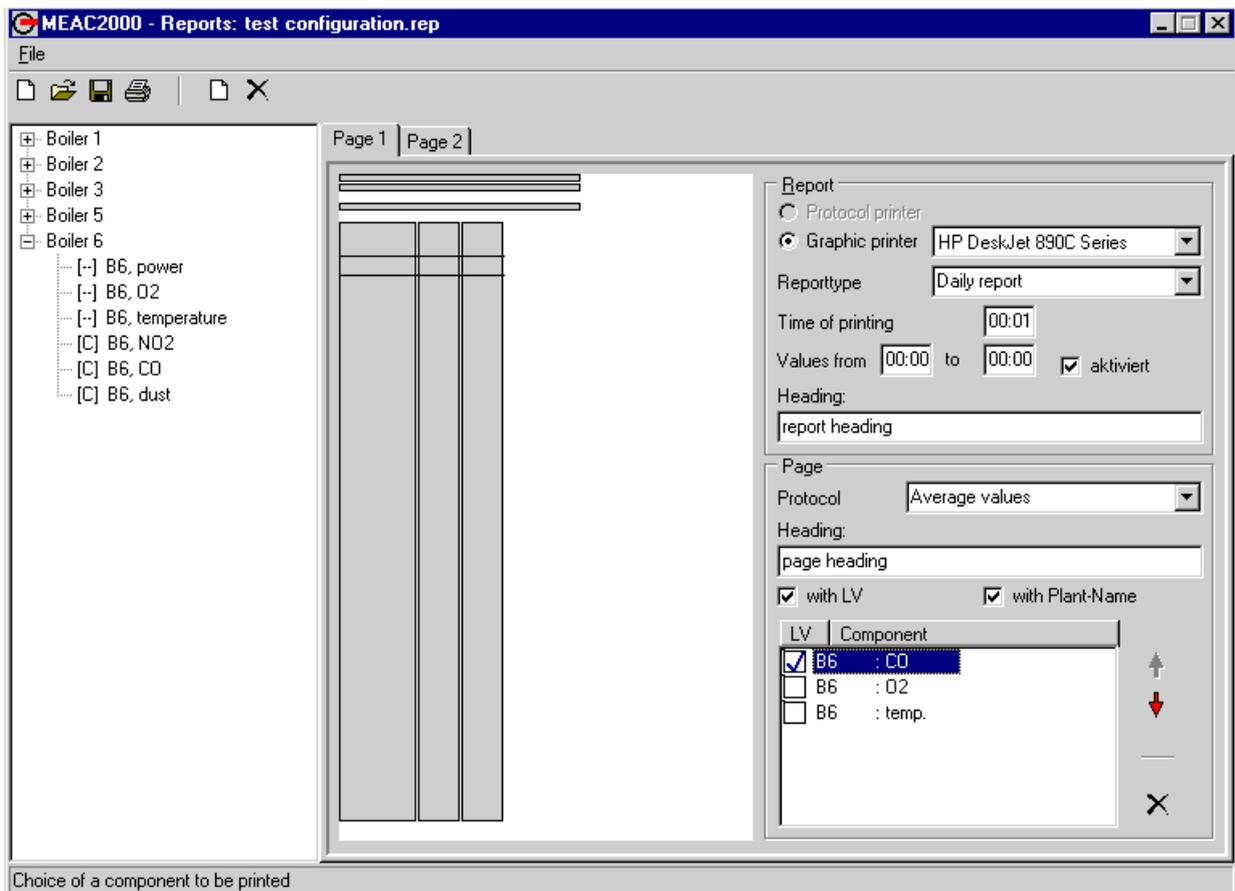
Selecting a component to print

In the left area of the window, click on the plus sign of the desired plant, then on the component to print. With the left mouse button pressed, move the pointer to the pre-print summary in the center of the window.

The selected component is placed on page 1 of the printout, and its name appears in the list of components to the right within the window (→ "Configuration of report parameters"). For each additional component to print, a new column is added to page 1.

Configuration of report parameters

The following definitions apply the area in the right side of the window:

Graphic printer	Select a connected graphics printer.
Reporttype	Select the printing frequency (daily or monthly).
Time of printing	Indicate to the nearest minute.
Values from [ ] *to* [ ]	Indication of the print interval varying in length from 1 minute to 1 day. This parameter only needs to be defined for daily printing of the average values at 10, 30, or 60 min. (→ "Configuration of page parameters" – Protocol). If the interval limit chosen is earlier than the print time, the printout will be for the current day and not the previous day.
Heading	Method for creating a principal title which will appear on each printed page in accordance with its position in the pre-print summary.

Configuration of page parameters

If the Parameter protocol is configured for "Average values at 10, 30, or 60 min. and/or daily", it is possible to also print the limit next to each value by checking the box for Limit next to the relevant component.Configuration in the area of the window below the report parameters:

Protocol	Choose a protocol type (values or classes) depending on the type of report configured (see Configuration of the report parameters).
Heading	Enter a page title for each page created.
with LV	Check to include the respective limit value in the page header.
with plant name	Check to include the plant in the page header.
Component list	The order of the columns on the page can be changed by clicking on a component in the list and using the positioning arrows displayed to the right. A column can also be deleted.

If the Parameter protocol is configured for "Average values at 10, 30, or 60 min. and/or daily", it is possible to also print the limit next to each value by checking the box for Limit next to the relevant component.

Using the tool bar

The functions of the icons, in the order in which they appear, are as follows:

New	For creating a new print configuration.
Open	To load an existing print configuration.
Save	Saves the print configuration in the indicated file.
New page	Opens a new page when the columns exceed the page width. Up to 8 different pages can be configured for a printout.
Delete page	Deletes a created page.

In this dialog box, it is also possible to delete a saved configuration by selecting the file name using the right mouse button or the Delete key on the keyboard.

The three main functions of the tool bar are also accessible through the *File* menu. In this menu, it is also possible to change the name of a saved configuration with *Save as*, and to exit the report creator with *Exit*.

3.3.6   Report Generator I

Another tool to create reports is the "Reportgenerator I", whose resulting contents are not as flexible as the first, but it is fixed by agreement with clients and authorities.
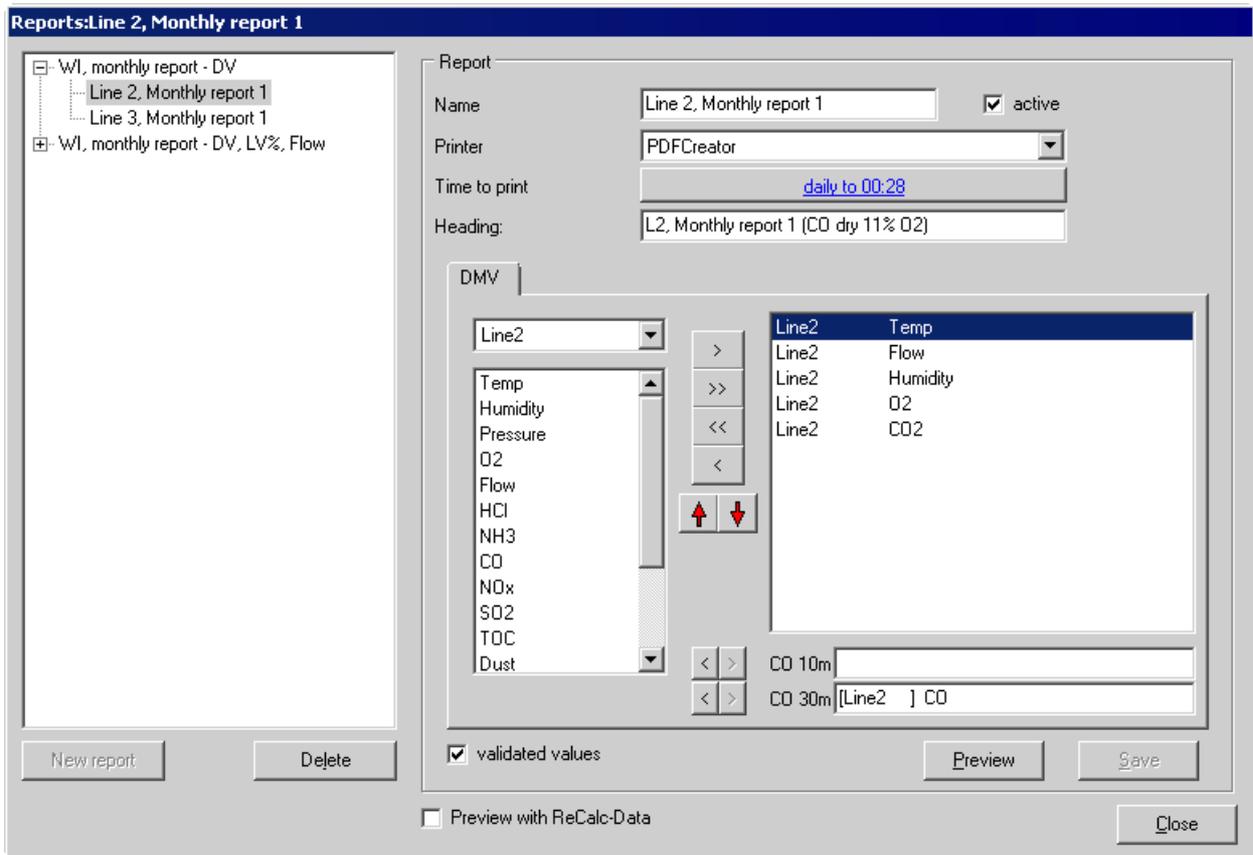
3 reports are available:

Monthly reports with daily averages	showing daily averages and additional information about CO/10-minute averages and CO/30-minute averages. Also min, max, and monthly average are calculated.
Monthly reports with daily averages and additional flow	showing daily averages, percentage of daily limit violations and total emission for each component. Min-, max and monthly averages are also shown, additional the monthly and culminated annual duration of limit violations.

All reports may be initiated to be printed:

– daily (with the monthly data until 24:00 the day before) *or*
– once a month (with the data of the month before) *or*
– by using *Time to print* and selecting a date manually on a selected printer.

Automatically printing is only possible after having activated the *active* checkbox.

The report configuration must be saved to disk and can be accessed by the given name.

> **!**   It is very important to distinguish between validated and normalized values.

Monthly report (daily average value)

Plant Hamburg
L2, Monthly report 1 (CO dry 11% O2): 30.April.2012

Day	comment	Oven OFF	Temp	Flow	Humidity	O2	CO2	CO
			DMV	DMV	DMV	DMV	DMV	DMV
limit value								< 50
Day			hh:mm	°C	Nm3/h	Vol%	Vol%	Vol%
01.04.2012			0:00	132,13	27734,75	5,72	3,91	3,13
02.04.2012			0:00	132,13	27466,13	6,64	3,91	3,13
03.04.2012			0:00	132,13	27294,76	7,21	3,91	3,13
04.04.2012			0:00	132,13	27906,11	5,13	3,91	3,13
05.04.2012			0:00	132,13	27616,60	6,12	3,91	3,13
06.04.2012			0:00	132,13	27727,67	5,75	3,91	3,13
07.04.2012			0:00	132,13	27801,77	5,48	3,91	3,13
08.04.2012			0:00	132,13	27673,62	5,91	3,91	3,13
09.04.2012			0:00	132,13	27876,76	5,23	3,91	3,13
10.04.2012			0:00	132,13	27522,25	6,43	3,91	3,13
11.04.2012			0:00	132,13	27274,75	7,28	3,91	3,13
12.04.2012			0:00	132,13	27431,38	6,75	3,91	3,13
13.04.2012			0:00	132,13	27398,43	6,86	3,91	3,13
14.04.2012			0:00	132,13	27615,94	6,12	3,91	3,13
15.04.2012			0:00	132,13	27407,93	6,03	3,91	3,13
16.04.2012			0:00	132,13	27514,98	6,45	3,91	3,13
17.04.2012			0:00	132,13	27464,89	6,64	3,91	3,13
18.04.2012			0:00	132,13	27519,24	6,44	3,91	3,13
19.04.2012			0:00	132,13	27599,94	6,10	3,91	3,13
20.04.2012			0:00	132,13	27749,43	5,66	3,91	3,13
21.04.2012			0:00	132,13	27599,35	6,19	3,91	3,13
22.04.2012			0:00	132,13	27675,26	5,92	3,91	3,13

Monthly report (daily average value and flow)
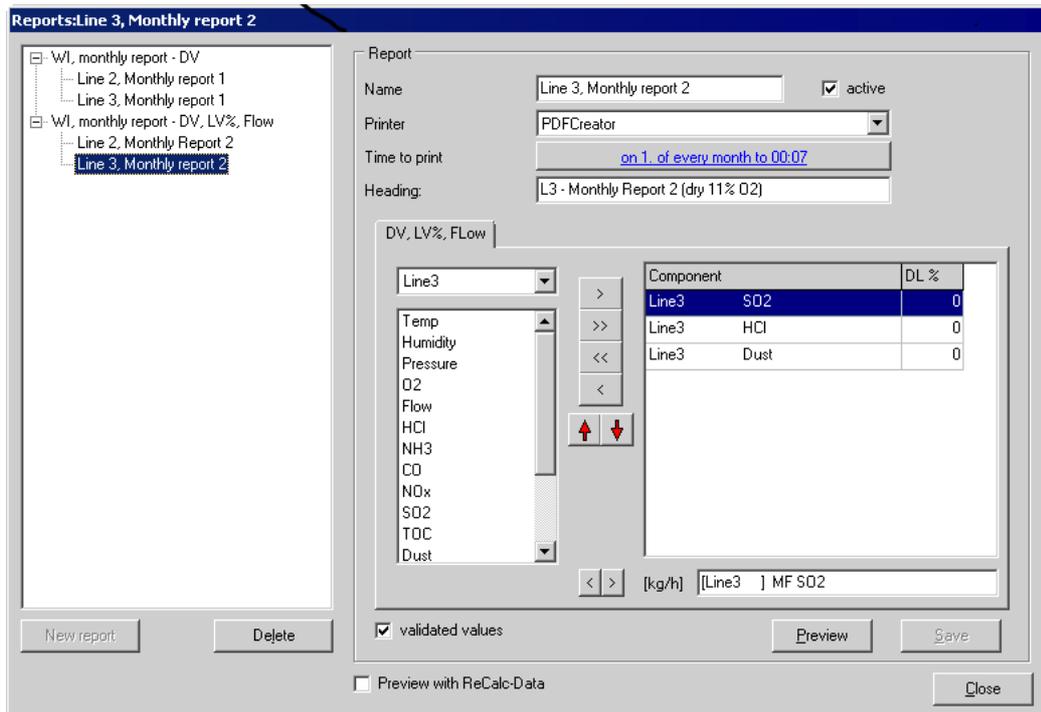
Allington

L3 - Monthly Report 2 (dry 11 % O2): April.2012

	SO2			HCl			Dust	
	DMV	30min > 50mg/Nm3	Flow	DMV	30min > 10mg/Nm3	Flow	DMV	30min > 10m
LV	< 50mg/Nm3			< 10mg/Nm3			< 10mg/Nm3	
Day	mg/Nm3	%	kg/h	mg/Nm3	%	kg/h	mg/Nm3	
01.04.2012	22,06	0,00	0,00	47,43	100,00	0,00	10,04	
02.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
03.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
04.04.2012	22,06	0,00	0,00	47,43	100,00	0,00	10,04	
05.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
06.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
07.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
00.04.2012	22,06	0,00	0,00	47,43	100,00	0,00	10,04	
09.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
10.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
11.04.2012	22,06	0,00	0,00	47,43	100,00	0,00	10,04	
12.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
13.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
14.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
15.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
16.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
17.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
18.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
19.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
20.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
21.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
22.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	
23.04.2012	22,86	0,00	0,00	47,43	100,00	0,00	10,04	

3.3.7 Printer settings

This dialog box configures the settings for a serial printer. This option is only accessible on the Emission PC.
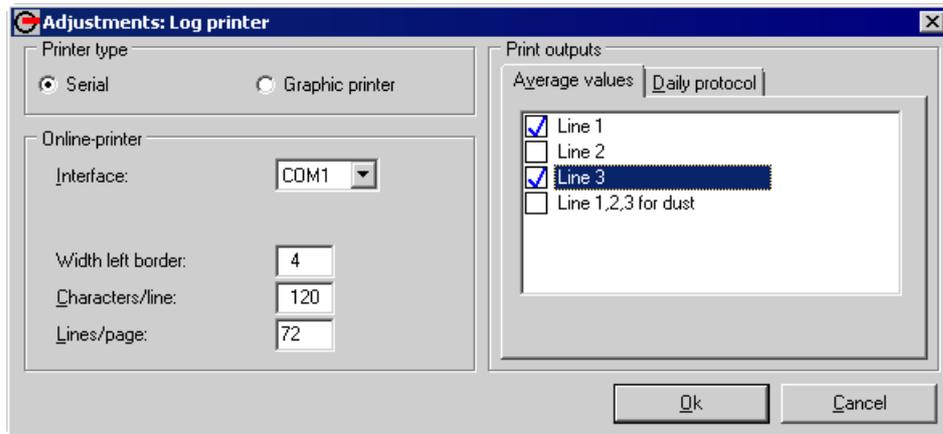
They include the PC connection, the print limits of the printer and the data to be printed.

The data to be printed is selected from a list.

The options are: Print the average values at 10, 30, or 60 min. on line, meaning without delay, and/or establish a daily protocol.
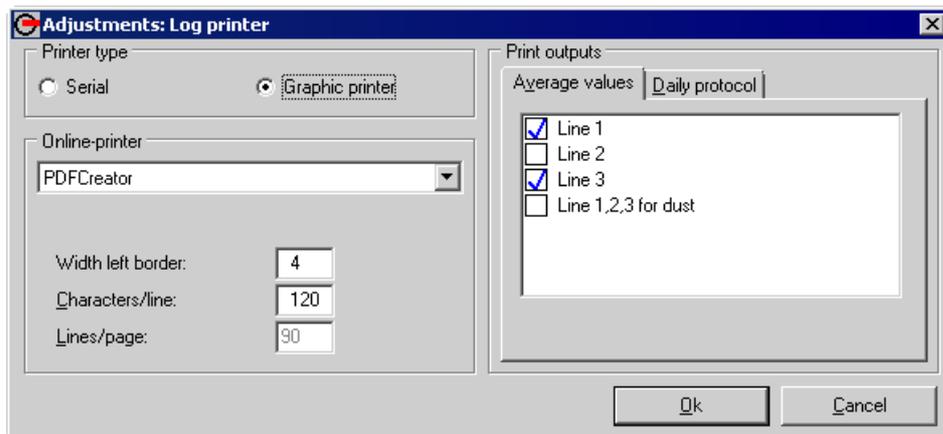
In order to print onto a graphic printer activate the graphic printer and select the printer in the combobox.

3.3.8 FTP (optional)

If necessary, it is possible to configure ASCII files of saved data which are transmitted every minute by the Emission PC to another PC through the network using a supplemental feature available as an option.

3.3.9 Function check

Use the *Function check* menu to indicate which plant can be removed from the classification due to a function check. The plant will remain in the list, but the related data analysis is conducted separately.

Data collected during a function check can only be viewed separately and retrospectively.

3.3.10 Process diagrams

The *Process diagrams* feature, available as an option, allows the user to create interactive process illustrations which can be viewed with the current values.

3.3.11 Storage need

The *Storage need* menu item displays the hard disk space required by the program as well as other current system information.

> **!** The displayed number of days until the disk is full is an estimate.

3.3.12 Recalculation

During an interruption of communication between the Emission PC and a DAU, the DAU saves data received during this lapse if it has an internal memory card (1 MB). When the communication is restored, the saved data is transmitted by the DAU to the Emission PC.

Through the *Recalculation* menu item, it is possible to activate a special data record for the delayed data.
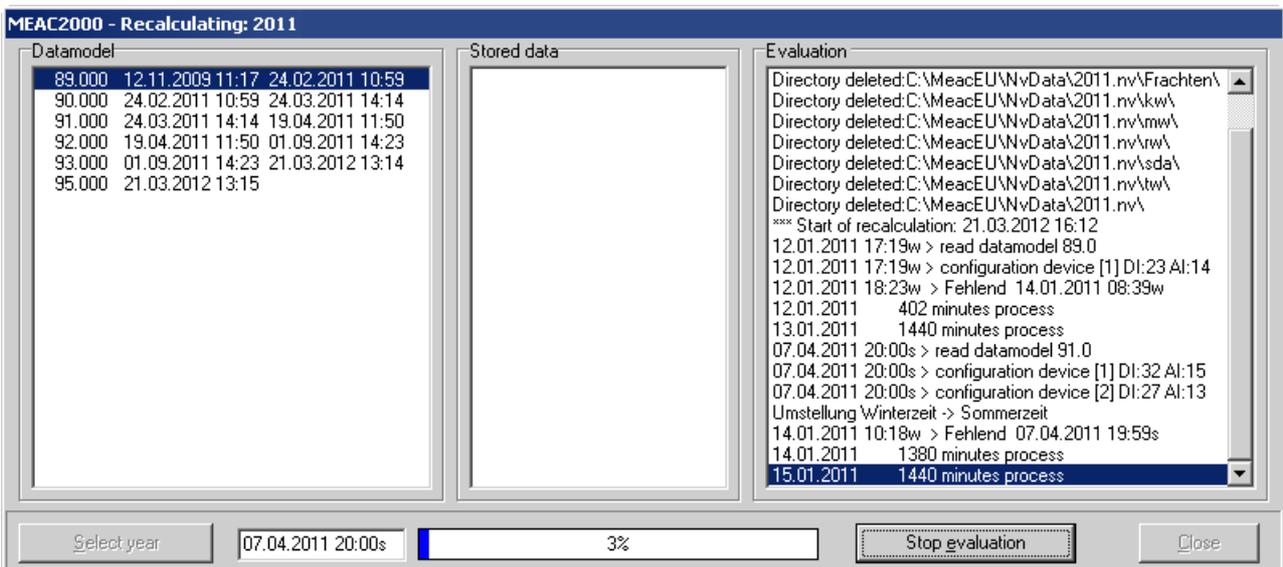
To do this, first open the selection window for the year containing the data to process using the *Select year* button. If no subsequent processing data has yet been executed for the selected year, it first needs to be saved in the list using *New* before being able to select it with *Open*. All versions of the data models for the selected year will then be listed in the main window for data models with their active dates.

The subsequent processing of this year can then begin in accordance with the version of the relevant data model, and can be interrupted if needed using the *Stop evaluation* button.

During the analysis, which can take some time, a progress bar indicates the percentage of the data already processed.

3.3.13   **Delete old data**

Monthly data which is no longer needed can be deleted from the system.
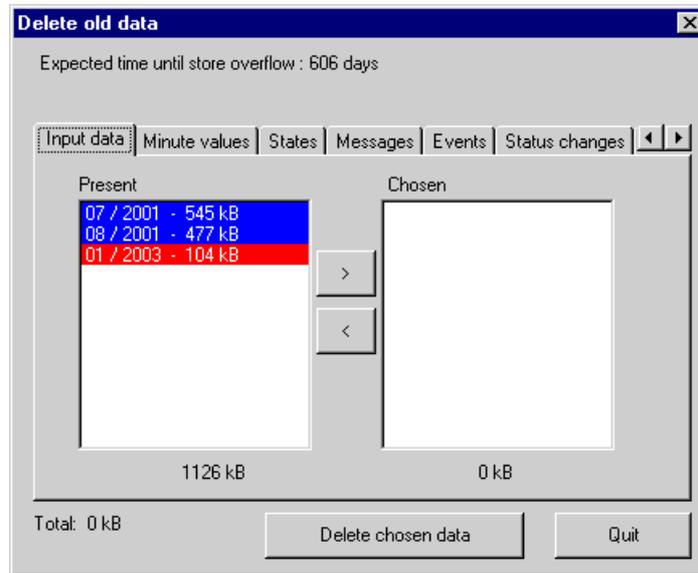
The type of data to delete is selected using the corresponding tab.

The data can be selected and deleted for each month:
– Select the data in the *Present* list, then use the *[>]* button to transfer it to the *Chosen* list.
– "Red" data cannot be deleted, due to legal requirements.
– The *[<]* button can be used to remove selected data.

Click on *Delete chosen data* to delete the selected data from the system.

> [!] Deleted data is permanently lost. *Recommendation:* Delete only data which has been stored on an external data backup device.

3.3.14   **Daily backup**

An automatic backup which saves the data acquired every day can be activated here. The time of the backup and the backup directory must be indicated.
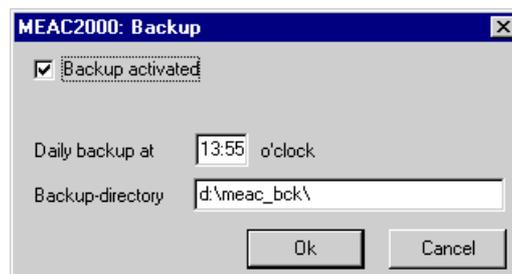
3.4 Log files

Automatically recorded events can be viewed here in different domains of the system.
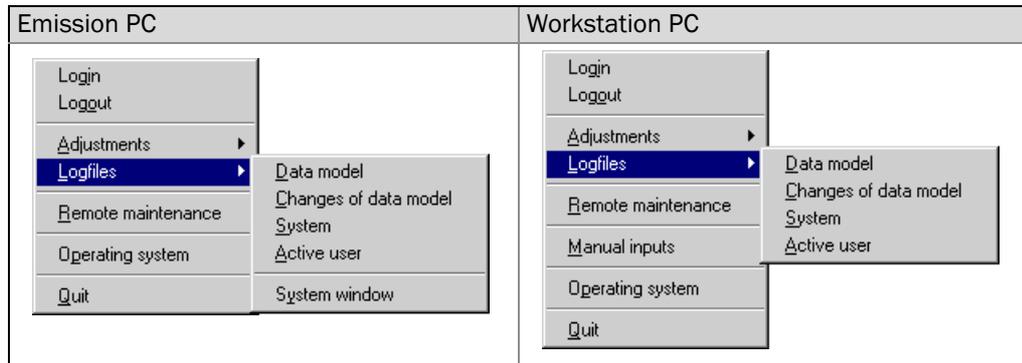
3.4.1 Data model

The data models activated to this point can be viewed here with:

- the date generated
- the date activated
- the expiration date
- the name of the last person who made modifications to the data model.
- the name of the person who activated the data model.

The configurations for each data model can be viewed by double-clicking on the model.

3.4.2   Changes of data model

This entry displays the differences between the various versions of data models and the current simulation version.
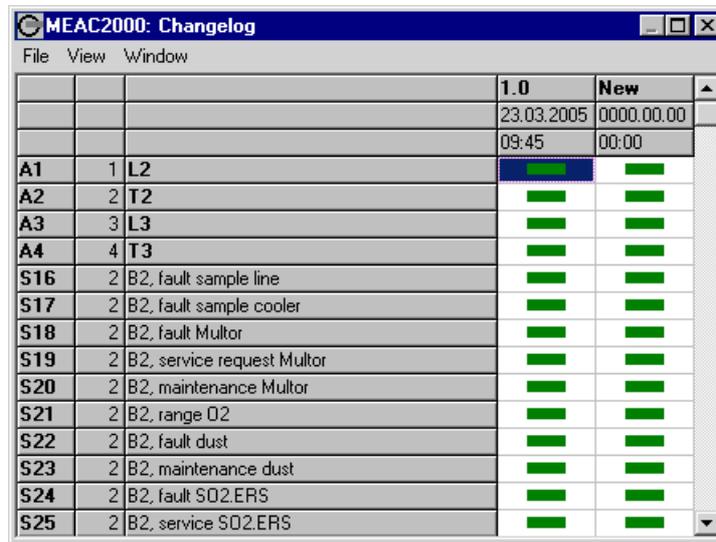
In the modifications log, the different versions of data models are detailed in the form of a table of all the objects configured to date. The information contained in the table has the following meaning:

Green bar	the object is an integrative part of the data model
Red bar	the object has been modified in relation to the immediately preceding version
No bar	the object is not an integrative part of the data model

- Double-clicking a bar opens the configuration window of the corresponding object in the relevant data model. When this is a red bar, the modified information is highlighted in *red* in the configuration window, the formulas are framed in *red*. When it is a green bar, any information that did not exist in the preceding data model is highlighted in *yellow*.

The positioning arrows at the bottom of the configuration window allow navigation between the areas of the modification table:

|	
[<] Object type [>]	to the preceding/next object of the same type in the same data model.
[<] Model [>]	to the same object in the preceding/next data model.
[<<] Model [>>]	to the same object in the preceding/next data model with a modification to this object.

A comparison window opens by right clicking on a column in the table and confirming. If there is at least one red bar in this column, all the modifications of the corresponding data model will be compared to the model immediately preceding it in the window. The contents of the window can be printed using *File – Print*.

The modification table is configured using the *Diagram* menu:

Choose object ...	to select the types of objects to be in the table
Sorting	to define the order in which the selected objects must be presented in the table
Only changed	select this when only those objects chosen which have been modified in at least one data model are to be listed
Position in plant	select this when all entries must have the plant number of the relevant object in the corresponding data model

3.5 **Operating system**

Here it is possible to display the system messages saved in the corresponding log file.

The program searches in the selected time period and the messages are then listed in chronological order. The following groups of messages can be selected:

All messages	
Data acquisition	DAU messages
Saved data	
Value calculation	Error messages during analysis (e.g. division by zero)
Hardware	Hardware defect, e.g. no connection
File	File defect, e.g. incorrect configuration file
System	System defect, e.g.interface fault
Login	Opening and closing of user sessions
Data model	Time of data model modification/activation
ERT	Transmission of emission data

Active users

The names of users currently active on the network with their location and identification (computer name).

System window

This option enables opening the system window on a MEAC2000 Workstation PC.

3.6 **Remote maintenance**

With this part of the program, the user can grant system access to technical support at SICK MAIHAK to the extent of the user's rights (→ page 30, §3.3.3)
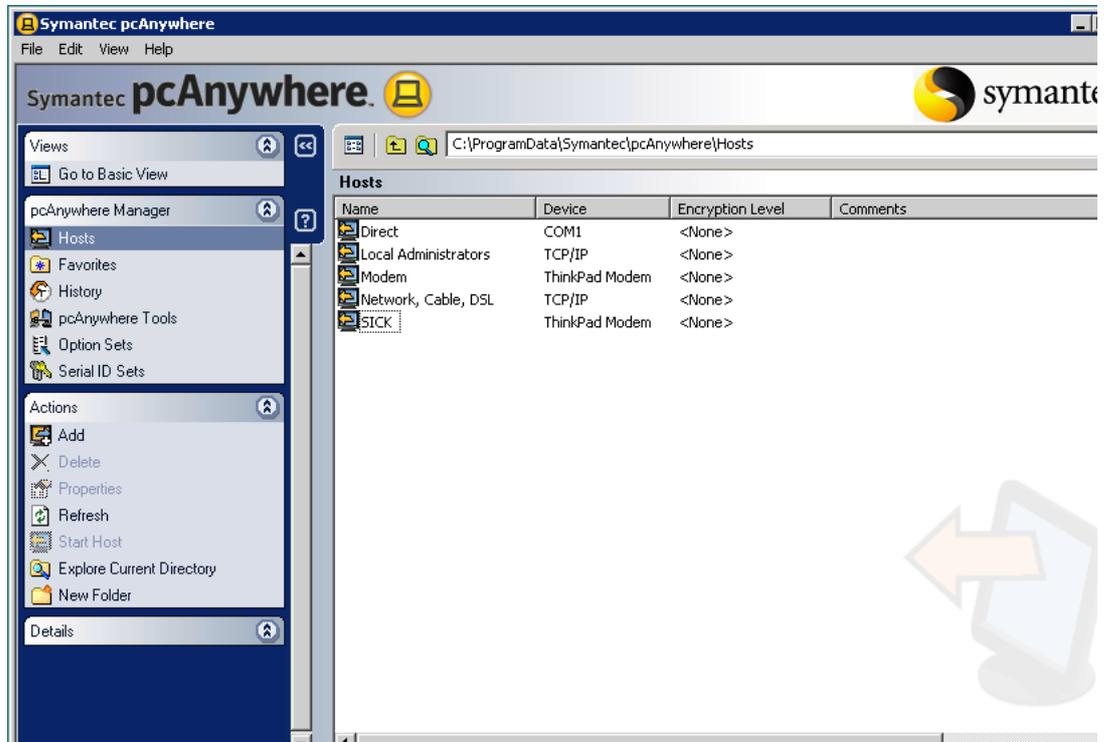
Choose the host mode and then double-click on the Remote maintenance icon or *MODEM*.

Since remote maintenance typically uses the same modem used for ERT, the ERT line at the corresponding COM interface is freed after selecting *REMOTE MAINTENANCE* in the *SYSTEM* menu. The ERT will try every 60 seconds to reopen the interface. For this reason, the selection host should be made within the space of a minute.

For further information consult the user manual for the remote maintenance software "pcANYWHERE32".

3.7 Manual inputs

This supplemental option displays a command window in which a user who has rights (→ page 30, §3.3.3) can manually define digital and analog entries configured in the manual entry interface.
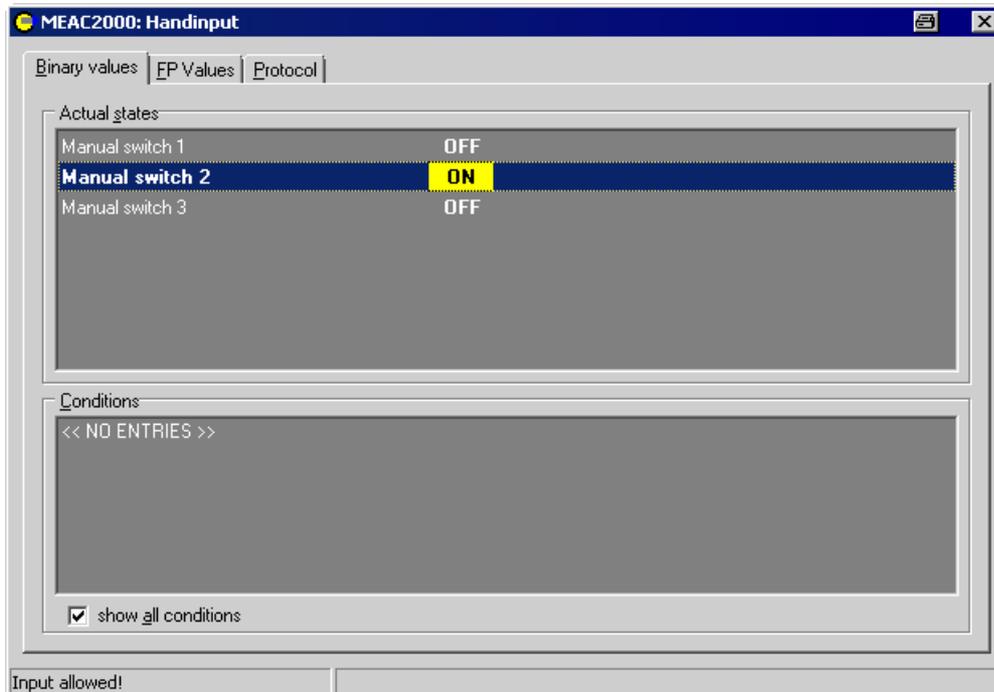
The following tabs can be selected:

Binary values	The *Actual states* list includes all the manually configured states and their currently defined values. The EN value is always highlighted in yellow. – Double-clicking on an entry in the list inverts its value. – A right mouse click on the list followed by a confirmation enables defining a status change for the selected entry. – The *Conditions* list includes all the modifications to the currently selected manual status which are clocked and must subsequently become active. – If the box *show all conditions* is checked, the future status modifications will be listed for all manual states.
FP values	The list of all configured manual values and their ranges are displayed here with their currently assigned value in floating point (FP) format. – To proceed to a new value allocation for an entry, select it and define the desired value above the list using the sliding control. – Direct input in the editing field is also possible. The new value is allocated with *Activate*.
Protocol	This page displays all the manual inputs processed in the past. Every opening and closing of the program as well as the user who processed it are also kept here. – The protocol of a specific day is obtained by double-clicking on the files column in order of the year, month and finally date desired. A record of a manual entry in a protocol includes the time, type of manual entry (aM = analog, dM = digital), its designation as text and the old and new manually defined status/value. – The *Update* button in the lower left allows completing the missing days in the Files column. – The second update button activates the protocol of the current day. – The displayed protocol can be printed using the *Print* button.

3.8 ## Operating system

Opens Windows navigator. It can be used to select new printers for example. This option is only accessible to users with supervisor rights.

3.9 ## Quit

If a user wants to close his session at the Workstation PC and turn off the Workstation PC, he should first exit the program with *Quit*. If changes have been made in the program they should be saved before closing it. All windows and command elements are then closed and the Workstation PC is logged off the network. The Workstation PC can then be turned off.

> [!] The Emission PC continuously logs the measured data and should not be turned off.

In rare cases, it can be necessary to stop the system (during a software update, for example). Users with supervisor rights have the option to exit the system on the Emission PC. The system must be started again immediately after an update.

MEAC2000 EU

4 "Current" functions

The Current screen
Screen configuration files
Diagrams
Listings
Data export

<table>
<tr><td>4.1</td><td>

The "Current" screen

</td></tr>
</table>

The *Current* button in the Tool bar opens the program section for viewing real-time values.

The screen is split in two halves to display the values ("Line 1" and "Line 2").
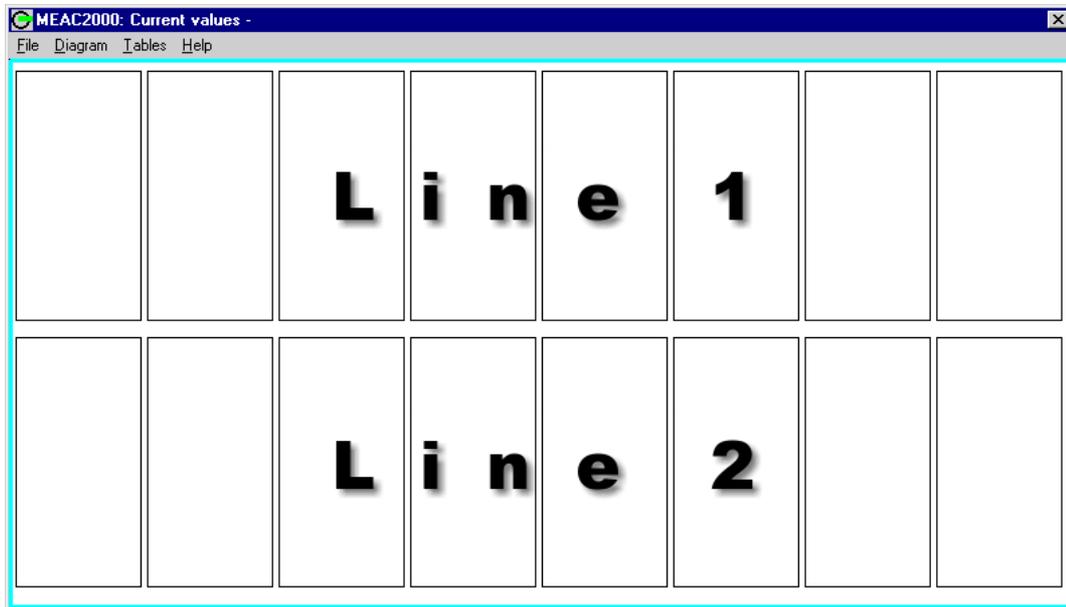
Values can be displayed in a beam diagram or linear diagram. On each "Line", 8 beam diagrams or 1 linear diagram with up to 4 values can be opened. There is also possible to represent 3 beam diagrams along with the status changes.
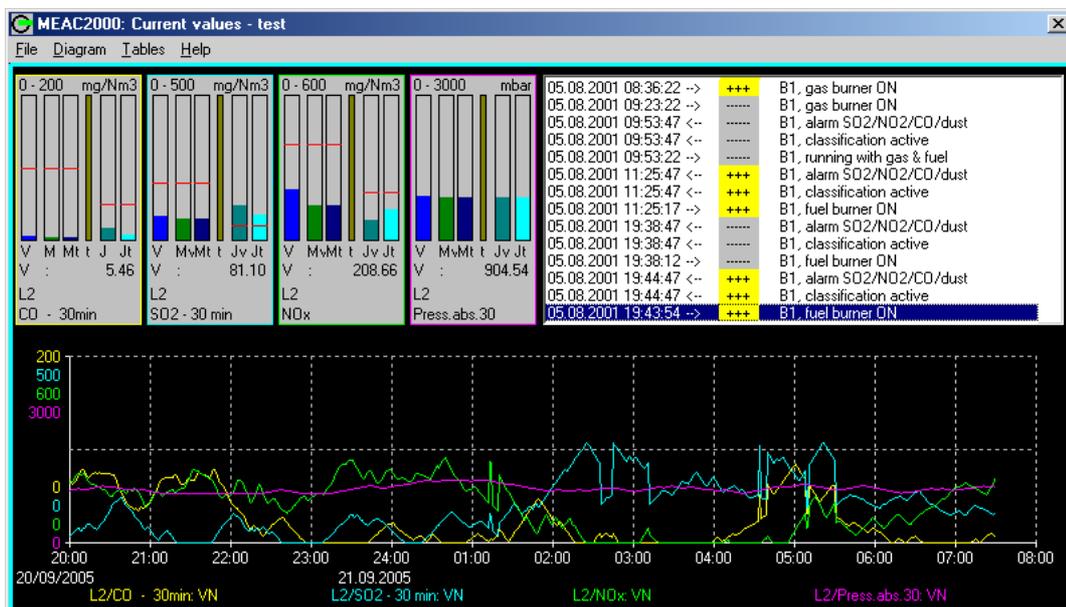
The views chosen can be saved as a named configuration which can be opened for future use. Several types of views can be created. The view used by the previous user will automatically load again whenever this menu item is selected.

4.2 **File**

The interface windows which display components and status can be customized. The *File* menu is used to maintain these visual interface configurations.
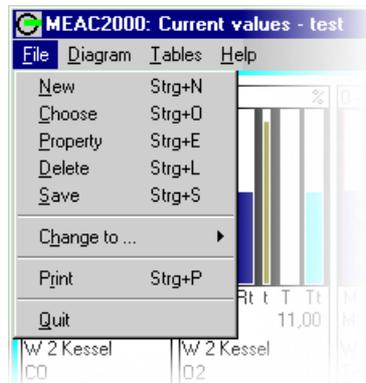
4.2.1 New

New is used to create a new visual interface window. The configuration must first be given a name. It will be linked to the name of the user who created it. Select the type of access to be permitted .
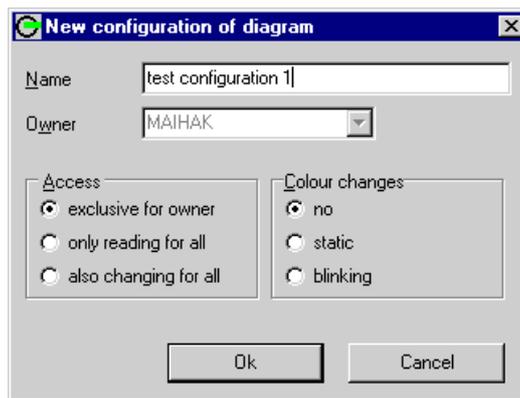
exclusive for owner	only the creator can use, modify, save, erase or transmit this configuration.
only reading for all	all users can use this configuration, but cannot modify it.
also changing for all	all users have the same rights as the creator (see « Creator only»).
no	no signal will be made.
static	the relevant red bar becomes red.
blinking	the relevant bar flashes in red.

Click in the color change area to select the display method in the beam diagrams when limits are exceeded.

A double-click on the chosen window (beam diagram or linear diagram) accesses a list of the components that can be displayed and of the display modes. Select the following:

● Plant (A1 to Ax)
● Components (K1 to Kx)
● Values before being displayed

For a beam diagram:
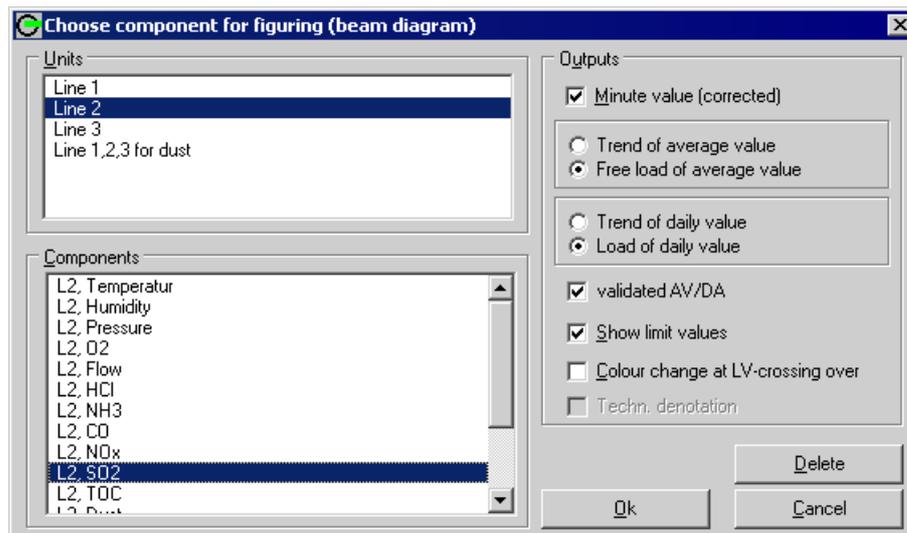
–	raw or corrected one-minute average values
–	average corrected values with limits or average validated values with limits
–	trends of corrected average values or free load of the validated average values
–	daily average corrected values with limits or daily average validated values with limits
–	trends of daily corrected average values or free load of the daily validated average values

For a linear segmented diagram:
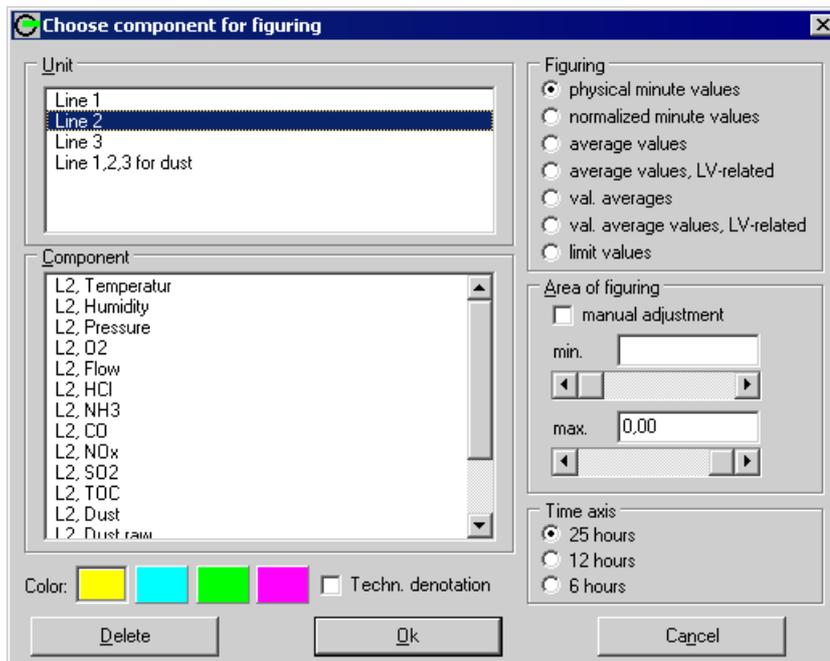
–	display color
–	one-minute average values, not corrected – *or*
–	one-minute average values, corrected
–	average values at 10, 30, or 60 min.
–	average corrected values at 10, 30, or 60 min.
–	average validated values at 10, 30, or 60 min.

Click on the button *Ok* and the window opens in the defined view.

The button *Delete* removes the components of the window.

4.2.2 Choose

Use this to activate a stored screen configuration. The name of the selected configuration is indicated on the window title bar.
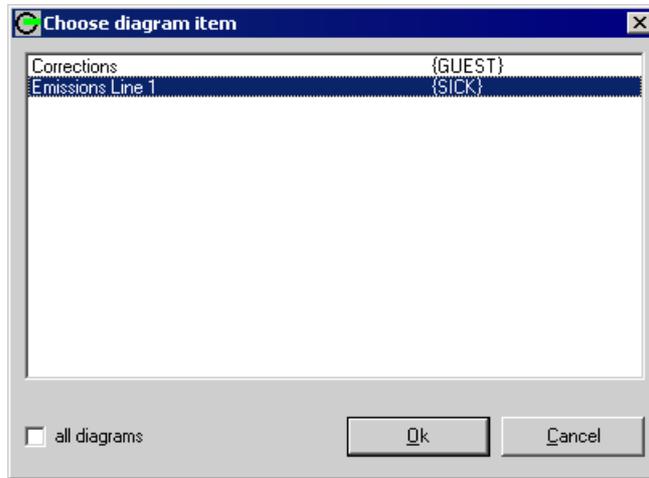
Checking *all diagrams* displays all the stored screen configurations, including those for which the current user does not have access rights (which, however, cannot be selected).

4.2.3 Change properties

The access rights for a configuration, their names and the method to display exceeded limits can be modified.

4.2.4 Delete

Deletes the currently selected screen configuration.

4.2.5 Save

Saves the current screen configuration. This function is only available when the configuration has been created or modified.

4.2.6 Scroll

Toggles through all the stored screen configurations.

4.2.7   **Print**

The contents of the *Current* window can be exported to a printer of choice.
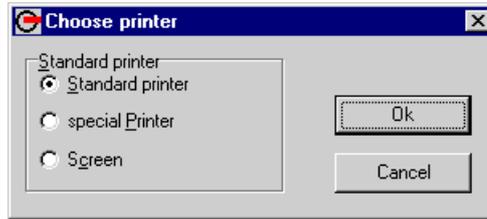
Standard printer	The default printer is used.
Special printer	A different printer on the network can be selected.
Screen	A print preview can be displayed.

4.2.8   **Exit**

The *Current* window closes. Modifications that the user made and did not save are detected and the option to save is presented.

4.3 Diagram

The window layout is defined here.
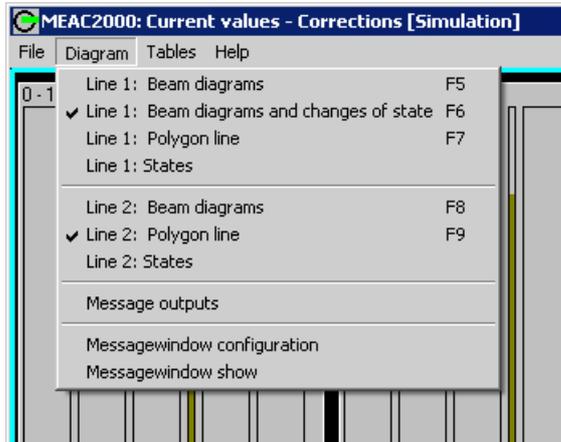
Values can be displayed in a beam diagram or a linear diagram. The screen presents in two *Lines*. The following forms can be selected:

● Line 1: Beam diagrams (8 beam diagrams)
● Line 1: Beam diagrams (4 beam diagrams) and changes of state
● Line 1: Polygon line (line diagram for 4 values)
● Line 1: States
● Line 2: Beam diagrams (8 beam diagrams)
● Line 2: Polygon line (line diagram for 4 values)
● Line 2: States

4.3.1 Beam diagrams

Values are represented as vertical bars. The display range and the unit of measure are indicated above the bars The first line below the bar indicates the type of display.

V	One-minute average value, corrected.
M	Average value at 10, 30, or 60 min., current
Mv	Validated value at 10, 30, or 60 min., current
Mt	Average value at 10, 30, or 60 min., trend
Ml	Average value (validated) – free load
t	Current integration time
J	Daily average
Jv	Daily average, validated
Jt	Daily average (validated) – trend
Jl	Daily average (validated) – free load

- The bars are responsive to the mouse. When the mouse pointer is placed on the bar, its designation and current value display. When a user clicks on the bar, the abbreviation of its designation appears in the second line below the bar as well as its current value. This display changes when another bar is clicked.
- The third line below the bar indicates the selected plant (A1 to Ax).
- The fourth line below the bar indicates the selected component (K1 to Kx).
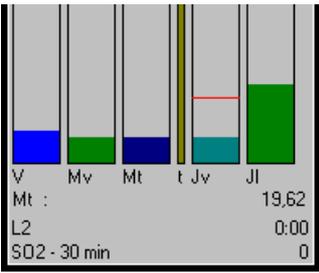
	• The beam diagram border is usually gray. However, when there is also a linear diagram displayed, the border has the color of the component in the linear diagram.
	• Additional information is displayed in right bottom edge.
	• The line beside the line/boiler name shows the actual total duration of limit violations for the line.
	• The last line shows the actual total number of invalid averages of the specific component.

Creating a new configuration for a beam diagram is described under *File – New*.

4.3.2 Polygon lines

4 components of different colors can be displayed. The vertical axis indicates the limits of the range displayed. The horizontal axis indicates the date and time of the period represented.

The plant name (A1 to Ax) and the designation of the component (K1 to Kx) are indicated below. The information matches the color of its line diagram.

Creating a new configuration for a linear diagram is described under *File – New*.

4.3.3 States

Status changes are indicated in the right half of the first "line" in the form of a table with date, time and status designation. Changes are highlighted in color. Definition:

+++	correct status
– – –	incorrect status
→	hardware digital input
←	hardware digital output

It is possible to configure the types of status changes before they are displayed using the *Message outputs* menu (see below).

4.3.4 Message outputs

This window is also accessible by clicking on an entry in the status changes table. The user can choose which changes should be saved.
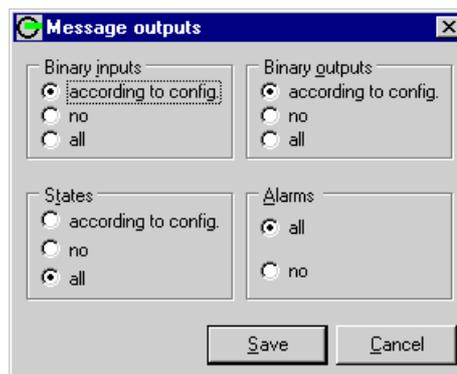
If *according to config.* is selected, only those states messages will appear which have the *Print state changes* option is checked in the configuration.

4.4 Tables

Various system data can be displayed. It can pertain to a plant, a part of it (components), or to a whole plant.

4.4.1 Hardware

The status of digital and analog inputs and outputs is indicated in a table for a whole plant, the whole plant or for the individual DAUs. The list always shows the current status.

The following is displayed:

– the channel no.
– the number of the apparatus and of the rack mounted unit when a DAU is the source of the data
– the abbreviation of the input or the output
– the designation of the input or the output
– status (input, digital output)
– +++ = contact closed, --- = contact open
– the value (input, analog output)

4.4.2 States

A status overview can be displayed for all plants or a single one as desired. The status is displayed with numbers and names.
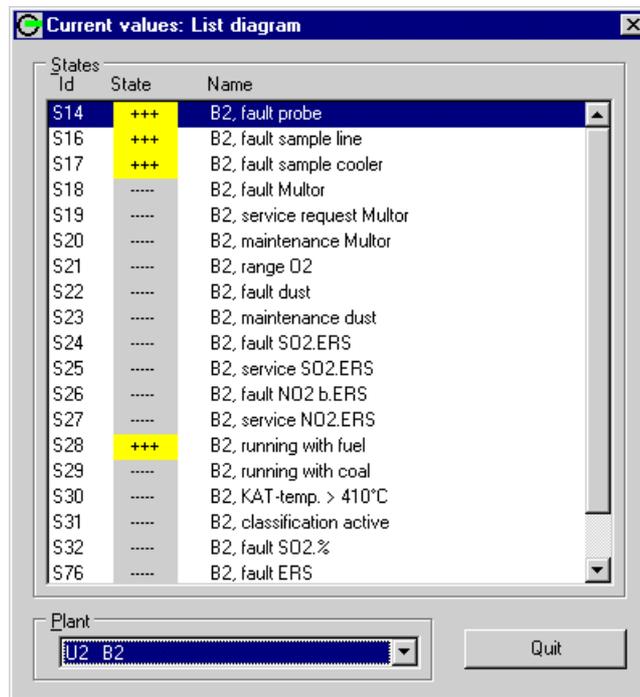
State coding:

+++	the status described is 'TRUE'
----	the status described is 'FALSE'

4.4.3   Components

An overview can be displayed for any or all plants selected. The list continuously displays the current values.

Name	Dimension	MR	MS	AV	AT	LV	DA	Dt	DL
L2, Temperatur	°C	140,00	140,00	140,00	140,00		41,71	115,43	
L2, Humidity	Vol%	6,25	6,25	6,25	6,25		6,50	6,35	
L2, Pressure	hPa	987,81	987,81	987,81	987,81		988,60	988,13	
L2, O2	Vol%	3,91	3,91	3,91	3,91		4,12	3,99	
L2, Flow	Nm3/h	39062,50	23605,27	23605,27	23605,27		27467,51	25150,17	
L2, HCl	mg/Nm3	28,13	16,45	16,45	16,45	60,00	16,32	16,40	10,00
L2, NH3	mg/Nm3	9,38	5,48	5,48	5,48	20,00	5,44	5,47	10,00
L2, CO	mg/Nm3	46,88	27,42	27,42	27,42	100,00	27,20	27,33	50,00
L2, NOx	mg/Nm3	187,50	109,69	109,69	109,69	400,00	108,81	109,34	200,00
L2, SO2	mg/Nm3	93,75	54,84	54,84	54,84	200,00	54,40	54,67	50,00
L2, TOC	mg/Nm3	9,38	5,48	5,48	5,48	20,00	5,44	5,47	10,00
L2, Dust	mg/Nm3	4,69	4,54	4,54	4,54	30,00	3,93	4,30	10,00
L2, Dust raw	mg/m3	4,69	4,69	4,69	4,69	30,00	4,65	4,67	10,00
L2, CO2	Vol%	3,13	3,13	3,13	3,13		3,10	3,12	
L2, NO	mg/m3	117,19	117,19	117,19	117,19		116,35	116,85	
L2, NO2	mg/m3	31,25	31,25	31,25	31,25		31,03	31,16	

Plant: 2   Line 2

☐ validated AV/DA
☑ Show formula results

Quit

Name	the number and designation of the component
Dimension	the unit of measure
MR	one-minute average value, raw
MS	one-minute average value, standardised
AV	Average value at 10, 30, or 60 min.
AT	Average value at 10, 30, or 60 min. – trend
LC	limit of average value at 10, 30, or 60 min.
DA	daily value
Dt	daily value - trend
DL	daily value limit

If *Show formula results* is checked, a new window will open which always displays the current results for all formulas for the selected plant.

Unit	Id	Denotation	Value
Formulae			☒
Line2	10	L2, Classification	+++
Line2	12	L2, Emission HCl	0,66
Line2	13	L2, Emission NH3	0,22
Line2	14	L2, Emission CO	1,11
Line2	15	L2, Emission NOx	4,43
Line2	16	L2, Emission SO2	2,21
Line2	17	L2, Emission TOC	0,22
Line2	18	L2, Emission Dust	0,18
Line2	36	L2, SO2 non compliant	-----
Line2	37	L2, NOx non compliant	-----
Line2	38	L2, NH3 non compliant	-----
Line2	39	L2, HCL non compliant	+++
Line2	40	L2, CO non compliant	-----
Line2	41	L2, TOC non compliant	-----
Line2	42	L2, Dust non compliant	-----
Line2	64	L2, SO2 DV	44,84
Line2	65	L2, SO2 RV	44,84
Line2	66	L2, NOx DV	87,75

4.4.4 Momentary values

The component values and the analog input current corresponding to the time of request can be displayed for any or all of the plants selected.

The *Update* button always displays the values and currents at the moment. This occurs automatically when *Autom. update* is checked. The following is displayed:

- the component designation
- the no. of the 'apparatus, of the placement and of the channel (a.e.c) when a DAU is the data source.
- The hardware input current in mA, when a DAU / MEAC is 1 x data source
- the following component values (error values in red)

MR	one-minute average value, raw
MN	one-minute average value, standardised
AV	average value at 10, 30, or 60 min., standardised

- unit of measure
- date/time
- the component designation

MEAC2000 EU · Operating Instructions · 8015074 V 1.0 · © SICK MAIHAK GmbH

MEAC2000 EU

5 "Retrospect" functions

Configuration files

Diagrams

Listings

Data export

The Retrospect screen

5.1 Scope of the "Retrospect" functions

MEAC2000 EU continuously logs the input data from the sampling points and the calculated values. The *Retrospect* button on the Tool bar opens the protocols. It is possible to display data saved since the first program launch provided it has not been overwritten during the course of system maintenance.

Displaying historical data is opened with a menu choice or an icon depending on the type of data desired. Up to 4 components in a linear diagram, or up to a maximum of 24 status condition entries at the same time.

The last used display configuration is the one that will display whenever retrospect are opened.

5.2   File

The windows displaying components, status or tables can be customized as needed (→ page 67, § 5.3.3). The *File* menu is used to maintain these visual interface configurations.

File	Diagram	Option
New	Strg+N	
Choose	Strg+O	
Property	Strg+E	
Delete	Strg+L	
Save	Strg+S	
Print	Strg+P	
Quit	Alt+F4	

New

Use *New* to create a new historical data display configuration.

The configuration type corresponds to the type of data currently in use (status or components), so first open the type of data desired by selecting *Status – Components* in the *Diagram* menu.

First enter a name for the new configuration in the blank display window. This configuration can be saved to re-use at a later time. It can be saved using *Save*, or automatically when exiting historical data after creating a new configuration. The program detects that the configuration has been changed and offers an opportunity to save the changes (see *Quit*). When the configuration has been saved, it is available the next time historical data is opened (see *Choose*).

> **!** It is important to know exactly when to save. Necessary configurations could have been incorrectly created under a correct name.

Choose

Opens a list of available display configurations. Choose between configurations for components and those for status. After confirming with *Ok*, the current display window will work with this configuration.

Property

Allows to change the author and name of the current display configuration. It is also possible to deny other users access to this configuration.

Delete

If a display configuration is no longer needed, the *Delete* item can be used to remove it from the list of available configurations. Select the unnecessary configuration in the list of available configurations, then select *Delete*.

Save

Use *Save* to add a new or modified configuration to the list of available display configurations. Saved configurations are available by selecting *Choose*.

Print

Use *Print* to export the contents of the current window to a printer of choice.

Quit

Exits *Retrospect*. If the configuration had been created or modified, you will be given the opportunity to save it before the window closes.

> **!** If the configuration is saved under the name of current configuration, it will overwrite it in its current form.

5.3   Diagram

Most of the functions in historic data are controlled using the menu bar.
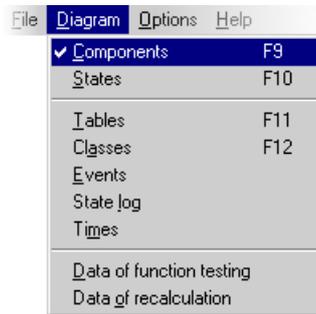
In the *Diagram* menu, the display of historical data toggles between *Components* and *States* as selected. The current display type is always checked. Components represent values saved from sampling points, while status indicates the situation of individual parts of the plant (plants) during the observed period. The last used configuration for components or status will be the one for the current window.

5.3.1   Components – display of values
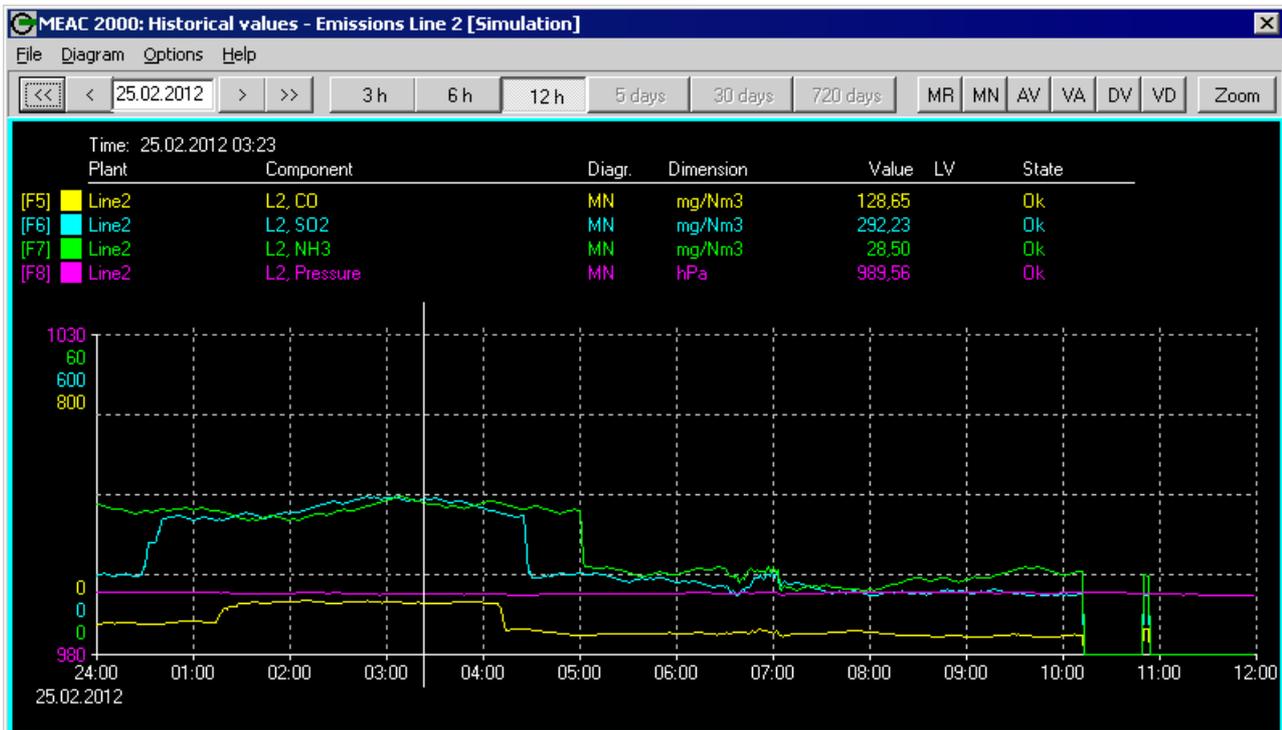
Up to four *Components* of different colors can be represented in a linear diagram. The time axis is defined by the type of values (average per minute, at 10, 30, or 60 min., daily).

Above the display, the following are indicated:

● In the color matching the selected component:

Plant	the name of the plant
Component	the component designation
Diagr.	the type of display
Dimension	the unit of measure
Value	the value (numerical)
State	the limit (numerical)
the status	

● The exact date and time corresponding to the position of the pointer.

Click on a point on the linear diagram to display the value of the corresponding component at that point. In this manner, up to 8 saved points can be numerically noted.

Components – creating a new configuration

Assign a name to the new configuration *File – New*. If this is not done, the program will request it before proceeding to the configuration.

After clicking on the desired color box in the upper left corner, a window opens with the following choices:

● Plants

● Components

● Value type:

– one-minute average values *or*
– one-minute average values – corrected
– average values at 10, 30, or 60 min. *or*
– limits of average values at 10, 30, or 60 min.
– daily values *or*
– limits of daily values

The type of values influence the possible time scales.

If the configuration is needed in the future, it can be saved. (*File – Save*).

Components – modifying/deleting the configuration

Choose the configuration to modify (*File – Choose*).

After clicking on the desired color square, a different plant, component or value type can be assigned to it in the window that opens.

Click on the button *Delete* to remove a component from the display.

An entire configuration can be deleted (*File – Delete*).

5.3.2 ## Status – display of operating status
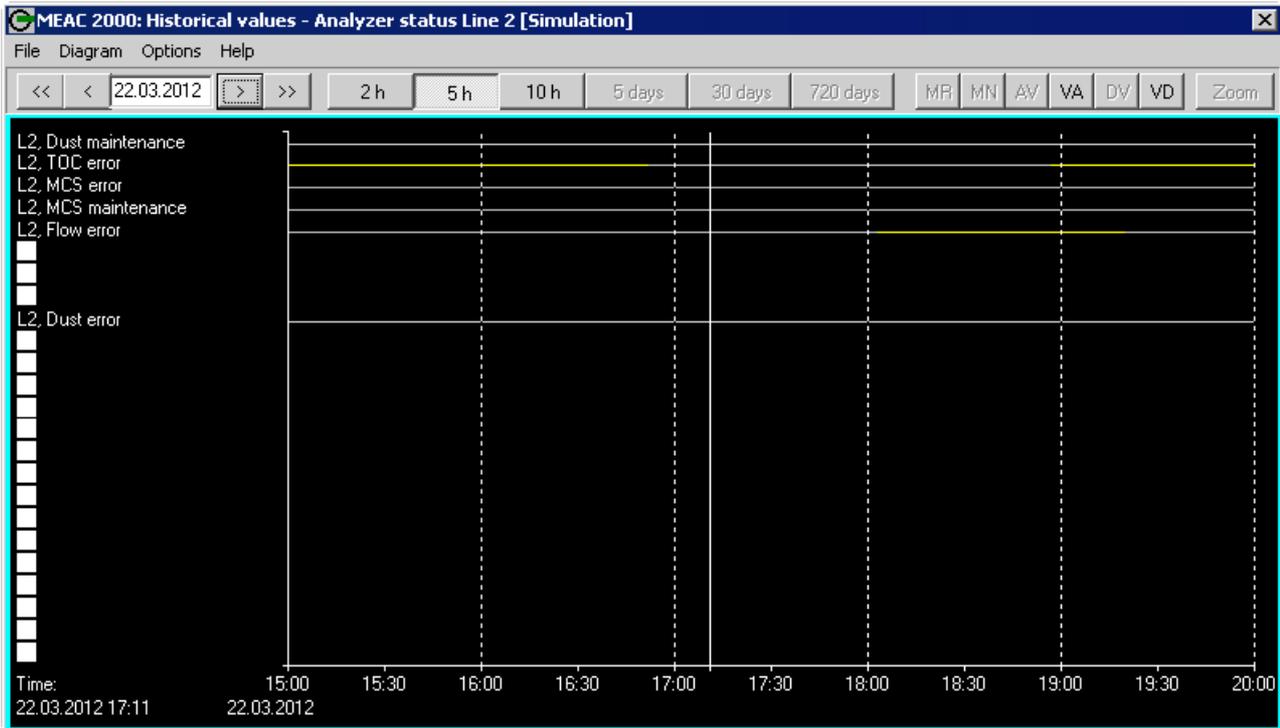
Position the pointer anywhere in the window and the currently selected date and time display in a frame in the lower left of the window.

A maximum of 24 selected status can be displayed for each point on the time axis.

Color coding:

grey	target state
yellow	deviation/fault

Status – creating a new configuration

Assign a name to the new configuration (*File – New*). If this is not done, the program will request it before proceeding to the configuration.

In the window that opens, there are 24 white squares in a column. By clicking on these fields, a window opens for selecting a plant and a status. The square is then replaced by the name of the status.

If the configuration is needed in the future, it can be saved (*File – Save*).

Status - modify/delete the configuration

Choose the configuration to modify (*File – Choose*).

After clicking on the name of a status, it is possible to allocate it to another plant and another status in the window that opens.

Click on the button *Delete* to remove a status from the display.

An entire configuration can be deleted using *File – Delete*.

5.3.3 Tables

A maximum of 5 components are processed in a table. The display window must be configured. Saved configurations can be retrieved.

Rough minut.values [Simulation]					☒
Configuration	Values			Date	
MR Line 2	⦿ Rough minut.values ○ Day values ○ Daily emissions			‹ 25.02.2012 19:01 ›	
New Change Delete	○ Corr. minute values ○ Month values ○ Monthly emissions				
	○ Average values ○ Year values ○ Yearly emissions				
	Line2	Line2	Line2		Line2
	CO	SO2	NOx		Humidity
	[mg/Nm3]	[mg/m3]	[mg/Nm3]		[Vol%]
25.02.2012 19:01	77,23	258,13	367,01		5,87
25.02.2012 19:02	76,65	257,06	370,24		5,99
25.02.2012 19:03	75,95	255,84	374,79		6,12
25.02.2012 19:04	75,51	256,09	378,29		6,21
25.02.2012 19:05	76,00	257,84	381,53		6,33
25.02.2012 19:06	76,90	259,46	385,17		6,49
25.02.2012 19:07	77,60	260,69	388,24		6,61
25.02.2012 19:08	78,20	259,55	391,47		6,73
25.02.2012 19:09	78,94	257,40	394,58		6,83
25.02.2012 19:10	79,51	256,09	397,37		6,95
25.02.2012 19:11	80,42	254,59	400,60		7,08
25.02.2012 19:12	85,55	256,78	402,28		7,75
25.02.2012 19:13	85,22	258,37	403,69		7,83
25.02.2012 19:14	85,25	259,86	407,41		7,91
25.02.2012 19:15	85,64	260,89	408,84		8,01
25.02.2012 19:16	85,09	262,05	407,71		8,09
25.02.2012 19:17	84,21	261,97	409,57		8,16
25.02.2012 19:18	83,85	260,74	412,26		8,25
25.02.2012 19:19	84,32	259,82	415,49		8,34
25.02.2012 19:20	85,06	258,83	418,48		8,46
25.02.2012 19:21	85,84	257,10	420,53		8,55
25.02.2012 19:22	85,63	255,89	418,21		8,65
25.02.2012 19:23	85,15	255,09	416,44		8,71

Print		Help ...	Cancel

Creating a new configuration

After clicking on the button *New*, enter the name for a new configuration. It is possible to select another creator and general access rights. The value types to display (one-minute average values, daily values, etc., loads) and the desired period must be defined.

At the top of the table there are five blank buttons. The window for selecting components opens by clicking above. A component can be selected for each one. Their names and corresponding unit of measure will be written on the buttons. The button serves as a title for the values displayed below it.

To have this configuration available for future use, it must be saved.

Using a saved configuration

Select the desired configuration from the list. It can be used, modified or deleted.

It is possible to scroll through the saved configurations changing the value types (values, loads) and the time period.

A modified configuration must be saved to have it available for future use.

Saving a configuration

A newly created or modified configuration must be saved to have it available for future use. Click on the button *Cancel*. Before returning to the *Status – Components* window, the program asks if the user wants to save the configuration. If it is not saved, the new creation will be lost and the display will have the view it previously had.

Changing the name of a configuration

Use the button *Change* to change the name of a newly created or previously saved configuration. The name of the creator and the access rights of a configuration can also be changed.

Deleting a configuration

Select the name of a configuration to be deleted. Click on the button *Delete*. A confirmation is required to avoid accidental deletion of a configuration: Use *Yes* to confirm, *No* to discard the saving.

Printing a table

The table can be printed on a selected printer.

5.3.4 Classes

Classes opens a menu which can be used to display and print the classification of a plant or a component.
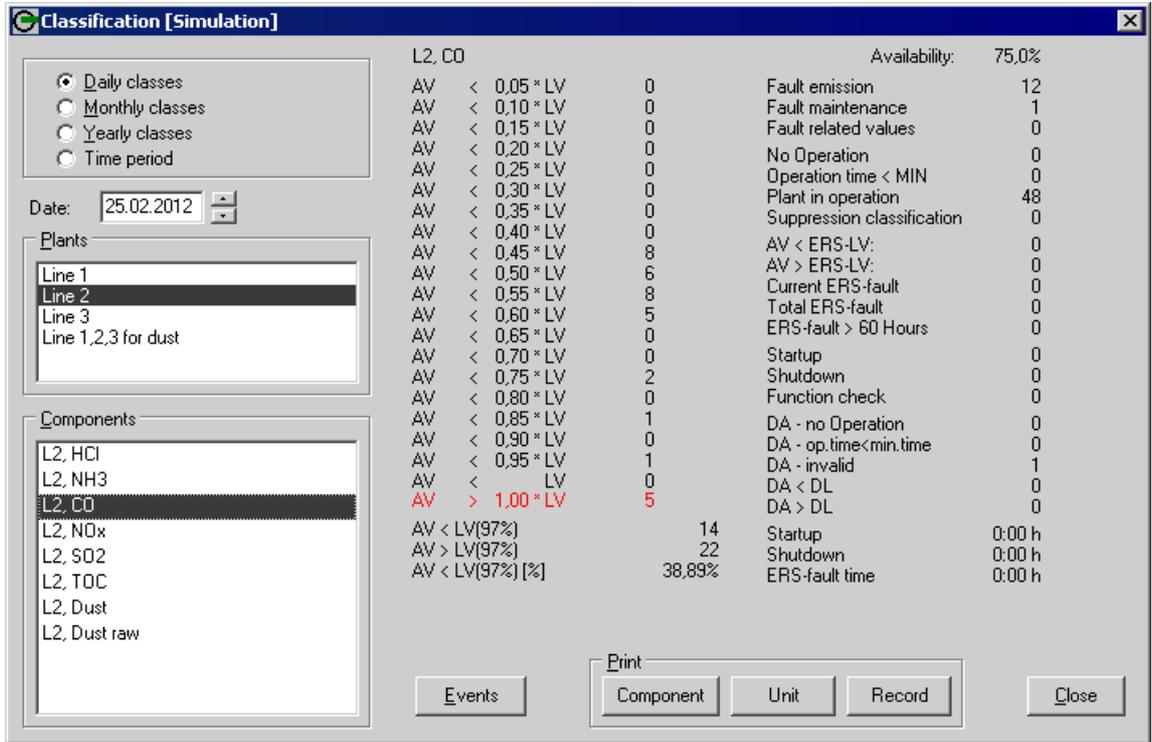
Selection

To display a set of classification data, select:

– *Plant*
– *Components*
– Type of *Classes* (*Daily/Monthly/Yearly classes*) *or*
– *Time period*

The classification data is displayed on the right side of the window.

Coding

ERS	emission gas purification system
AV	average value at 10, 30, or 60 min.
LV	limit value
DA	daily average value
DL	daily limit value

Click on *Events* to see the events which took place in a given period for the selected component. The time, event, value and limit are indicated.

Output

The classification data can be output to a printer or to a screen.

– for the selected *Component*
– for the plant (all components of that unit)
– for all units of the plant (*Record*)

5.3.5 Events

Selecting *Events* allows to search events from a certain period.
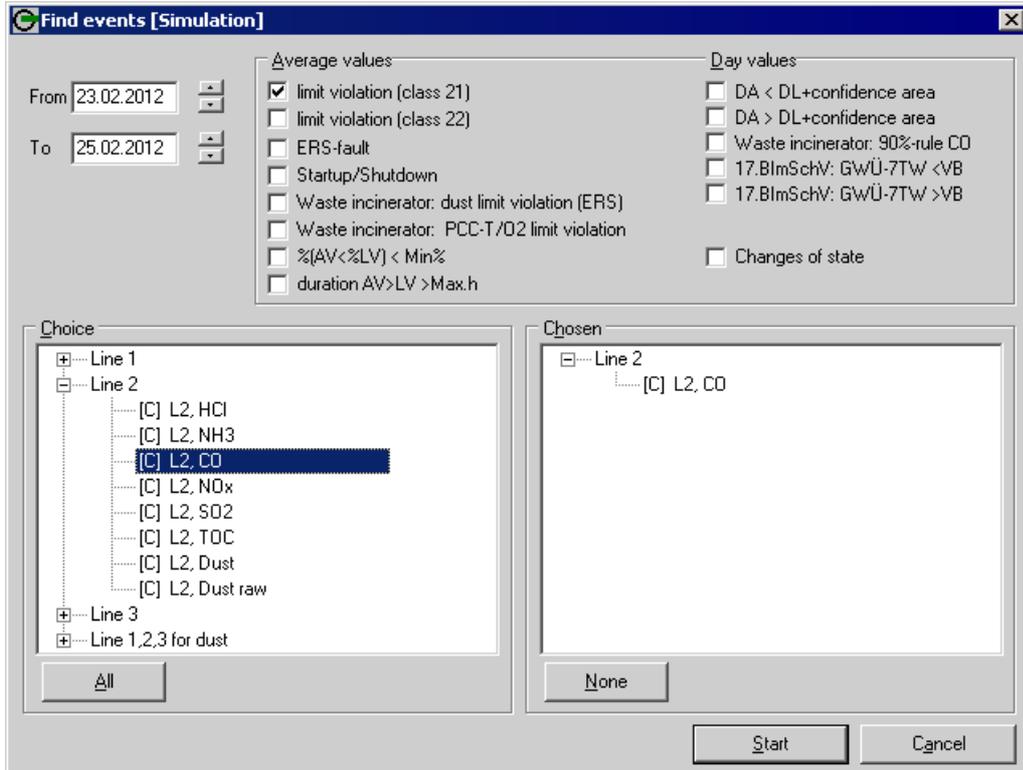
1 Select the desired time period (*from ... to ...*).

2 Select the desired types of events (status changes).

– limit value violation (class 21 and/or class 22)
– ERS troubles
– Startup/Shutdown status
– dust limit violation (CO 90 % rule)
– 17. BImSchV limit monitoring [1]

[1] BImSchV = Bundes-Immissionsschutzverordnung (German emission control regulation)

ERS	emission gas purification system
AV	average value at 10, 30, or 60 min.
LV	limit value
DA	daily average value
DL	daily limit value

3 Select the desired plant(s):
  – Double-click in the *Choice* list to copy a unit to the *Chosen* list.
  – Or select *All* to select all units. (*None* deletes the *Chosen* list.)

4 Select *Start*.

The resulting events will be displayed as a table. Printing is possible.

5.3.6	**Status changes**

Changes of state opens a window where it is possible to display a list of all status changes in a certain selected period.
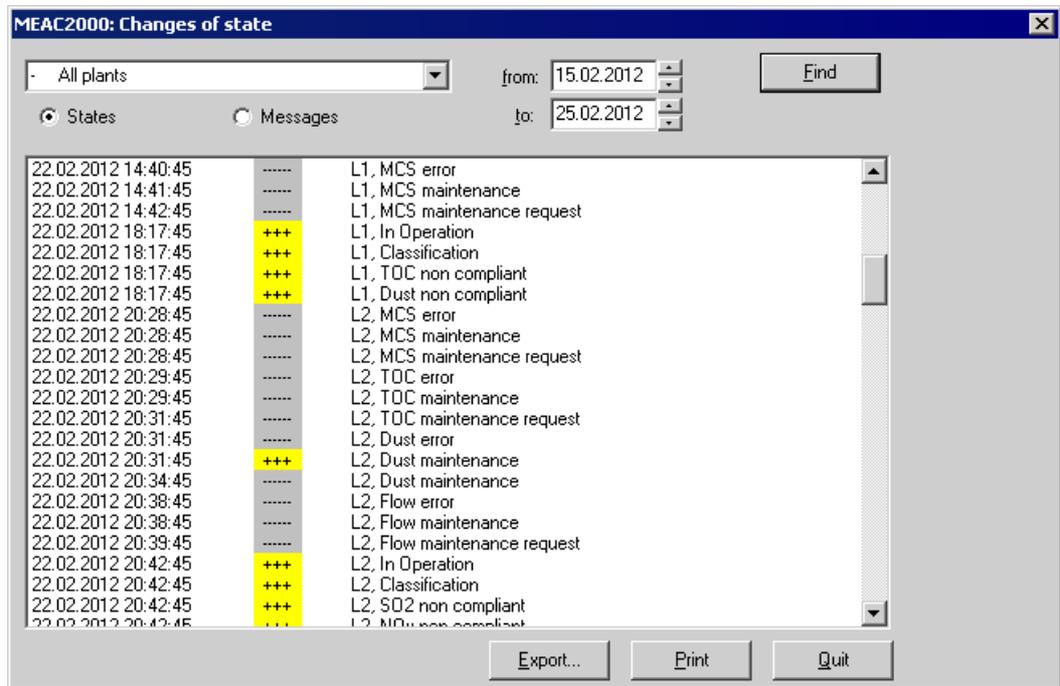
1 Select the plant (combobox at the top left of the window).

2 Select the desired time period (*from ... to ...*).

3 Select the desired type.

State	all binary states in the selected period
Messages	all messages in the selected period

4 Select *Find*.

The resulting events will be displayed as a table. Printing is possible.

5.3.7　Time

The *Operation time* window displays operation times and annotated breakdowns for the selected plants.
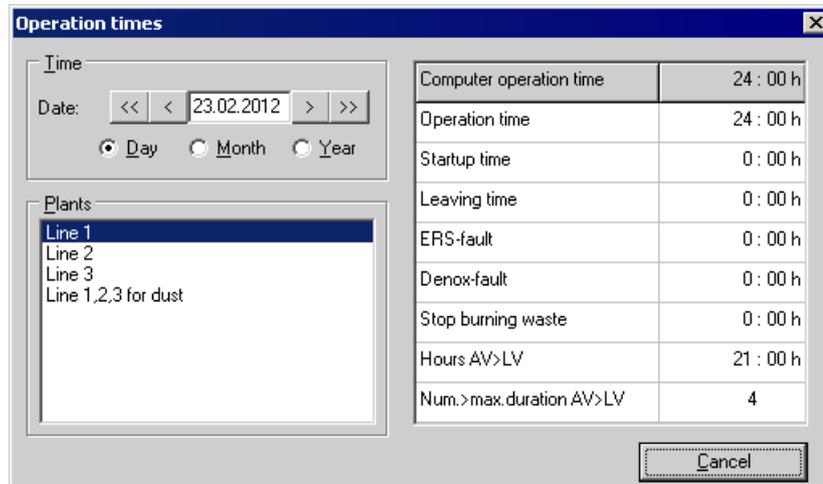
The user can choose between daily, monthly and annual operating times.

The desired period (day, month, or year) can be entered to the right of its designation, or selected using the positioning arrows at the bottom.

The following is displayed:

Operating time	the operating times
Start-up time	the heating up phase time
Leaving time	the shut down phase time
ERS-fault	ERS down time
Denox-fault	Denoxing down time
Stop burning-waste	lockout timing

AV	average value
LV	limit value

5.3.8　Data of function testing

During the function test of a plant, all measured values and all status messages are saved separately from those saved during normal operation. That is why a Retrospect view does not display any results from function test periods. The menu item *Data of function testing* gives access to the data recorded during function test periods.

The menu item is tagged when this mode is active. To return to normal operation, select *Data of function testing* again.

5.3.9　Post-processed data

Subsequently processed data can only be displayed in a special *Restrospect* view. Use the *Data of recalculation* menu item to access such data.

The menu item is tagged when this mode is active. To return to normal view, select *Data of recalculation* again.

5.4 Options

5.4.1 Exporting data

Using the *Export of data* window, data from a selected period can be exported into an ASCII text file.
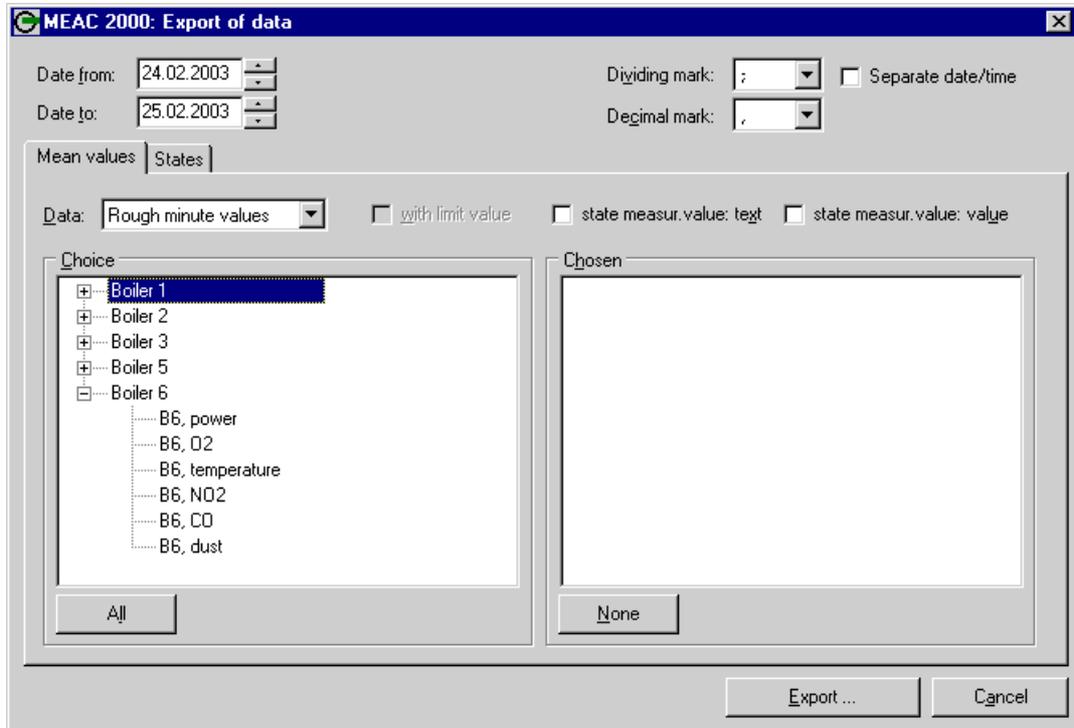
1 Select the data to be exported:

Date from / Date to	desired data period
Dividing mark	separator between single data
Decimal mark	decimal sign used in the exported data
Separate date/time	date/time format
Mean values (averages)	type of data
States	

For *Mean Values*:

– *Data* (type of values, including emission loads)
– *with limit value* (exported data will include the limit values)
– *state meas. value: text*: exported data will include the state of the measured value as a text code (for example, "INC" for "incorrect average value at 10, 30, or 60 min")
– *state meas. value: value*: exported data will include the state of the measured value as a numeric code (for example, code 32 for "incorrect average value at 10, 30, or 60 min.")
– plant: Double-click in the *Choice* list to copy a unit to the *Chosen* list. Or select *All* to select all units. *None* deletes the *Chosen* list.

2 Click on *Export...*
3 Enter the desired path (storage device, folder) and file name (including extension) of the file to be exported.

When the export is completed, the number of exported lines is displayed.

5.4.2 Minimum/maximum values

Use the *min/max values* menu item to search for the first 50 average values at 10, 30, and 60 min. or daily maximum or minimum of a given year for a selected component.
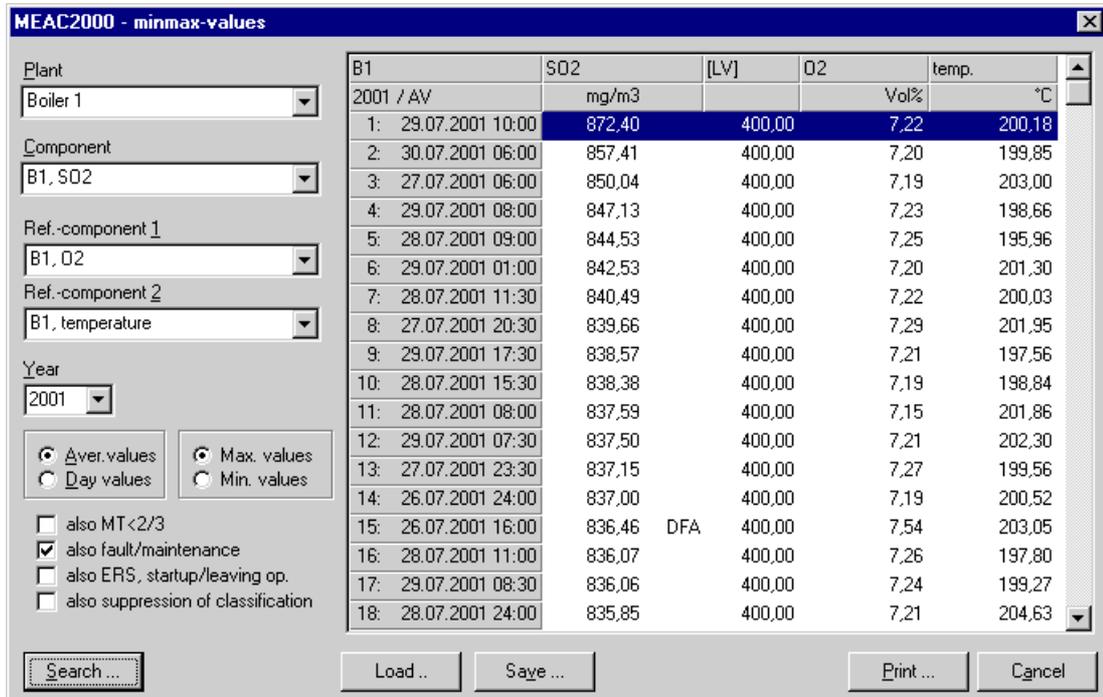
▶ Select *Plant* and *Component*.

▶ Select *Ref.-component 1* and *Ref.-component 2* (reference components) if these components should also appear in the list.

▶ Select the desired check box options.

▶ Click on *Search...* to generate a new list.

▶ Double-click on an line in the list to obtain a table of average values at 10, 30 and 60 min. corrected for this entry. [1]

Check box explanations:

MT	Scan time
ERS	Emission gas purification system
also suppression of classification	The list includes periods where plants were not operating in normal mode.

● The requested values are listed in ascending order.

● *DFA* behind a value indicates a apparatus malfunction.

● It is possible to *Save...* and *Print...* the displayed list. *Load...* allows to call-up a saved list.

---

[1] Can also be accessed via *Diagram – Tables*.

5.5   The Retrospect tool bar

| << | < | 21.09.2005 | > | >> | | 3 h | 6 h | 12 h | 5 jours | 30 jours | 720 jours | | VB | VN | MN | MV | JM | JV | Zoom |

Date

Selects the start time for the Retrospect period.

Arrow keys

The period of the Status/Components window can be shifted using the arrow keys:

Time scale	Key	Result
up to 12 hours	[<][>]	1 hour back, then
	[<<][>>]	6 hours back, then
5 days	[<][>]	12 hours back, then
	[<<][>>]	3 hours back, then
30 days	[<][>]	2 days back, then
	[<<][>>]	12 hours back, then
720 days	[<][>]	2 months back, then
	[<<][>>]	1 year earlier, later

Time scale

Use these buttons to set the scale of the time axis for the data display.

The possible range for the time period displayed depends on the type of value selected:

for daily values and daily limit values:	5.3 to 720 days
for average values at 10, 30, or 60 min. and the limits of these values:	3, 6, 12 hours or 5 days
one-minute average values and corrected one-minute average values:	3, 6 or 12 hours
for status:	2.5, 5, or 10 hours

Value types

These items are available only for displayed components. They enable modifying the type of base value for all displayed components.

VB	one-minute average value, raw
VN	one-minute average value, corrected.
MN	average value at 10, 30, 60 min. corrected
MV	average value at 10, 30, 60 min. validated
JM	daily value corrected
JV	daily value validated

Zoom
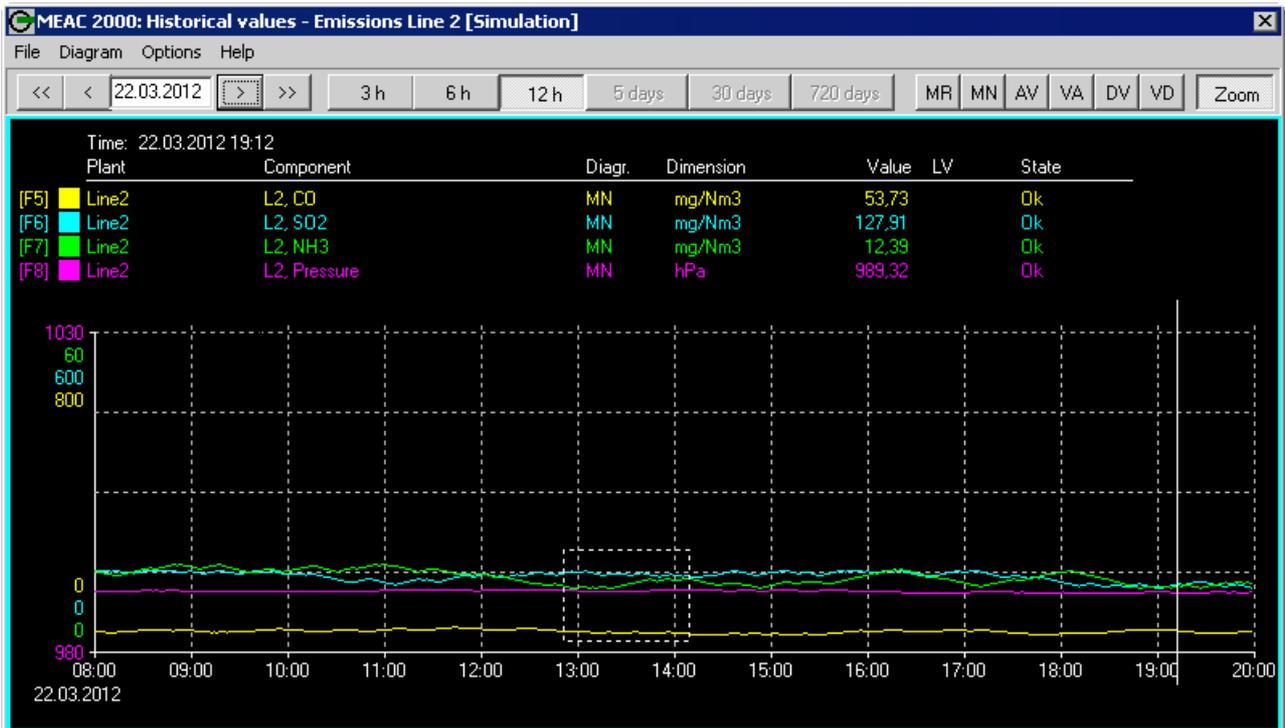
Zoom is available for the period displayed. After clicking on the *Zoom* button, use the left mouse button to define the beginning and end of the zoom window.
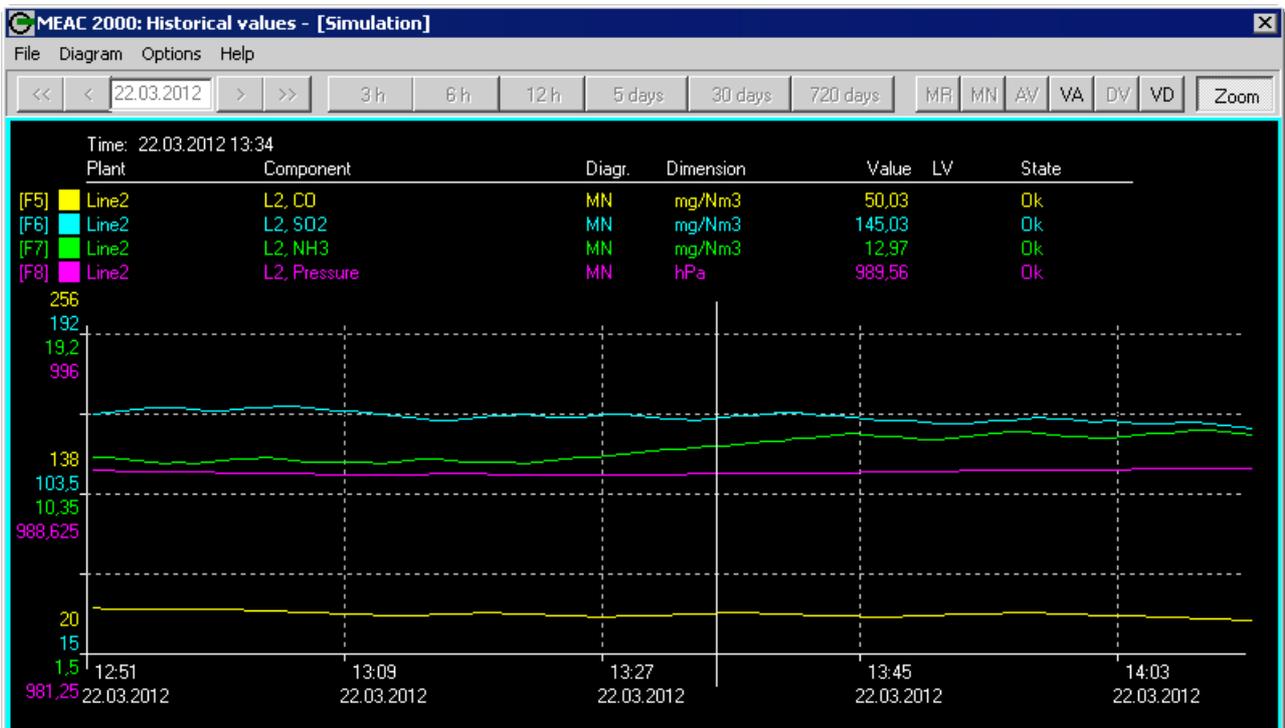
+i   This function is only available for components.

MEAC2000 EU

6   "Reports of fault" functions

Directories

Reports

Search

+i	"Report of fault" functions are an optional feature.

6.1   Introduction to the "Reports of fault"

The *Reports of fault* button leads to a sub-program of standardized documentation for fault reports. The reports are saved in a data base as shown in the directory.
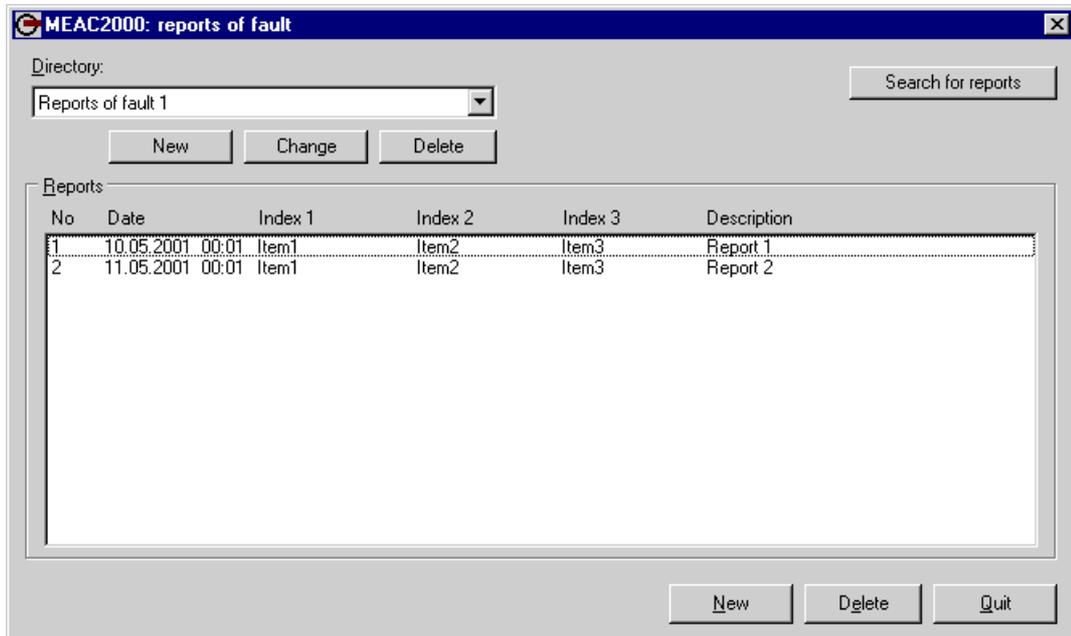
6.2   Directories

The directories have a sequential number allocated by the system and a name supplied by the user.

6.2.1   Creating a directory

Click on *New* to open a window in which the name of a new directory can be entered. The directory is then available for adding fault reports.

6.2.2   Renaming a directory

After selecting a directory, the name can be changed using the *Change* button. All fault reports are saved and can be accessed using the directory name.

6.2.3   Deleting a directory

After selecting a directory, it can be deleted from the data base by clicking on *Delete* and responding to the confirmation.

> [!] When a directory is deleted, all the reports contained within it are also deleted.

6.3 Reports

Fault reports also have a sequential number allocated by the system and can be indexed on three additional search levels.

6.3.1 Creating a report

To create a fault report, define in which directory the report should be saved (→ page 78, §6.2). Click on *New* at the bottom of the *reports of fault* window.

The following is automatically annotated for the report:

● Sequential number
● Selected directory
● Creation date
● Author (login user name)

To be added manually:

Description	short description (as a title)
Period of	beginning and end of the fault (date and time)
Fault case	description of the fault
Reason	description of the causes
Measure	measures to take
Index ...	up to three keywords for indexing (→ page 80, §6.4)

6.3.2 Displaying/modifying a report

1 Select the fault report to display/modify (→ page 80, §6.4).
2 Double-click to display or modify the report.

When there is a modification, the current date and the name of the user who processed it are automatically added to the report.

6.3.3 Deleting a report

1 Select the fault report to delete/modify (→ page 80, §6.4).
2 Select *Delete* and confirm the requested confirmation.

6.4 Search

Select a report to display, modify or delete. This is done through the *reports of fault* window or the search function

6.4.1 Direct selection

After selecting a directory in the *reports of fault* window, all the reports contained within the directory are listed. The following are displayed:

● Sequential number
● Creation time
● Indices 1 to 3
● Description

6.4.2 Search function

Reports can also be selected using the integrated search function. All saved reports are searched regardless of the directory in which they are saved.
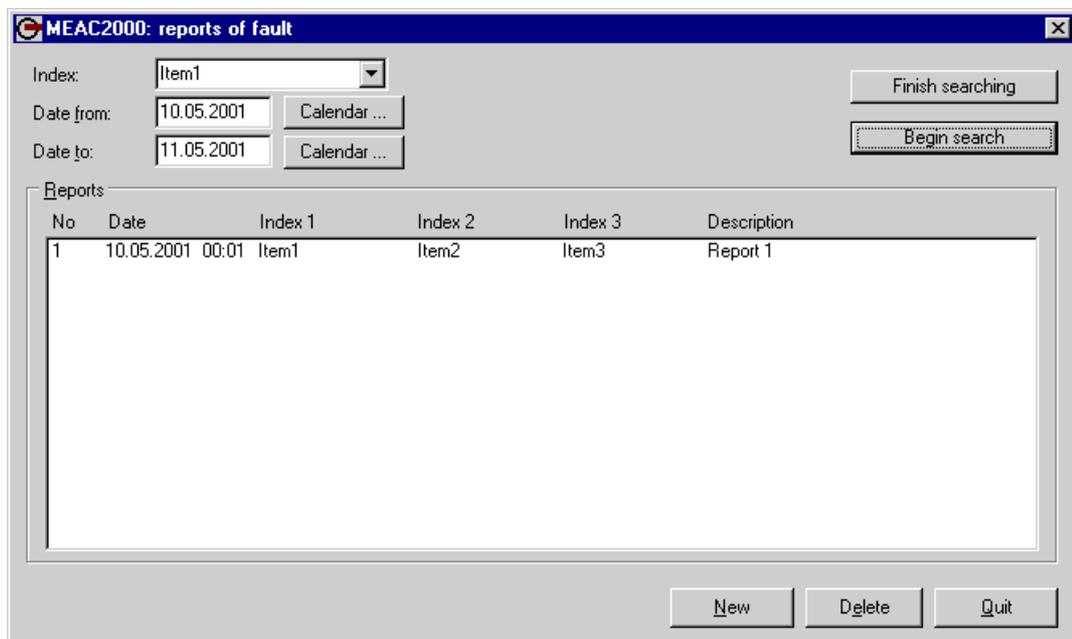
The search can be defined by defining a time period (*Date from/Date to*) to be searched or by using a keyword called *Index*. After clicking the *Begin Search* button, the reports matching the criteria are listed.

MEAC2000 EU

7   "Configuration" functions

System

Plants

Components

Outputs

Formulas

Subject to change without notice

7.1 **Scope of the "Configuration" functions**

It is possible to access a detailed view of the current data model by clicking on the *Configuration* button on the Tool bar.

To create a new data model or to modify an existing data model, first select *Simulation* in the Tool bar before opening the *Configuration* window.

Figure 7   Configuration menu
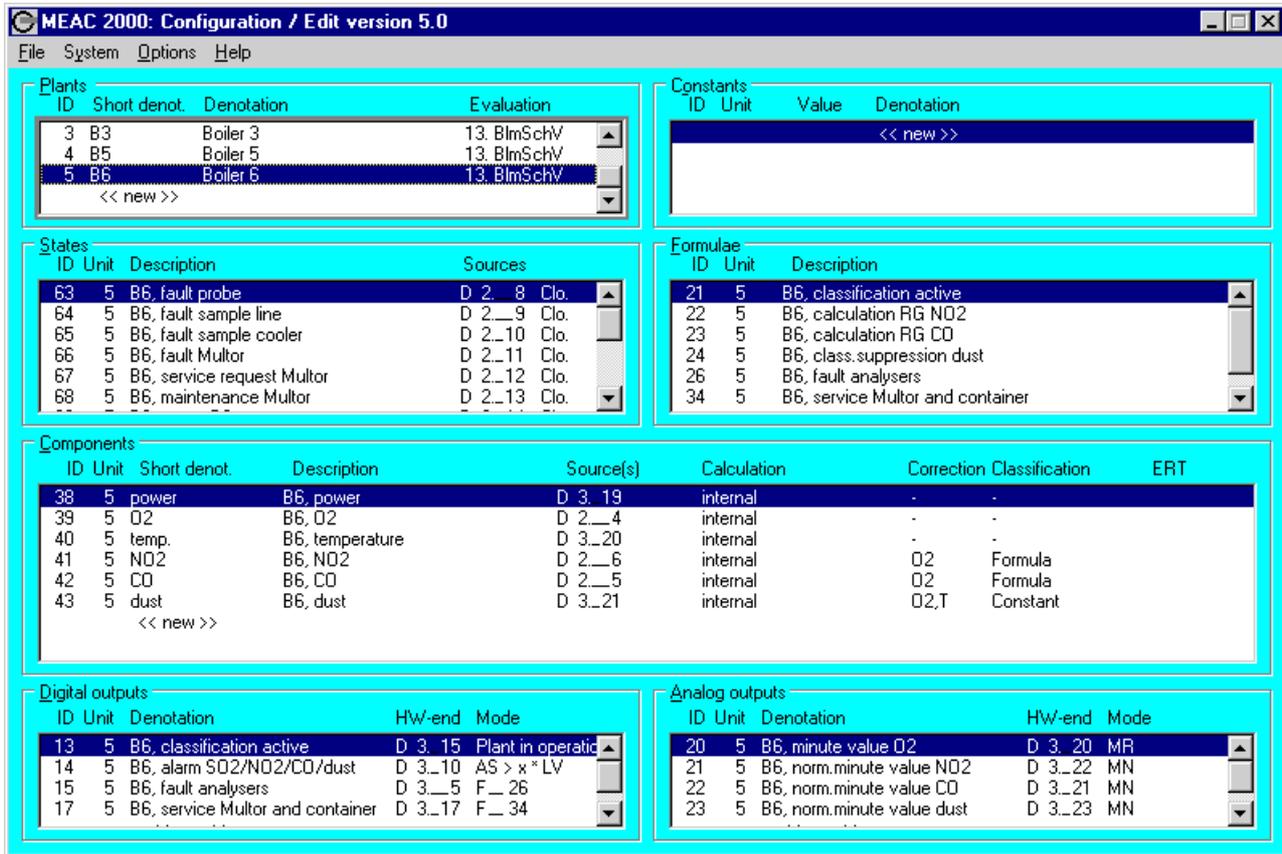
7.2   System (configuration)

7.2.1   Service name

The *Service name* holds the name of the plant operator – which is important for the data model – and must be indicated here. It will appear, among other things, on every printed protocol.

7.2.2   Interfaces

All previously configured hardware interfaces of the Emission PC will be listed. Double-click on an entry to process the configuration. To proceed to a new interface, choose a free entry.

Configuration is done in this window as follows:

1 Select *Interface connected* to activate the analysis of the connection.

2 For *Location of the device*, enter the location for the new hardware. For a new DAU, it will be helpful to use the designations of the plants listed.

3 The *Device type* must be selected from among the following possibilities:

– DAU (data acquisition unit)
– MEAC (MEAC1 AS for data acquisition)
– PCNM (Honeywell PC Network Manager)
– SIMATIC (process control system)
– Analog Devices (analog and digital devices for saving data)
– Modbus (system control integrated module)
– Manual entry (virtual apparatus with manually configurable entry channel)

7.2.3 **DAU selection**

1 Choose the *Communciation port* connecting the Emission PC to the DAU. Any available serial COM port on the PC can be used.

2 Select the *Digital Inputs* tab and create an entry for each digital input channel.

The following entries are required:

Slot	Indicate the sequential number of the plug-in DAU
No	Indicate the sequential number of the channel on the plug-in unit
Short den.	Designate an short denotation: optional
Description	The corresponding plant must be included
Prn	Enter the letter "X" if the channel contact changes must appear in the print proto-col

3 Proceed in the same manner to the inputs under the tabs for Analog Inputs, Digital out-puts and Analog outputs tabs. There is no *Prn* input for the analog channels.

4 Save a newly created configuration in the table of interfaces with *Ok*. *Print* sends the cur-rently selected interface configuration to a printer of choice.

5 Exit the table of interfaces with *Ok* after a new terminal has been configured.

7.2.3.1 **Date/time of the classification**

Use the *Date/Time* item to change the date/time of the usual change of day and pre-config-ure from 00:00 for the daily classification.

7.3 **Configuration menu**

7.3.1 **Plants**

- If a single plant is selected in the *Plants* list (→ page 82, Figure 7), the configuration of this one plant is displayed.
- If *All plants* is checked, the configuration shows all components of all plants.

► To Double-click on a *Plant* to process its configuration.
► To set-up to a new plant, double-click on *New* at the end of the list.

Proceed to the following configurations in the *Unit parameters* window:

1 Enter the *Short denotation* and *Description*.

2 If applicable, check:
  – *Order conformed plant*
  – *Transfer values with ERT* [1]

3 Select the plant status in the relevant plant's data model status as determined by the *Status* frame in the configuration window. The selection of the plant in *Plant states* is mandatory, all the others are optional.

4 In the *Evaluation follows* section, select the relevant evaluation method for this plant (following prescribed legal regulations).

---

[1] For information on the usage of the ERT (Emission Remote Transmission) option, please refer to the user manual of the ERT module.

Enter the following parameters of the plant:

Interval valid for AV from (%)	Defines minimum proportion of valid minute values to get a valid average value.
AV - ERS fault from (%)	Defines proportion of integration time after emission reducing system (ERS) is considered to be in fault state, will result depending on classification mode in special treatment, storing average in values in "ERS classes", additional status signal "ERS fault" for component required.
AV - Startup op. from (%)	Defines proportion of integration time after average value might be stored in class "Startup", additional status signal "Startup op." for component required.
AV - Leaving from (%)	Defines proportion of integration time after average value might be stored in class "Shutdown", additional status signal "Leaving op." for component required.
AV:=Mean(MN)	If checked normalized average values will be calculated from mean of normalized minute values. If not checked normalized average values will be calculated from normalized mean of raw minute values.
Min. operation time a day [Min]	Minimum daily total operation time to get a valid daily average value to be checked against a daily limit value.
max. no inv. AV for DA	Maximum number of invalid average values not to invalidate the daily average. 2000/76 EU: 5x 30-minute values 2001/80 EU: 6x 30-minute values
incl. Startup/Shutdown	Option to include also valid average values during startup/shutdown in daily average value.
all AV to DA	Option to include also valid average values above limit value into daily average value.
max. duration AV<AL [Min]	Maximum duration of continuous limit violations.

5   Select the types of important events for logging in the *Event records* section.

6   If the ERT transmissions is active (see above), other ERT actions can be defined.[1]

7   To save the newly created plant in the list of plants, the *Unit parameters* window must be exited with *Ok*.

7.3.2   Constants

● Double-click on a *Constant* to change its designation and numeric value. *Or:*

● Double-click on *New* at the end of the list of constants to proceed to a new constant window and proceed to the desired entries in the subsequent window.

---

[1] For information on the usage of the ERT (Emission Remote Transmission) option, please refer to the user manual of the ERT module.

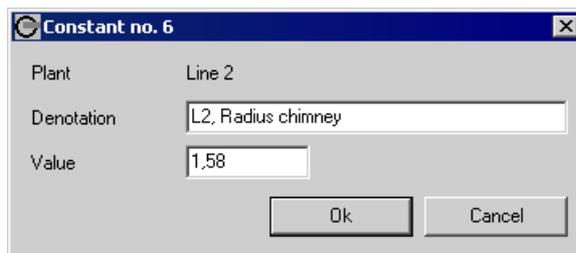| 7.3.3	### States

► To edit an existing *States* configuration, double-click on an item in the *States* list (→ page 82, Figure 7).

► To create a new *State*, double-click on *New* at the end of the list.
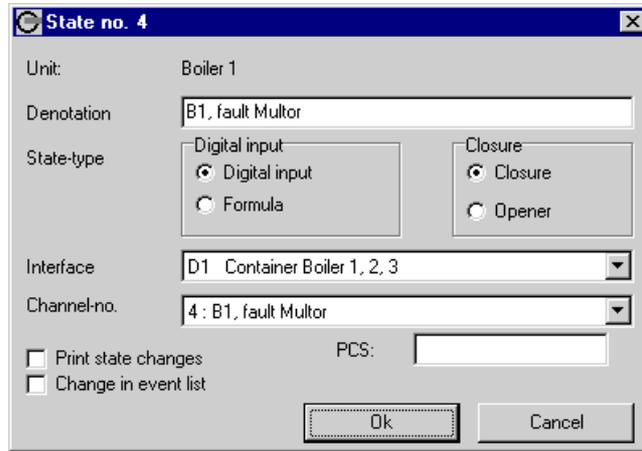
► Enter the name (*Denotation*) of the new status. *Recommendation:* The name should indicate the plant and the source of state (numeric or format entry).

► Choose a *State-type* (type of the source):

For *Digital input*:

– Choose the allocation principle between physical state (open/close) of the relevant digital input and the logical value (correct/incorrect) of the status. Definition:

Normally closed contact	– open	→	FALSE
	– closed	→	TRUE
Normally open contact	– open	→	FALSE
	– closed	→	TRUE

– Select the interface of the relevant hardware source.

– Select the no. of the relevant input channel according to the interface configuration.

For *Formula*:

– Select the relevant formula in the data model of the relevant plants as determined by the *Formulae* list in the configuration window.

– Check *Execute before minute calculation* if the status calculation per minute is based on the result of the formula of the preceding minute.

● If *Print state changes* is checked, all the changes of this status will appear in the print pro-tocol and in the current display.

● If *Changes in event list* is checked, any change of this status will be logged as an event.

Click on *Ok* to save the settings.

7.3.4 Formulas

Formula basics
- ► To edit an existing formula, double-click on one of the *Formulae* (→ page 82, Figure 7).
- ► To create a *Formula*, double-click on *New* at the bottom of the *Formulae* list.
- ► Enter the name (*Description*) of the new formula. *Recommendation:* The name should indicate the corresponding plant.
- ► Enter the formula in the *Formula* window. You may want to use the *Operators* buttons for assistance.
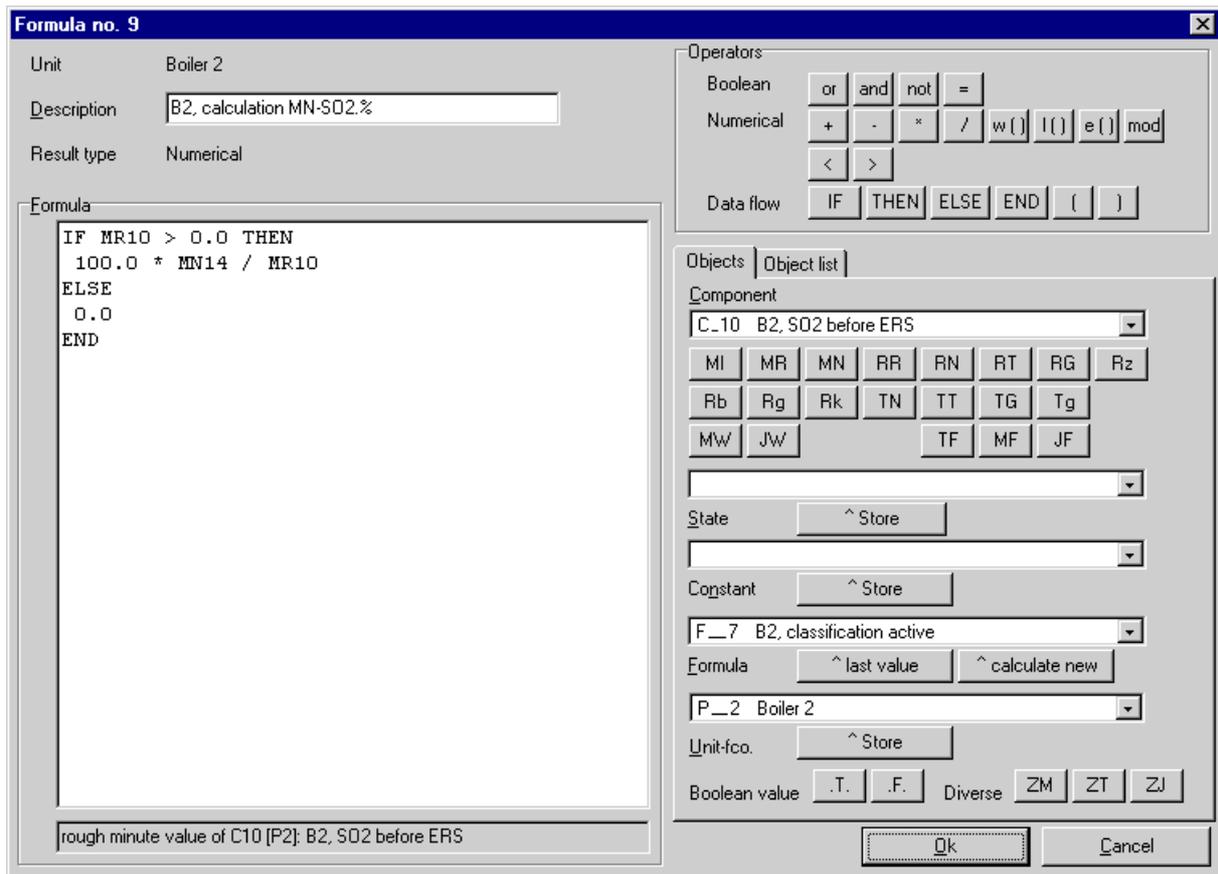
Formula rules
- ● Operators and operands must be separated by a space character.
- ● All operands can be without an operator.
- ● The period (.) must be used as the decimal sign.
- ● Within a single IF...THEN...ELSE expression, the results must be of the same type (either Numerical or Boolean). Different result types will cause an error message.
- ● When using the boolean operator NOT, the whole expression must be set in parentheses "( )".
- ● It is possible to create a conditional formula using the operators of data flow.
  - – The operator IF requires a boolean condition as the operand.
  - – The formula should be placed after THEN or ELSE.
  - – ELSE is always required in the expression. END must be at the end of the expression.
- ● Conditional formula expressions can be nested. In nested expressions, each single expression must have an END statement.

Boolean formulas

Boolean formulas consist of logical connections and branching. The result of a Boolean formula is a logical state.

● Boolean operands are TRUE (.*T.*) and FALSE (.*F.*).

● Boolean operators are:
  – Current state
  – Result of a formula
  – Plant *fn-tst.* (plant function testing; symbol: *P*)

Numerical formulas

Numerical formulas are used for mathematical calculations. The result of a numerical formula is a number. Numerical operators are:

– Specific number, entered by keyboard
– Specific measured value for a component (see following)
– The value of a constant
– Result of a formula
– Time and date specifications *ZM*, *ZT*, *ZJ*

ZM	elapsed minutes of the day
ZT	elapsed calendar days of the year (not including the current day),
ZJ	number of calendar days of the elapsed year.

Objects

Select the desired component in the data model of the plant corresponding to the new formula. Using the button for type of value desired, the corresponding value of the component will be accepted as an operand in the text of the formula.

The buttons for value types are as follows:

MI	input current
MR	one-minute average value currently calculated
MN	one-minute average value currently calculated, standardized as a function of the O_2 reference if needed
RR	average value at 10, 30, or 60 min. (raw)
RN	current average value; if required: standardized and as a function of the O_2 reference.
RT	trend average value at 10, 30, or 60 min. (= (Rg * RN + (Rz – Rb) * MN) / (Rg + Rz – Rb))
RG	average limit value at current 10, 30, or 60 min.
Rz	averaging time in minutes.
Rb	actual number of one-minute average values of the interval
Rg	number of valid one-minute average values.
Rk	date/time of the RW classification
TN	current daily average (= average of RN)
TV	validated daily average (= average of RV)
TN	trend of the daily average
TT	trend of validated daily average
TG	limit of the current daily average
Tg	number of average values at 10, 30, or 60 min. where valid
MW	monthly average
JW	annual average
TF	current load of the day
MF	current load of the month
JF	current load of the year

Constant operands

To insert a defined constant as an operand, select the desired constant and click on *Accept*.

Formula result operands

You can also use the result of a formula as an operand. First select the formula from the list. Click on *^last value* to insert the formula result as an operand (symbol: *f*). Click on *^calculate new* if the formula giving this result should be recalculated with each use and the current result used in this formula (symbol: *F*).

When you position the mouse pointer on the operands referring to the data model inside the formula text, their full designation is displayed in the bottom border of the Formula section.

A newly created formula can be added to the formula list with *Ok* if it does not have any errors. If there is an error, a description of the error displays in red under the text of the formula. Only after correcting the error will it be possible to exit the formula creator with *Ok*.

Components

► To edit an existing component configuration, double-click on the respective *Component*.

► To create a new component, click on *New* at the end of the *Component* list.

7.3.5 **Component configuration**

The upper part of the window is used to define basic parameters for each component.

Short denotation	Short name for the identification of a component
Denotation	Short name of a component
Tech. denot.	Technical identifier for components
Display area	Display range of the component
Dim.	Unit of the (eventually) normalized value
Dim. (MR)	Unit of the raw value

7.3.5.1   **Interfaces / Conversion**

Parameters on this page are:

– Integration time
– Signal device(s) and channel(s)
– Status signals determining state of component
– Calculation constants or formulas

Integr. time (min)	Integration time in minutes. Possible values are: 3 / 10 / 30 / 60 / 120 / 240 / 480
Repl. value	Substitution value for the calculation if the component is in fault or maintenance.
MN >= 0.0 *RN >= 0.0*	Activate this if a suppression of negative values is required for normalized minute and average values.
Dezimalstellen	Number of decimal digits
Interfaces	
Mode	Calculation/device modes – 1 channel: source has one signal exit.(even with two ranges) – 2 channels: source has two signal exits representing two different ranges. – Virtual: the component is calculated by result of other sampled values
Device	Physical device reading input signals
Channel	Logical channel identifying input signal of the component
Plausibility from / to	Permissible signal range for the evaluation. If the input value is out of range, the analyzer state will change to fault.
States	
Fault	Digital state for analyzer fault
Mainten.	Digital state for analyzer maintenance
Calibration	Digital state for analyzer calibration
Conversion	
Measur. area 1	Measuring range 1
Measur. area 2	Measuring range 2
Measur. area 3	Measuring range 3
Emissions	
Form.	Formula for the calculation of mass flow using product of concentration and stack flow (stored as total emission)
Dim.	Unit of the mass ("kg" or "t")

7.3.5.2 O_2 reference and correction calculation

All average values in the end must be comparable to the same conditions (0°C, standard pressure 1013 mbar and dry conditions). Because not all analyzers depending on the installation and settings give normalized signals as required, MEAC2000 has already implemented the standard formulas internally – also the O_2-reference calculation, which is obligatory to all emission components in waste incineration and large power plant applications following the european directives 2000/76 EG and 2001/80 EG.

The implemented formulas are:

O2-reference:	$$F_{O2} = \frac{21Vol\% - O2_{ref}}{21Vol\% - O2_{act}}$$
T-normalization:	$$F_T = \frac{273K + T_{act}}{273K}$$
P-normalization:	$$F_T = \frac{1013mbar}{P_{act}}$$
H$_2$O-normalization:	$$F_{H2O} = \frac{100Vol\%}{100Vol\% - H2O_{act}}$$

Internal formulas are activated by selecting an appropriate reference component, leaving all combo-boxes empty will suppress internal calculations – the normalized values will be the same as the raw values .

Component	Signal	O2	T	H$_2$O	P
O$_2$	wet	–	●	–	–
Dust in-situ	hot, wet	●	●	●	–
Dust in-situ	hot	●	●	-	
SO$_2$ extractive	dry, cold	●	–	-	–
NO$_2$ extractive	dry, cold	●	●	●	
Flow	hot, wet	–	● (inv!)	● (inv!)	● (inv!)

Component no. 23

Unit	Line 2

Short denotation: CO   Denotation: L2, CO   Dim.: mg/Nm3

Techn.denot.: [ ]   Display area: 0 to 800   Dim. (MR): mg/Nm3

Interfaces / Conversion | **O2-ref.- and corr.-calculation / ERT / QAL3** | classification

O2-ref.- and corr.-calculation

Mode	constant O2-ref. ▾ ☑ without ERS
Const.value:	11

Fault ref.val

O2-measuring value	K_19 L2, O2 ▾	inv. ☐	- ▾
Temperature	- ▾	inv. ☐	- ▾
Humidity	- ▾	inv. ☐	- ▾
Pressure	- ▾	inv. ☐	- ▾

Correction MN	- ▾
Correction RN	- ▾

ERT
Transfer active ☐

QAL3
aktiv ☐

Ok   Cancel

O2-ref.- and corr.-calculation		
	Mode	Mode of the O2-reference calculation: • No: no O_2-reference value calculation • Constant O_2-ref.: calculation with constant O_2-reference value • Variable O_2-ref: calculation with variable O_2-reference value
	Const. value	Constant value for the reference value calculation
	O2-measuring value	Component of the actual O_2-value
	Temperature	Component of the actual temperature value
	Humidity	Component of the actual humidity
	Pressure	Component of the actual pressure
	Inv.	For stack-flow normalization formulas must be executed inverse
	Fault ref. val.	Select the reference/normalization components if the reference /normalization is not done using internal calculation but by formulas.
	Correction MN	correction formulas for the minute values
	Correction RN	correction formulas for the average values
ERT		
	Transfer active	*only applicable in Germany with optional software package*
QAL3		
	aktiv	Activation of data recording during calibration status is true.

7.3.5.3   **Classification**

This menu refers to the treatment of a component concerning monitoring limit values.

States	
ERS-fault	Digital state for fault of flue gas cleaning
Startup op.	Digital state for startup operation
Leaving op.	Digital state for leaving operation
Max. ERS-failure time	Maximum time for ERS failures

Limit values according to 2000/76 EG			
Mode	Determines classification (monitoring) mode for component, possible values are (descriptive names derived from german 17.BImSchV-regulation):		
	no limit	no classification	
	NV-O2	monitoring O2 in post combustion chamber	
	NV-T	monitoring Temperature in post combustion chamber	
	CO-10min	monitoring only 10-minute average value of CO, no daily limit value	
	CO-30/60min	monitoring component against average and daily limit value, class storage for average value up to twice average limit value	
	Dust	monitoring component against average and daily limit value, class storage for average value up to average limit value, also 2nd limit value for times of failure of dedusting system (reference ERS).	
	C total	monitoring component against average and daily limit value, class storage for average value up to average limit value, continuous monitoring also during times of failure of emission reducing systems (reference ERS).	
	Gas emission	monitoring component against average and daily limit value, class storage for average value up to average limit value, during times of failure of emission reducing systems (reference ERS) average values are stored in class "ERS-Fault".	
Suppress classification	Formula to suppress classification in specific operating conditions (for example: dust during gas fuel)		
LV	Average limit value, possible values are – no limit – constant value – variable value calculated by formula		
97% LV	Allows additional evaluation for 2nd average limit value		
DLV	Daily limit value, possible values are - no limit - constant value - variable value calculated by formula		
enable for monitoring of LV exceedance	Effects that average limit value violations are counted in total sum of boiler/line. NOTE: Use only for 30-min averages.		
95% confidence interval	Range of the 95% confidence interval for validation of average values		
Absolute [1]	If V < MV [2]	then	MV := MN – V
		else	MV := 0
Percentage			MV := MN * (100% – V) / 100%
*Percentage (max 1 *LV)* [3]	If MN ≤ MS	then	MV := MN * (100% – V) / 100%
		else	MV := MN – (V / 100% * MS)
*Percentage (max 1 *DL)* [4]	If MN ≤ JS	then	MV := MN * (100% – V) / 100

[1] German standard

[2] V   value entered at interval 95% confidence interval

MN normalized average value

MV validated average value

MS average limit value

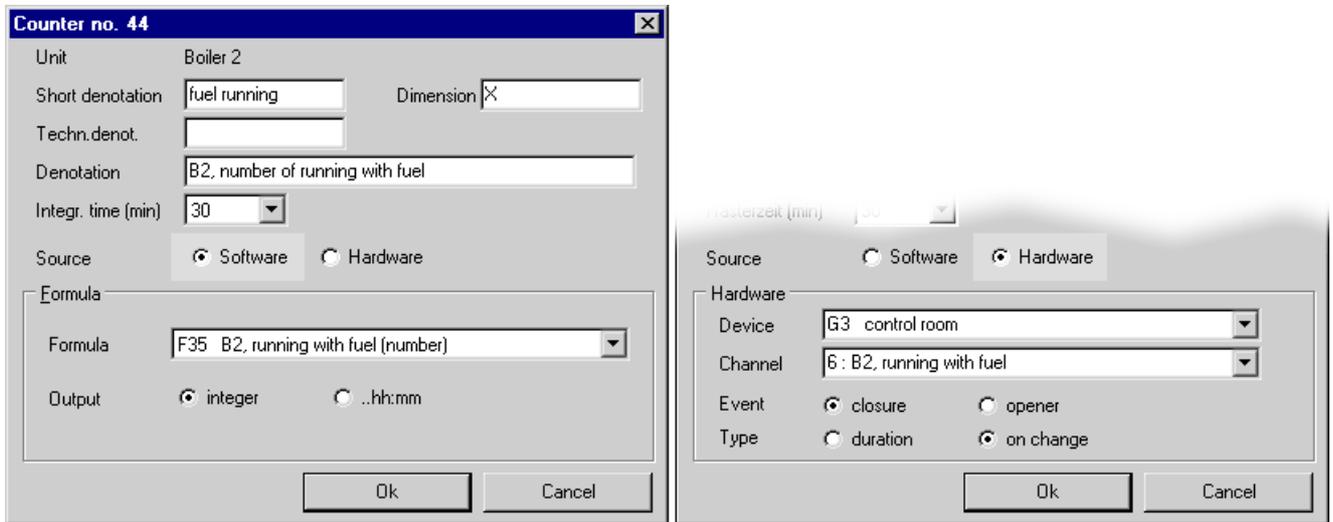JS   daily limit value

[3] 2001/80 USA standard

[4] 2000/76 USA standard

7.3.6 **Counters**

The list of counters can be added to the main *Configuration* window by activating *Display counters*. The display status is indicated by the fact that the menu element is checked. It returns to its original status when the check is canceled.

► To edit an existing counter, double-click on a counter name.

► To create a new counter, click on *New* at the end of the counter list

Short denotation	Short Identification of the counter	
Dimension	Desired unit of measure	
Techn. denot.	Counter identification, internal to operation (if needed)	
Denotation	Detailed name for counter	
Integr. time (min)	Averaging period (MN) after which the counter is reset to zero 0. Possible values: 3 / 10/ 30/ 60/ 120 minutes.	
Source	*Software*	Counter readings are calculated every minute.
	Hardware	Counter readings are calculated by the second from a DAU digital input

If Source = Software:

Formula	Numerical formula providing the one-minute average value for the counter.	
Output	*integer*	The counter indicates the frequency of the specific boolean expression in the selected formula included in the current average.
	...hh:mm	The counter adds the time of the specific boolean expression in the selected formula included in the current average.

If Source = Hardware:

Device	Select a DAU from those defined in the Interface table.	
Channel	Indicates the digital input signal to be monitored.	
Event	*closure*	Event = contact closes/is closed
	opener	Event = contact opens/is open
Type	*duration*	*Event* duration is counted
	on change	*Event* frequency (number) is counted

7.3.7   Digital outputs

► To edit an existing alarm, double-click on a digital output (alarm) name.
► To create a new alarm, click on *New* at the end of the alarm list.

Denotation	Alarm message identification, preferably including the corresponding plant.
Device connection	Device to which the alarm message will be sent, or *GO* for a virtual alarm (displayed and saved, but without an output to a physical device).
Channel	Related digital output channel of the terminal (not applicable for virtual alarm).
PCS	PCS compliant code of the selected channel (if applicable).
Mode	Type of alarm cause.

Modes:

Formula	Select the boolean formula used to activate and to stop the alarm.
Plant ...	The alarm will be activated by a status of the selected plant.
Status confirmation	Select the status which will activate the alarm. If *Output inverted* is checked, the alarm reacts to the state with inverted logic.
Components:	Select the component for which the status selected in the configuration will activate the new alarm.
State: [...]	Select the components for which correcting the selected status will activate a new alarm for at least one of them.
Alarm: [...] > *x* * [...]	Select the components for which multiple (x) limit violations will activate a new alarm for at least one of them. *X* can be set (default: $x = 1$).
Component [...] > *manual value*	Select the relevant component for which exceeding the manual value will activate the new alarm, referred to an analog input in the manual entry type terminal. If *Output inverted* is checked, the alarm reacts to the state with inverted logic.
Deactivated	This alarm will not be activated by any cause.

Click *Ok* to add a newly created alarm to the Digital outputs list.

7.3.8 Analog outputs

► To edit an existing analog output setting, double-click on an analog output name.

► To create a new analog output setting, click on *New* at the end of the analog output list.

- Enter the *Denotation* of the new object including the corresponding plant.
- Select the *Device connection* before permitting the output value of the new object.
- Select the relevant analog output *Channel* in the terminal.
- Select the *Mode* by which the value allocation of the new object must be executed.
  - *Formula*: Select the relevant numeric formula before supplying the value to the new object.
  - Other modes: Select the *Component* whose value referring to the selected mode must be transmitted to the new object.
  - *Deactivated*: Analog output is permanently set to the electronic zero point.
- Enter the *Physic. area* (physical range) of the object value. This is useless for modes selected on the basis of the formation of a quotient. In place of this range, it is possible in this case to vary the factor (x) contained in the quotient.
- Select the *mA-area* (range) before relating the new object to this physical value which is preferential for the terminal display.
- To delimit the mA output range, check *Output limitation* and set the desired min/max mA values.

A newly created object can be saved in the analog outputs list with *Ok*.

7.4 File operations

7.4.1 Saving data models

A newly created or modified data model must be saved.

To activate this data model for the realtime environment:

1 Close the configuration window (*File – Quit*).
2 Press the *Main Program* button in the (simulation) toolbar to switch to the main (realtime) toolbar
3 Select *System – Adjustments – Activate Data model*.

7.4.2 Loading the current data model

To modify the current data model, it must be loaded in the configuration window.

7.4.3 Printing a model

The currently displayed data model can be sent to a printer of choice.

7.4.4 Printing an overview of the components

The currently displayed components can be sent to a printer of choice.

7.5 Options

7.5.1 Syntax

Any inconsistencies contained in the loaded data model are listed here. The object concerned is indicated and the description of the corresponding syntax problem.

7.5.2 Reference list

A Windows tree structure diagram is displayed to represent the interdependencies between the objects, status, formulas and components of the loaded data model. The mutually configured accesses of these objects serve as branching criteria.

7.5.3 Displaying the counters

See Elements of the configuration window – counters.

MEAC2000 EU

8 Software License Agreement

The right to use the MEAC Software will be granted to the buyer (hereinafter referred to as "Licensee") after acknowledgement of the following License Agreement.

Licensor:
SICK MAIHAK GmbH Poppenbütteler Bogen 9b 22399 Hamburg Germany

1. The subject matter of the License Agreement are the MEAC Software, and, to the extent acquired by Licensee, all optional MEAC Software modules and the corresponding user manual.

   The License Agreement relates to the MEAC Software from the delivery of the product (hereinafter referred to "as "Contract Product") under the Licensee's order.

In detail, the following single-user licenses will be granted to Licensee with number of pieces defined in the order:
a) MEAC2000 evaluation software, version 1.28 EU
b) MEAC2000 network access software
c) MEAC G-System
(a, b and c hereinafter referred to as "MEAC Software")

   The source code of the MEAC Software is not subject to licensing.

   The MEAC Software will be delivered as a CD and/or already installed on a PC supplied.

2. With the first commissioning of the MEAC Software or the activation of the access code, Licensee acknowledges the License Agreement. If Licensee does not consent to the License Agreement, Licensee shall return the MEAC Software including all devices and parts of devices from the above-mentioned order to SICK MAIHAK GmbH. The purchase price shall then be reimbursed, partially reimbursed or offset.

3. Licensor hereby grants to Licensee the non-exclusive, non-transferable, non-sublicensable right to use the MEAC Software without limitation in time and place. The right to copy the MEAC Software is limited to the installation of the MEAC Software on a PC for use of the MEAC Software as well as to the right for an authorised person to make a copy of the MEAC Software for security backup purposes, as stated in sec. 69 d para. (2) UrhG (German Copyright Act). The right to revise the MEAC Software is limited to the maintenance or reinstatement of the agreed functionality of the MEAC Software. No more extensive rights to use and exploit the MEAC Software are granted to Licensee.

4. Licensee is not entitled to:
   - copy the MEAC Software or the documentation supplied with the MEAC Software,
   - lend, lease, in whole or in part, the MEAC Software or the license, nor to grant sub-licences in respect of it or transfer it to a third party,
   - reverse engineer, decompile, disassemble the MEAC Software, nor to otherwise attempt to make the source code of the MEAC Software accessible, nor to change, translate the MEAC Software or to create products derived therefrom,
   - use, after receipt of a replacement set of disks or an upgrade version in replacement of a previous version, the previously received copy or the previous version of the MEAC Software.

5. Any and every use on further PCs shall not be permitted. Under the License Agreement, the right to make a copy for security backup purposes is granted to Licensee. Such backup copy must have a copyright note of SICK MAIHAK GmbH.

6. The MEAC Software is protected by a registration code. The registration code will be disclosed to Licensee by SICK MAIHAK GmbH as soon as Licensee installs the MEAC Software on a PC (this shall only apply to the German MEAC2000 evaluation software, version 2.0).

Subject to change without notice

7. Through acquisition of a MEAC Software, Licensee shall only obtain the ownership of the acquired data carrier. The MEAC Software acquired with this license shall remain the property of SICK MAIHAK GmbH and is protected by copyright.

8. SICK MAIHAK GmbH shall be free to further develop the MEAC Software and to create new software versions. SICK MAIHAK GmbH is not obliged to inform Licensee about new MEAC Software versions.

9. Licensor warrants that the MEAC Software provided by it is substantially in accordance with the product description. There can be no claim under this warranty in the case of minor or immaterial deviations from the agreed or assumed characteristics nor in the case of just slight impairment of use. Product descriptions shall not be deemed guaranteed unless separately agreed in writing. In respect of updates, upgrades and the delivery of new versions, the warranty shall be limited to the new features of the update, upgrade or new version compared to the previous version release.

10. If Licensee demands subsequent performance because of a defect, Licensor has the right to choose between the improvement, replacement delivery or replacement of services. If the defect is not cured within a first time limit and Licensee has set Licensor a reasonable second time limit without success or if a reasonable number of attempts to remedy, replacement deliveries or replacement services are unsuccessful, then Licensee may, subject to the statutory prerequisites, at its option withdraw from this Agreement or reduce the price. The remedying of the defect may also take place through the delivery or installation of a new program version or a work-around. If the defect does not or not substantially impair the functionality, then Licensor is entitled, to the exclusion of further warranty rights, to remedy the defect by delivering a new version or an update as part of its version, update and upgrade planning.

11. Licensee shall inspect the delivered items without delay for any transport damage and other apparent defects, preserve the appropriate evidence and assign any claims for recourse to Licensor while handing over the documents.

12. If the defect is caused by the defective products of a supplier and the supplier does not act as an assistant in performance of Licensor, rather Licensor is merely passing on a third party product to Licensee, then Licensor's warranty shall at first hand be limited to the assignment of its warranty claims against the supplier. This shall not apply if the defect is caused by improper handling of the supplier's product for which Licensee is responsible. If Licensee is unable to assert its warranty claims against the supplier out of court, the subsidiary warranty by Licensor shall remain unaffected.

13. Licensor warrants that the MEAC Software delivered or provided by it shall be free from third party rights, which prevent the use in accordance with the contract. Excepted from this are customary retentions of title.

14. The limitation period in respect of warranty claims is limited to 12 months and shall begin on the date of delivery of the first copies of the MEAC Software including user manuals. In respect of the delivery of updates, upgrades and new versions, the warranty period for such deliverables shall in each case begin on the date of delivery.

15. If third parties are entitled to such rights and they pursue these, then Licensor shall do everything in its power, in order to defend the MEAC Software at its own expense against the third party rights claimed. Licensee shall inform Licensor in writing without delay of the claiming of such rights by third parties and shall give Licensor all powers of attorney and authorisations which are necessary in order to defend the MEAC Software against the third party rights claimed.

16. To the extent that there are defects in title, Licensor is (a) entitled at its option to either (i) take legitimate measures to remove the third party rights, which impair the contractual use of the MEAC Software, or (ii) remedy the enforcement of such claims, or (iii) change or replace the MEAC Software in such a manner that it no longer infringes the rights of third parties, provided and to the extent that this does not substantially impair

the warranted functionality of the MEAC Software, and (b) under an obligation to reimburse Licensee for its necessary refundable costs incurred in the enforcement of legal claims.

17. If a release under Section 16 fails within a reasonable time limit set by Licensee, then Licensee may subject to the statutory prerequisites at its option withdraw from this Agreement or reduce of the price and claim damages.

18. Licensor shall be liable for damages – regardless of the legal cause – solely:
    – in the event of intent;
    – in the event of gross negligence of organs or executives;
    – in the event of culpable violation of a person/health/life;
    – in the event that Licensor has fraudulently concealed a defect;
    – insofar as Licensor has given an explicit guarantee for a specific consistency of the delivered Contract Product;
    – insofar as Licensor has given an explicit guarantee that a specific consistency of the delivered Contract Product is maintained for a certain period; as well as
    – insofar as Licensor is liable for damages caused to persons or to privately used property pursuant to the Product Liability Act.

    In the event of culpable violation of essential contractual duties, Licensor shall also be liable in case of gross negligence of non-executives and in case of slight negligence. The liability of Licensor in cases of slight negligence shall, however, be limited to typical contractual losses which could have been reasonably foreseen. Essential contractual duties are duties safeguarding essential contractual legal positions of the Purchaser, which are granted to the Purchaser by contract with regard to its content and purpose; further, essential contractual duties are duties the fulfilment of which is required for the due execution of a contract and the observance of which the Purchaser relies on, and may rely on, regularly. Any further claims shall be excluded.

19. There shall be no longer any claims for warranty and damages as soon as Licensee amends, deletes or modifies in any form whatsoever, on its own and without SICK MAIHAK GmbH's approval, settings of the parametrization or of the configuration, or files in the MEAC2000 data directory.

20. Any more extensive liability of Licensor is excluded on the merits.

21. General Provisions

    21.1 Written Form

    This Agreement requires the written form. No additional oral agreements were made.

    21.2 Modifications to the Agreement

    Any modifications or amendments to, as well as the mutual rescission of, this Agreement must be in writing in order to be valid.

    21.3 Partial Invalidity

    If a provision of this Agreement is or becomes invalid or void, the validity of the remaining provisions hereof shall remain unaffected thereby. In such a case, the invalid or void provision is to be interpreted, reinterpreted or replaced in such a way that its economic purpose is achieved.

    21.4 Transfer of Rights

    Licensee may transfer rights resulting from this Agreement to a third party only with the written consent of Licensor.

    21.5 Legal Successor

    The Parties are obliged to impose the obligations under this Agreement on any legal successors.

21.6 Choice of Law

This Agreement shall be governed by German law, in particular by the provisions contained in the German Civil Code (BGB) and the German Commercial Code (HGB).

21.7 Force Majeure

If any obligations under this Agreement may not be performed due to force majeure, the performance of the respective contractual obligation shall be suspended for so long as the circumstances of force majeure may continue. The respective other Party must be immediately notified thereof.

8015074/2012-05 (V1.0)

SICK worldwide

You will find our local subsidiary
or agency at:
www.sick.com
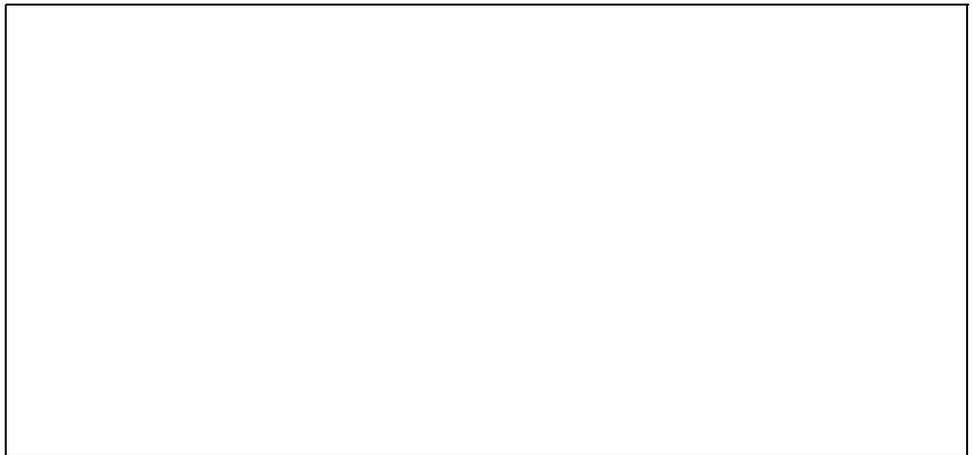
Your local sales and service partner

SICK
Sensor Intelligence.