
SMART Control 1.24



K-Soft Haustechnik-Management

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Introduction

Welcome to SMART Control 1.24!



Welcome to Measuring Technique-Software SMART Control 1.24. This manual enables you to quickly get familiar with the windows-program for measurement value recording with OPUS-measuring device technique and to quickly get started.

It describes how to install the package and how to execute most common program operations. It provides tips and makes you aware of some new features and functions of SMART Control 1.24.

If you want to know more details or technical features about SMART Control 1.24, please proceed to the corresponding sections, where the available information are described.

What is SMART Control 1.24?



SMART Control 1.24 is a windows-program used for recording and evaluating measuring values based on OPUS-measuring device technique in Online- and Offline mode. This program operates under Windows 95/98, Windows 2000, Windows ME and Windows NT.

The Online-Help is the main source of information about SMART Control 1.24. All necessary program functions are described in the menu **Help** under the item **Contents**. Further information can be found in the respective sub item by clicking the mouse.

In all dialog boxes, quick help with hints and information to the respective entry fields and processing possibilities are provided. Just activate the corresponding **Help buttons**

The program uses the keyboard as well as the mouse for easy handling. In the standard user setting, the **Icons** in the menu bar are provided with **short help**.

Overview

Delivery Contents

Your SMART Control 1.24 package should contain the following:

- Up to 4 SMART Control 1.24 program disks 3,5" or 1 CD depending on program package
- SMART Control 1.24 user guide manual
- SMART Control 1.24 registry card
- Others

If any of the above listed part is missing, please contact your SMART Control dealer.

System requirements

To run your SMART Control 1.24 properly, your system should at least meet the following requirements. Normally, you can install and operate with SMART Control 1.24 if your Windows is properly installed; you have a free communication port RS232 and enough hard disk space available.

Hard-/Software	Minimum-Configuration	Recommended Configuration
Computer:	Intel Pentium, 200 MHz or any Windows 95/98 compatible PC	Intel Pentium III, 500 MHz
Operating system:	Windows 95/98/ME/NT/2000	Windows 95/98/ME/NT/2000
RAM:	32 MB	128 MB or more
Monitor:	Any windows-supported monitor	Monitor with VGA- or higher resolution graphic
Mouse:	Any windows-supported mouse	Any windows-supported mouse
Disk drive:	A 3,5"-disk drive (HD)	A 3,5"-disk drive (HD)
Port:	1 free serial port RS232	1 free serial port RS232
Printer:	Any windows-supported printer	Any windows-supported printer

Installing



Smart -Control 1.24 is very easy to install. The data files in the delivered disks are mostly in the compressed form. You should however, before installing, make safety copies of your installation disks and read the file **Readme.txt** containing recent information.

To uncompress data files and to install in **Windows 95/98/2000/ME and Windows NT** click the **Start** button, select **Settings** then click **System Control**, start the program **Software** and then select the function **Installation**. To continue, please follow further instructions. The setup will now install the program in your computer and in the „Start“ under the menu „Program“ the start directory „SMART Control 1.2“ will be created. The De-Installation follows the Windows 95/98 Standard.

The complete installation of the software requires about 15 MB of space on your hard disk. The recording of 100.000 measuring values per channel requires about 3 MB memory capacities.

After successfully installing, please write down your **license number** on page 1 of this manual. You will find this number on your license contract.

Software-Versions and Options

Software-Versions

The software is available in two versions:

- SMART Control 1.24 Standard (limited function scope)
- SMART Control 1.24 Professional with 8, 24, 100 and 300 channels

The professional-version is extendable by activating the following described options.

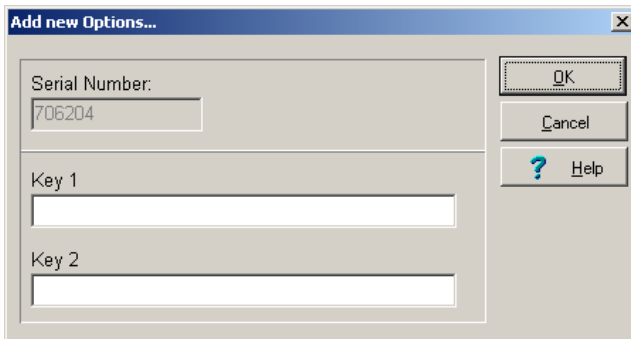
Brief description of the options

PAS-ALARM	Function indicating-panel, password system and event recording
AL-EMAIL	Alarm with E-Mail
AL-SMS	Alarm via SMS
AL-TCP/IP	Alarm via TCP/IP-Network
AL-VOICE	Alarm via voice with ISDN
OP-TWMD	Save the files in daily, weekly and monthly files in different formats during ONLINE-measurement
OP-MWSUM	Mean value calculation and summation
OP-PPD	Calculation of the PPD-value (predicted percentage of dissatisfied people)
EMWL	Extended functions of the measurement data list
MULTI-DOK	Printing of a Y/t diagram in several consecutive pages
PROVISU	Project visualization with Pictures or graphs and digital display
BACKUP	Automatic backup-function via external program- data saving via external drives

The options are described in detail in the corresponding chapters in this manual.

Activating the Options

By choosing in the main menu **Help** the sub-menu **activate options**, the shown dialog box will be opened. You may activate here further software options with the help of a registration key. The **registration key** is available from your distributor.



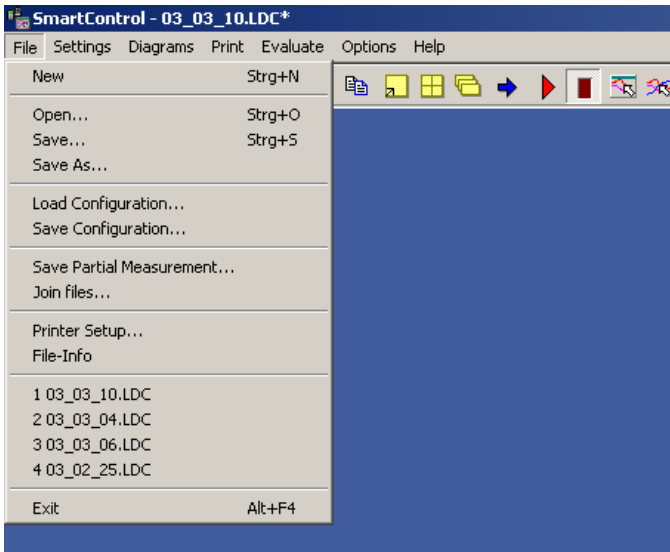
The User Surface

The Menu

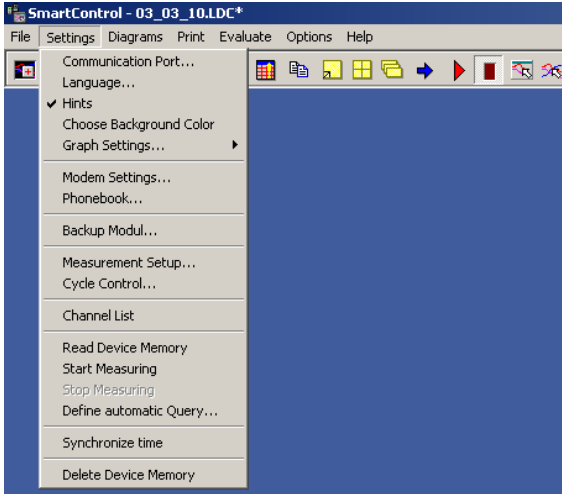
The user interface of the program is graphic and is in accordance to the common windows-standard. You can activate each function either via **Menu** or via buttons in the **toolbar**. In addition, the buttons contain short hints about its function. Please note, only menus and buttons, which are necessary for the program part, currently in use are active.

The menu is made up of seven functional groups.

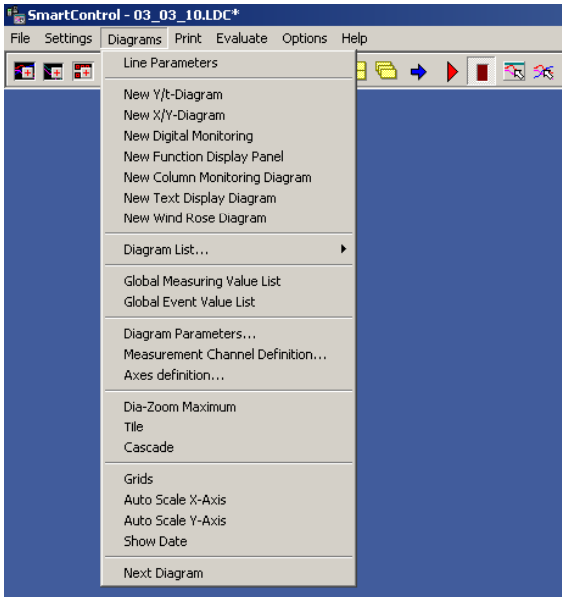
The **File** group contains general information about program execution and managing, saving of measurement and configuration data and printer settings.



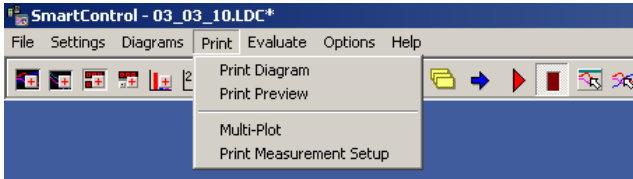
The **Settings** group allows a remote parametering of all program device setting of the connected measuring devices and sensors.



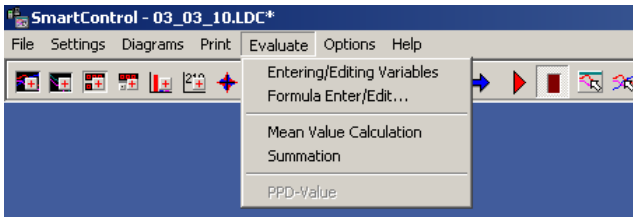
The **Diagrams** group covers all functions for the representation of the measurement data in online mode and also for the representation of the saved and recorded measurements.



All printer- and output possibilities are defined and listed in the menu **Print**.



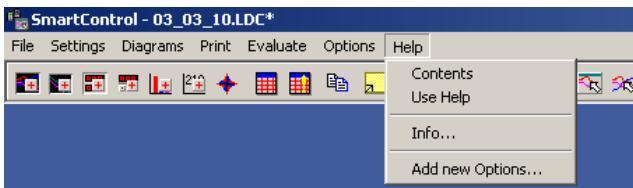
The **Evaluate** group offers possibilities to define your own evaluation function or to choose from a pre-defined evaluation functions.



The **Options** group allows you to protect your files with password, to set your system features and to adjust your program behaviour.



The **Help** group contains an extensive Online-Help system, which is available in different languages. In addition, the current program version could be shown here and you may as well do modifications in your program version adapted to your own needs by activating the options.







































The Toolbar

In addition to menu bar, the functions of the menus may be activated via **buttons** in the toolbar of each dialog box. Only buttons, which are necessary for the program part, currently in use, are active. The toolbar on the main screen essentially contains buttons for the menu „Diagrams“, „Print“, „Evaluate“.



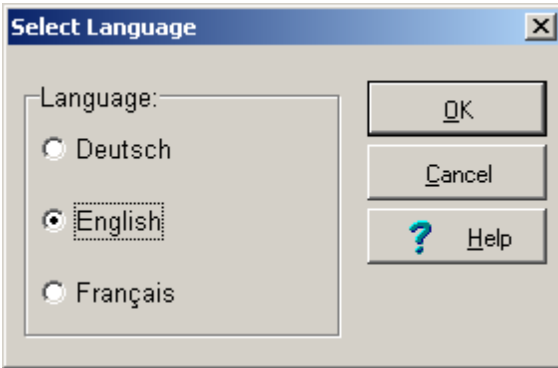
These button commands are described below:

-  Creates new Y/t-Diagram
-  Creates new X/Y-Diagram
-  Creates new Digital-Monitoring-Diagram
-  Creates new function display panel (Option PAS-ALARM)
-  Creates new Column-Monitoring-Diagram
-  Creates global measurement value list
-  Creates global event list
-  Inserts Diagram in the memory clipboard
-  Display diagram in entire screen mode
-  Arrange diagrams in tiles
-  Arrange diagrams in cascades
-  Go to next diagram
-  Start measuring
-  Stop measuring
-  Modify diagram parameters
-  Modify line parameters
-  Sets delay logging for limiting value
-  Switches the function „Diagram-Settings Apply to All“ ON and OFF

	Switches the grid lines ON and OFF
	Auto-Zoom
	Automatically scales the X-axis to maximum
	Automatically scales the Y-axis (axes) to maximum
	Previous view Y-axis
	Previous view X-axis
	Print
	Page Preview
	Multi-Plot (Option MULTI-DOK)
	Enter/edit variables (not in Standard Version)
	Formula enter / edit (not in Standard Version)
	Mean Value Calculation (Option OP-MWSUM)
	Sum Calculation (Option OP-MWSUM)
	PPD-Index (predicted percentage of dissatisfied people) (Option OP-PPD)
	Activates pump control for particle counter
	Activates list of diagram windows
	Pass word entry (Option PAS-ALARM)
	Locking program for unauthorized use (Option PAS-ALARM)

Selecting a Language

Select from the main menu **Settings** the item **Language**. The dialog box Select Language will appear. You may choose here your desired language. All text and hints will be displayed in the chosen language.



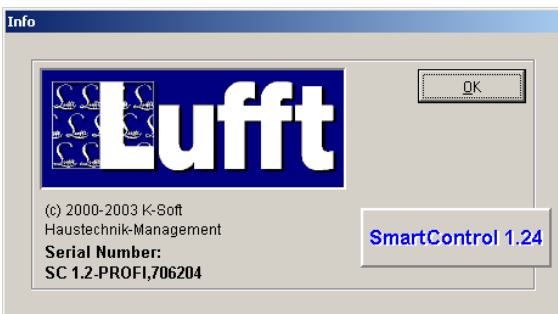
Checkmark your desired language and click OK.

Note: The selected language is immediately active. Re-starting the program is not necessary.

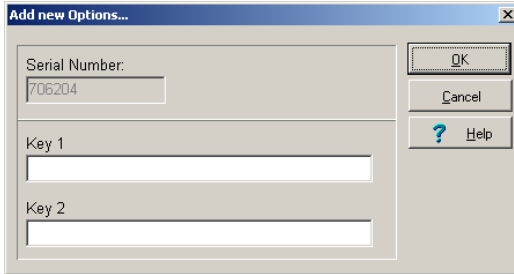
Help

The Online-Help may be activated in the main menu **Help** under the item **Contents**. Just click the colored marked help file with the left mouse button to proceed to the corresponding help topic. With the command **Use Help**, you can proceed to the general help topics of the Windows-Operating System.

Clicking **Info** enables you to obtain the displayed information about the program.



Via the menu item **Add new options** the shown dialog box will be opened. You may activate here further software options with the help of a registration key. The registration key is available from your distributor.

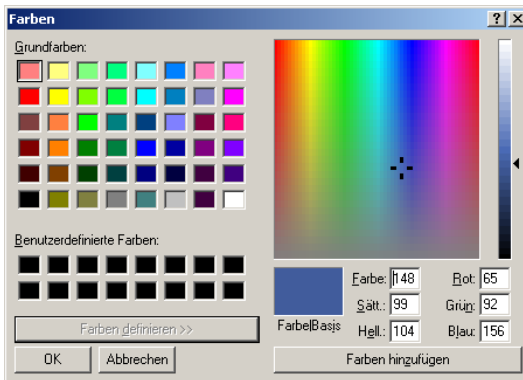


Hints

You may activate **Hints** in main menu **Settings**. The program displays the corresponding hints for each buttons or menus, if you move the mouse near the buttons or menus. Normally hints are always set active.

The Background Color

In the main menu **Settings** you may choose the **Background Color** for your screen. The program will then display the chosen background color.



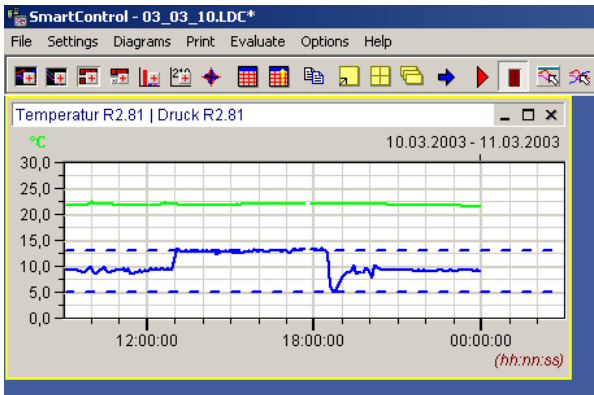
The Diagrams

Representation Possibilities

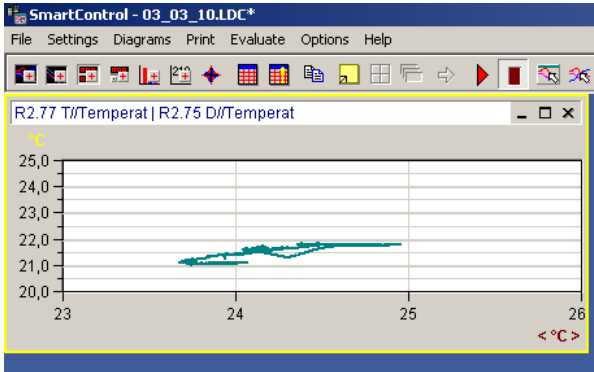
The program offers you six possibilities to create diagrams from your measuring and evaluation data and to create a measurement data list that is described in the following chapter. With the help of the diagrams and the measurement data list, you can create a historic –already recorded and stored – data and also an actual trend data during the measuring process. The items in the main menu **Diagrams** or the buttons in the toolbar enable you to create, delete, arrange, scroll and format each of these diagrams –also during the measuring process.

You may also enlarge your diagram view. To do so, position the mouse over the diagram border or corner, click the left mouse button and drag the diagram to the desired size. In addition, it is always possible to obtain an entire screen view. Details about each of these diagrams are described in the respective topics in this manual.

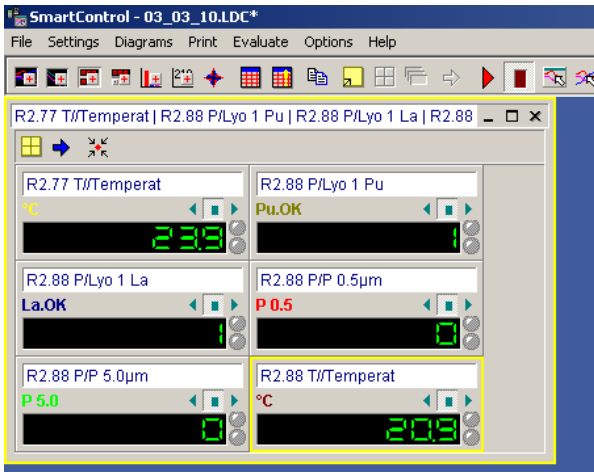
The **Y/t - Diagram** shows the measurement values with respect to time.



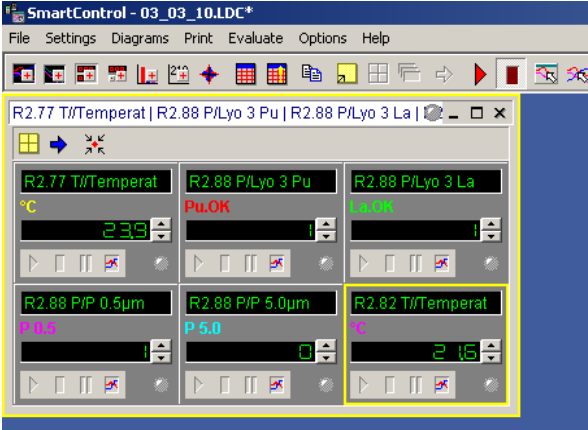
The **X/Y - Diagram** shows the measurement values with respect to a measurement channel. The first value of the measurement channel definition determines the value of the x-axis.



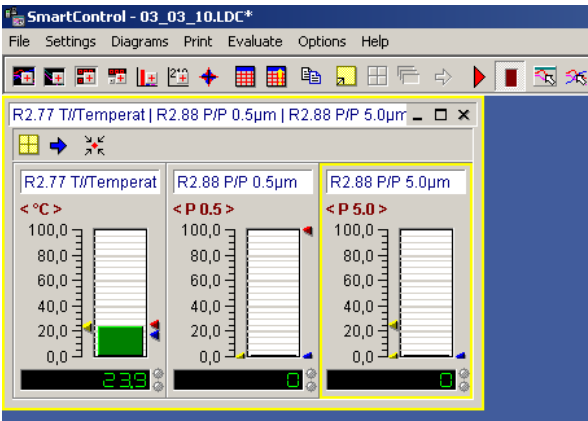
The **Digital Monitoring Diagram** displays the measurement channel in numbers and is used for online visualization.



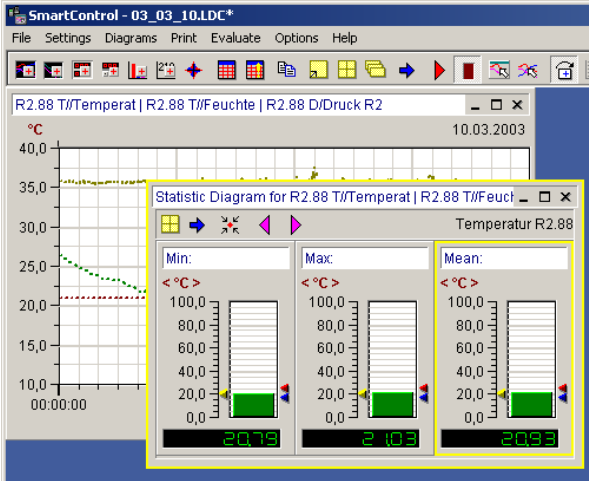
The **Function Display Panel** shows the measurement channels like the digital monitoring diagram in numbers and it is intended for online- visualization. From the function display panel, you may start and stop the measurement of each and every channel. Limiting value violation will likewise be displayed (Option OP-PANEL/ALARM).



The **Column Monitoring Diagram** displays the measurement channel in form of columns and is also used for online visualization.

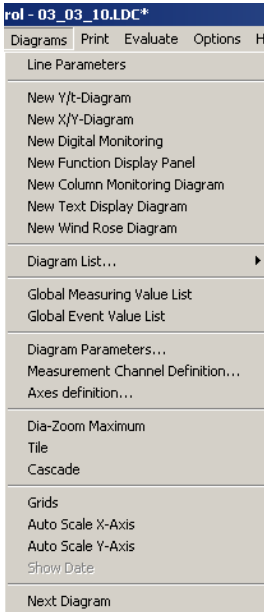


The **Statistic Diagram** is an additional function to the **Y/t-diagram**. It displays the minimum, mean and maximum values of a selected line in the Y/t-diagram.



Creating a Diagram

The diagrams for the presentation of your measurement and evaluation data may be created either via the items in the main menu **Diagrams** or with the help of the **Buttons** in the toolbar.



Creates new Y/t-Diagram



Creates new X/Y-Diagram



Creates new Digital-Monitoring-Diagram



Creates new function display panel (Option PAS-ALARM)



Creates new Column-Monitoring-Diagram

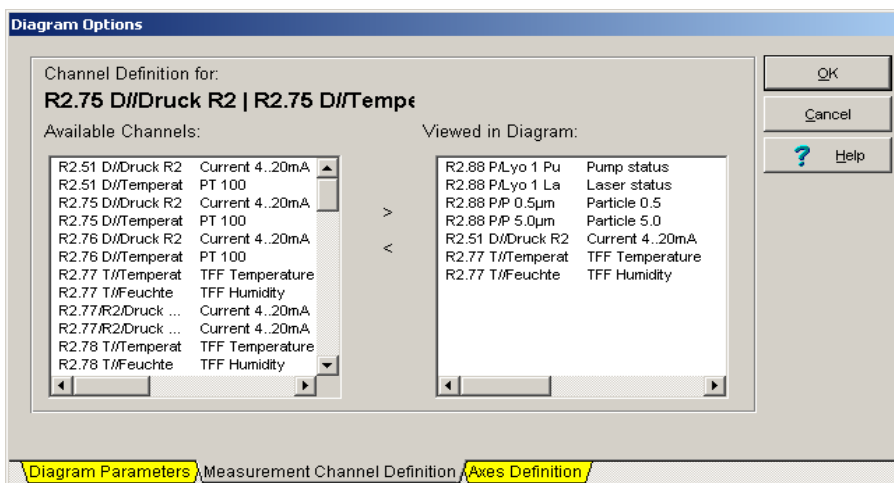
After activating one of the functions mentioned above, the selected diagram will be displayed in its partial view. The functions for creating and formatting a diagram are explained below.

Note: The statistic diagram is a supplement function to the Y/t-diagram and could only be drawn up from the local menu.

Assigning a Channel

After selecting your desired diagram type, choose in the main menu **Diagram** the item **Measurement Channel Definition**. In the dialog box you may define or modify the measuring or formula channels in each of your diagram.

This dialog box appears automatically if an online connection to the available channels exists or if a saved file is opened.



To **add** channels to a diagram, click the desired channel on the left window with the left mouse or hold the left mouse pressed to select more channels at a time, and then enter the chosen channels into your diagram by simply clicking the button.



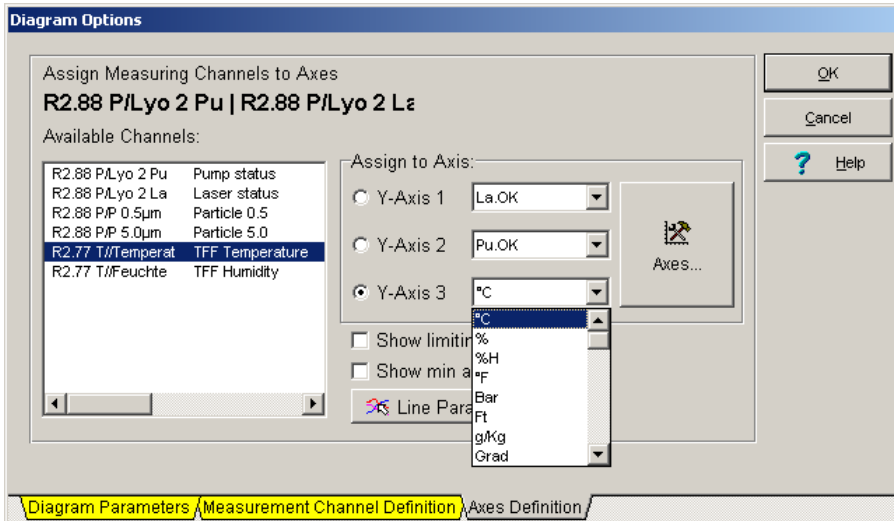
To **remove** channels from a diagram, click the desired channels on the right window then click the button to remove these channels from the diagram.

Note.: You may also activate this function by double clicking a diagram title or via the local menu.

Defining an Axis

Select in the main menu **Diagram** the item **Axes Definition**, to choose a Y-axis for the Y/t or X/Y diagram. The corresponding diagram must be active.

A maximum of three Y-axes at a time may be shown in a diagram. A selection box displays all possible units. Activate **Show limiting values** to show values defined as limits in the channel table.

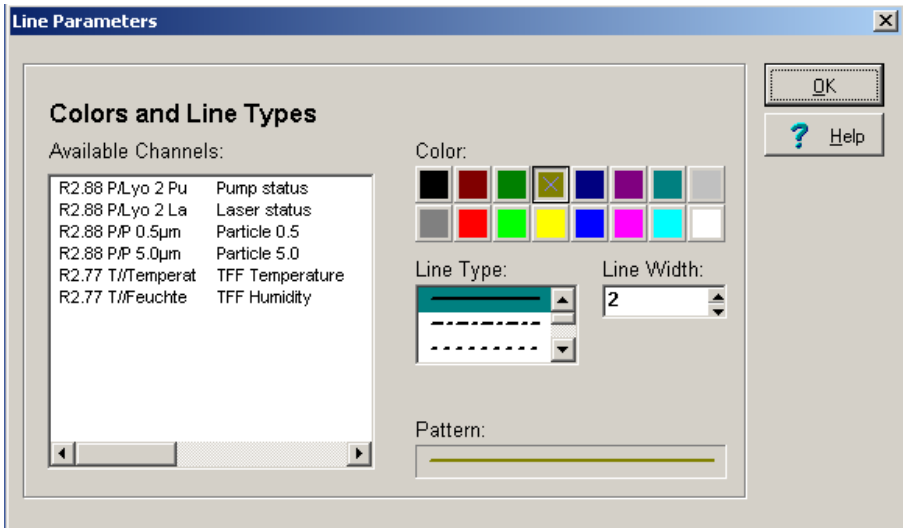


Activates the axes scaling for setting the display range.

Note: The function Axes Definition is only available for the Y/t and X/Y-diagrams. **Digital monitoring diagrams, function display panel, column monitoring diagrams and statistic diagrams have no Y-axes.**

Setting of Line Parameters

Via the item **Line Parameter** in the main menu **Diagram**, you may get into the dialog box for the line parameters. Here you may set for each measurement line the color, line type, and line width. Select a line on the left window and modify the corresponding line parameter by clicking with the left mouse button.

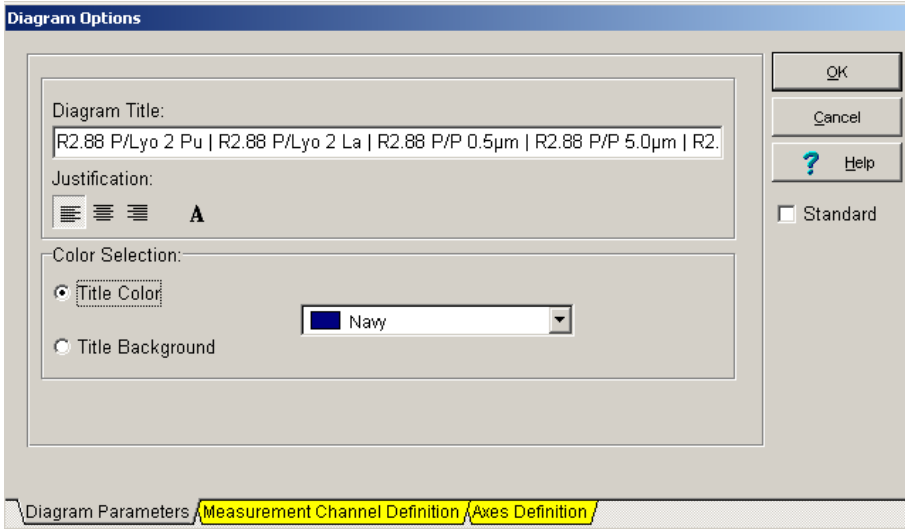


The line parameters are also available via this button in the toolbar.

Note: The function Line Parameter is only available for the Y/t and X/Y-diagrams. **The digital monitoring diagrams, function display panel, the column monitoring diagrams and statistic diagrams have no Y-axes.**

Setting/Copying of Diagram Parameters

To modify diagram title, text color, text background color, font type and text justification, choose in the main menu **Diagram** the item **Diagram Parameter**.



Text **left justified**



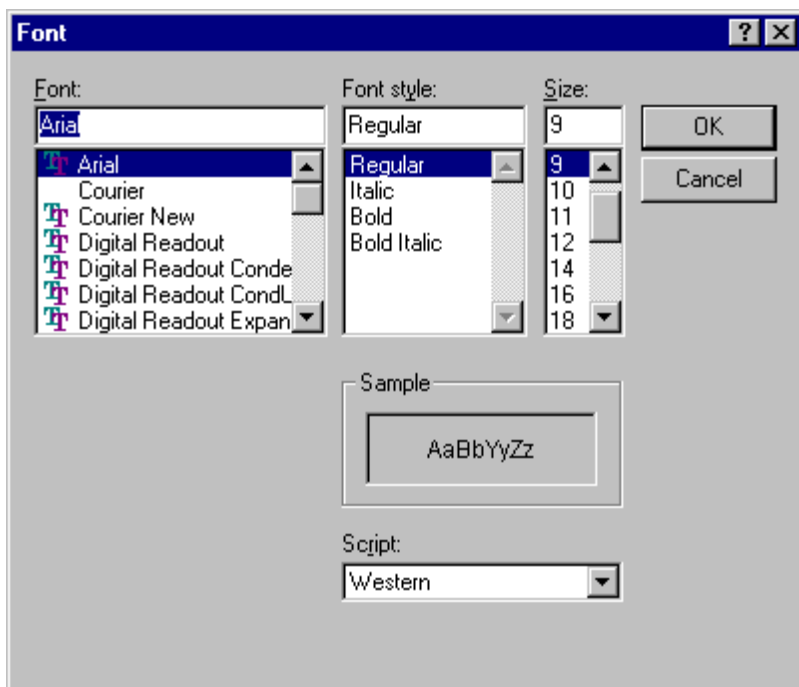
Text **centered**



Text **right justified**



Opens the selection menu to change the **Font Type** for the available font types.



In the color selection you may choose the color of your text title and the background color. Activate the checkbox **Standard** to set your chosen settings as standards for all other diagrams.



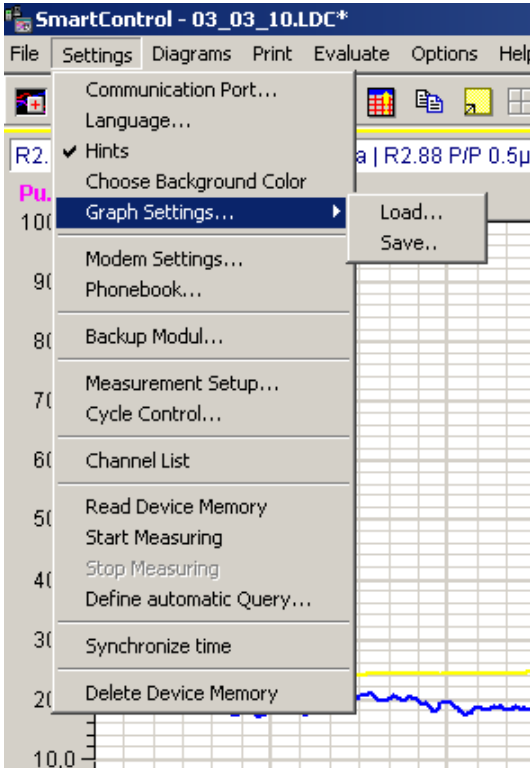
The diagram parameters may be activated via this button in the tool bar.



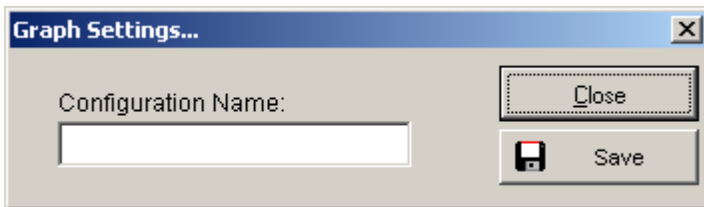
If this button in the tool bar is active, current diagram settings will be copied to other diagram.

Load / Save Diagram Parameters

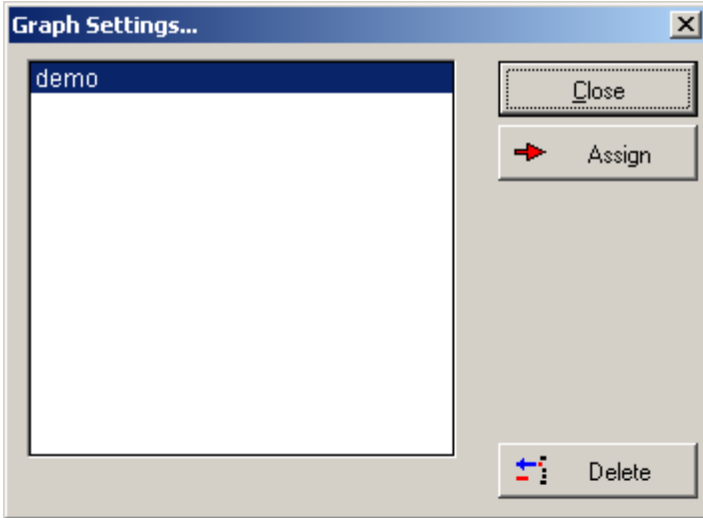
For the Y/t-diagram, the settings may be saved. Select in the main menu **Settings** the item **Graph Settings**, to save or to load your diagram parameters.



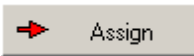
Choose in the sub-menu item **Save** and enter a name for the current parameter configuration. The settings will be filed in dia.ini program directory.



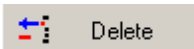
Select your desired parameter configuration via the sub-menu item **Load**.



Closes the selection window.



Assigns the selected settings to the current Y/t-diagram.



Deletes the chosen diagram settings.

Arranging Diagrams / Deleting / Copying to the memory clipboard



Copy the current diagram to the clipboard



Changes from a diagram partial view to an entire screen view and back.



Arranges your diagrams in tiles on the screen optimal.



Arranges the diagrams on screen in cascade.

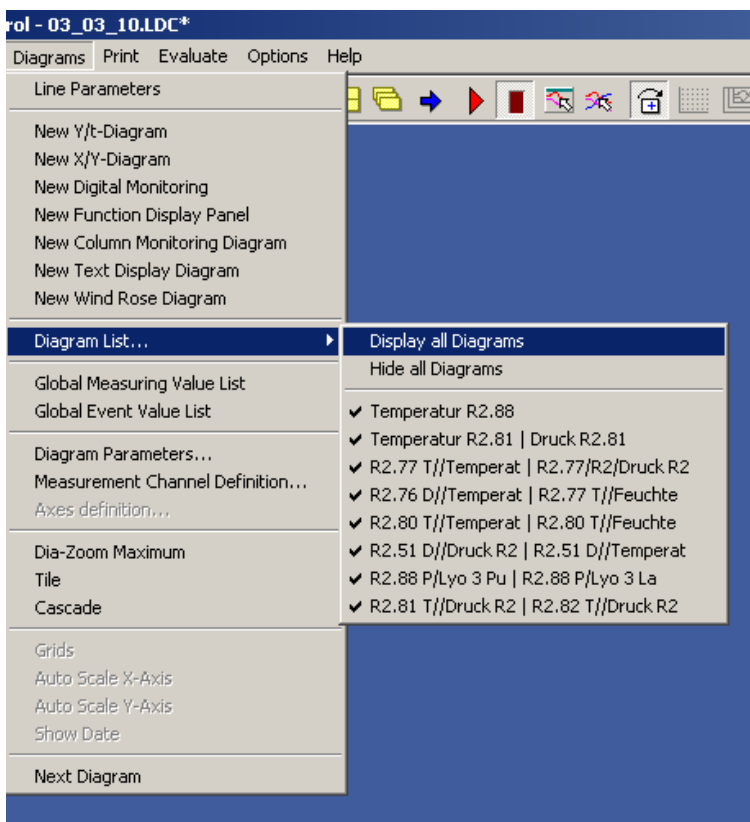


Scroll from one diagram to the other.

Diagrams display On/Off / scale down / delete

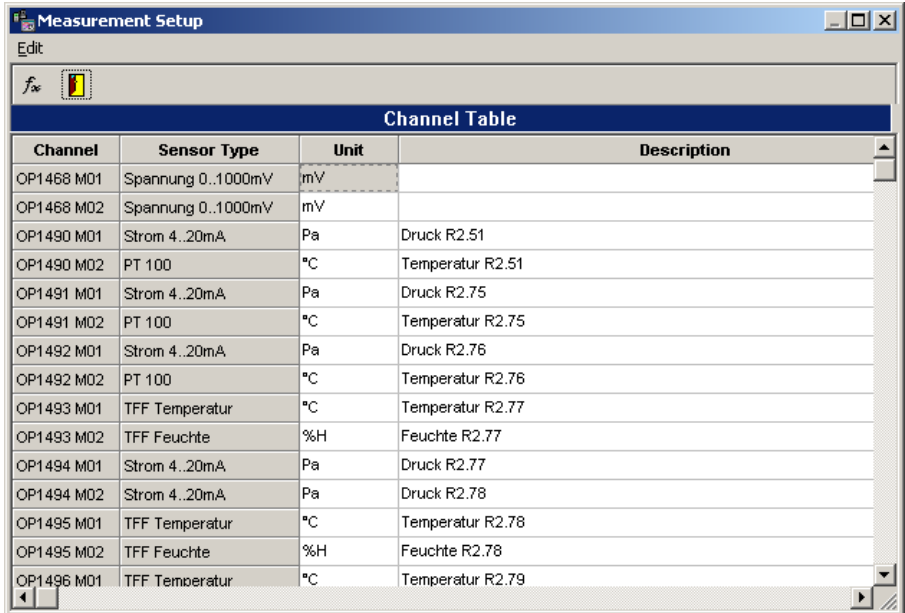
The diagrams may be displayed On/Off, scaled down and deleted via normal windows functions.

To display a diagram again, select in the main menu **Diagrams** the item **Diagram List**. Here you may either display On/Off all diagrams or just a single diagram on the screen again.



Channel list

You may have the list of channels permanently displayed at your monitor. Choose hereby the command **Channel List** in the main menu **Settings**. The table list shown above with the current connected channels will be displayed. The table list remains active for all setting steps within the program, until it is again turned off.



Channel Table			
Channel	Sensor Type	Unit	Description
OP1468 M01	Spannung 0..1000mV	mV	
OP1468 M02	Spannung 0..1000mV	mV	
OP1490 M01	Strom 4..20mA	Pa	Druck R2.51
OP1490 M02	PT 100	°C	Temperatur R2.51
OP1491 M01	Strom 4..20mA	Pa	Druck R2.75
OP1491 M02	PT 100	°C	Temperatur R2.75
OP1492 M01	Strom 4..20mA	Pa	Druck R2.76
OP1492 M02	PT 100	°C	Temperatur R2.76
OP1493 M01	TFF Temperatur	°C	Temperatur R2.77
OP1493 M02	TFF Feuchte	%H	Feuchte R2.77
OP1494 M01	Strom 4..20mA	Pa	Druck R2.77
OP1494 M02	Strom 4..20mA	Pa	Druck R2.78
OP1495 M01	TFF Temperatur	°C	Temperatur R2.78
OP1495 M02	TFF Feuchte	%H	Feuchte R2.78
OP1496 M01	TFF Temoeratur	°C	Temperatur R2.79

The Fields of the Channels List

Channel:	measuring channel number of the connected sensor (starting with M...) or formula channel number (starting with F...)
Sensor Type:	factory name of the sensor
Unit:	physical unit of the sensor
Description:	text box for user specifications
Formula:	formula name of the formula channels

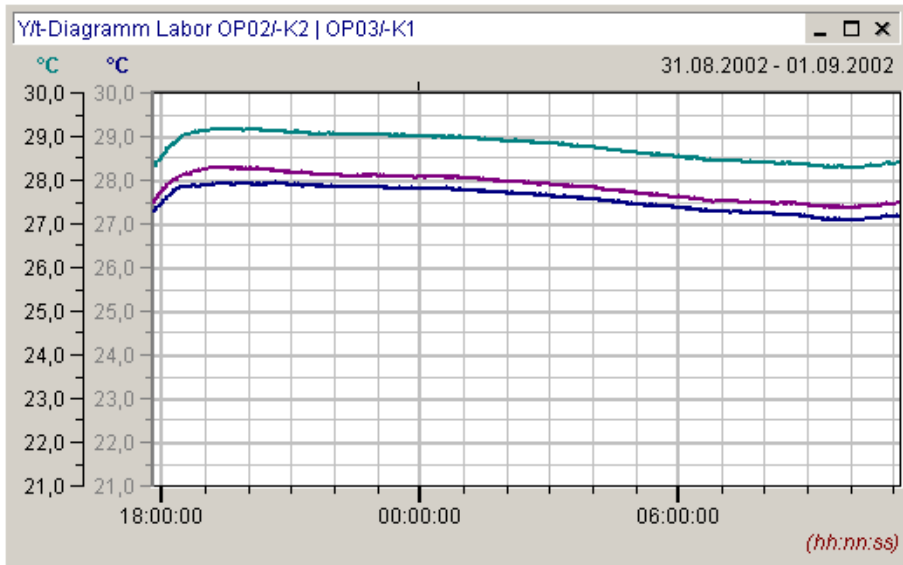
All highlighted fields in the channel table may be shown with the scroll bar. The field **description** contains pre-settings that can be modified in the channel list.

To modify the **Column Width**, click the column title border, hold the left mouse button pressed and move to the desired width.

The Y/t-Diagram

The Y/t-Diagram in Partial View

To create an X/Y-diagram, select in the main menu **Diagrams** the item **New Y/t-Diagram** and assign your desired channels. The Y/t-diagram appears in this **Partial View**, if you chart historic data - already recorded and stored data. By clicking and moving the border or corner of the diagram with the mouse, you may modify the diagram size..



To show a **Part** of your measurement and evaluation data in an enlarged form, move the mouse in the diagram, press and hold the left mouse until you have the desired diagram section, then release the mouse. The selected diagram part will be shown in its enlarged view.

A double click at the **Axes Labels** opens a control box, where you can enter the exact limits of the diagram section in the Y- and X-direction. Using the arrow keys in the toolbar, you may scale back the Y- and the X-axes to its maximum values.

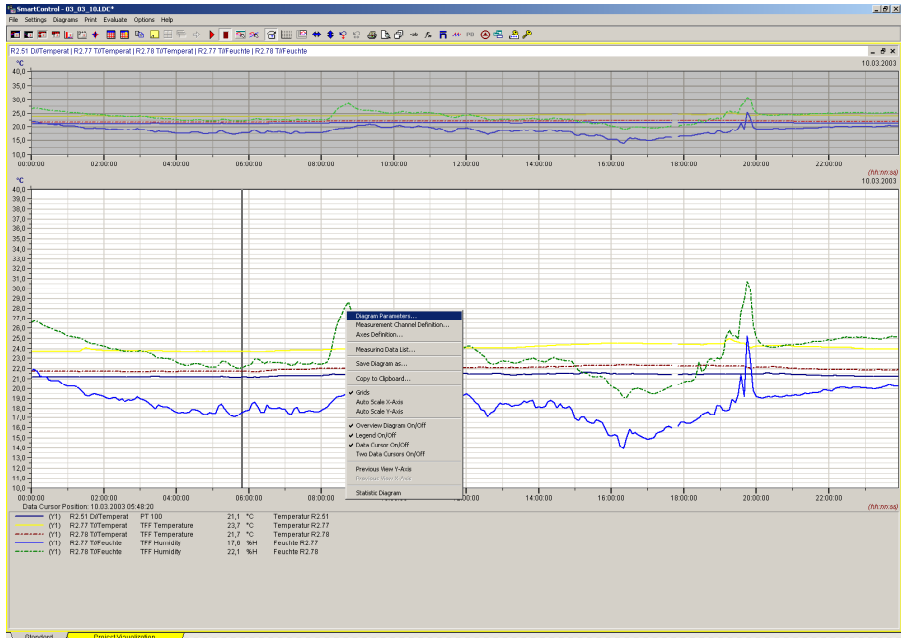
Other **Diagram Parameters** may be activated by double clicking the diagram title with the left mouse button.



creates a new Y/t-Diagram via the tool bar

Further details are described with the **Entire Screen View** of the diagram in the next pages. For explanations of further functions of the diagrams during the **ONLINE-measurement**, please refer to the corresponding chapters in this manual.

The Y/t-Diagram in Entire Screen View



Press this button in the tool bar for an **Entire Screen View** or choose in main menu **Diagram** the command **Dia-Zoom to Maximum**. Pressing this button again will turn the diagram view back to its original size.

- The **Measurement Data Segment** in the middle shows your desired range of measurement data.
- The **Overview Diagram** shows the complete measurement data. The measurement data segment is high lightened in the overview diagram. This overview may be switched ON/OFF via local menu.
- The **Legend** below contains detail information about the measurement lines at the point of the data cursor position. You may switch the legend ON/OFF via local menu.
- To position the **data cursor** please click with the left mouse key your desired area in the measurement data segment. The data cursor may be switch ON/OFF via the local menu. If you choose the option **two data cursors**, you will obtain in the legend evaluation of both values.

- Clicking the right mouse button may activate the **Local Menu** that is related to this diagram.
- The **Date** may be switched ON/OFF via the command **Show Date** in main menu **Settings**.

The Measurement Data Segment in Y/t-Diagram

Um To select and to enlarge a **Measurement Data Segment**, move the mouse in the diagram, press and hold, then move the left mouse button until you have the desired diagram segment. The selected diagram segment will be shown in its enlarged view. At the same time the high-lightened diagram segment in the overview diagram changes accordingly.



Scales back the **X-Axis to maximum** (Auto scale X-Axis).



Scales back the **Y-Axis to maximum** (Auto scale Y-Axis).



Switch the **Grid ON/OFF**. See also **local menu**.



Auto-Zoom enables **zooming in fixed time steps**



Previous view Y-Axis



Previous view X-Axis

Via the local menu you may retrieve your **last applied settings** of the X- and Y-axes. If you modify the measurement data segment during the measurement process, the program sets for every new measurement data recording the actual segment again. If you want to evaluate, you must hold the diagram using the pause-key.

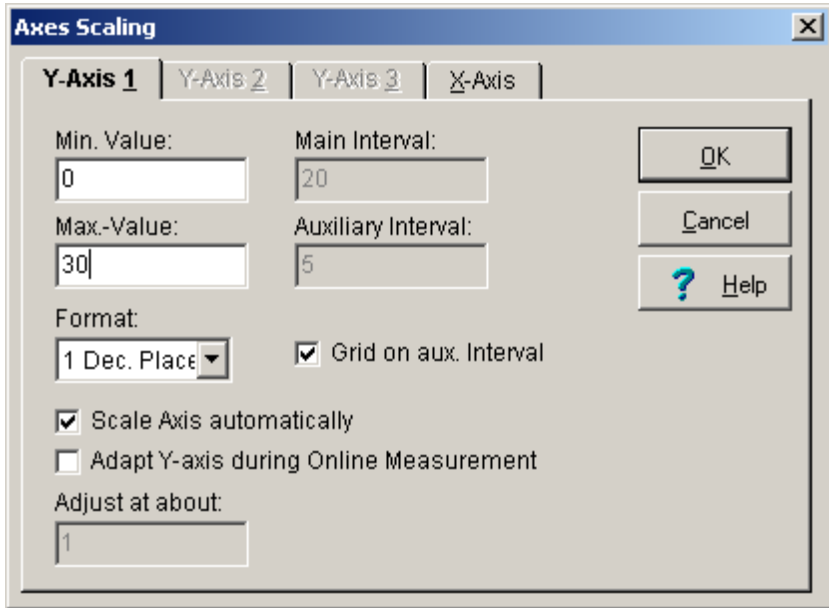
On the toolbar you may set with the button Auto-Zoom a **fixed Zoom-Mode for Y/t-Diagrams**. If this mode is turned on, the display of the local menu is turned off. A double click with the mouse activates an auto-zoom in the following steps

Year	1 h
Month	10 min
Week	1 min
Day	10 s
12 h	1 s
6 h	

By double click with the **left mouse button**, the zoom segment will be scaled down, by double click with the **right mouse button**; the zoom segment will be scaled up.

Scaling the Y-Axes in Y/t-Diagram

The measurement data segment of the Y-Axes may be set exactly as follows: A double click with the left mouse button at the Y- or X-axes labels of the diagram, opens the dialog box **Axes Scaling**.



Select a **Y-Axis** and enter the desired limits manually for your diagram.

Enter the interval for the graduation of the Y-Axis. The **Main Interval** marks the distance from one value to the next on the Y-Axis. The **Auxiliary Interval** divides the main interval into its corresponding subdivisions. The main intervals are labeled the auxiliary intervals are not. Activate the **Grids on the auxiliary interval** to create additional grid lines.

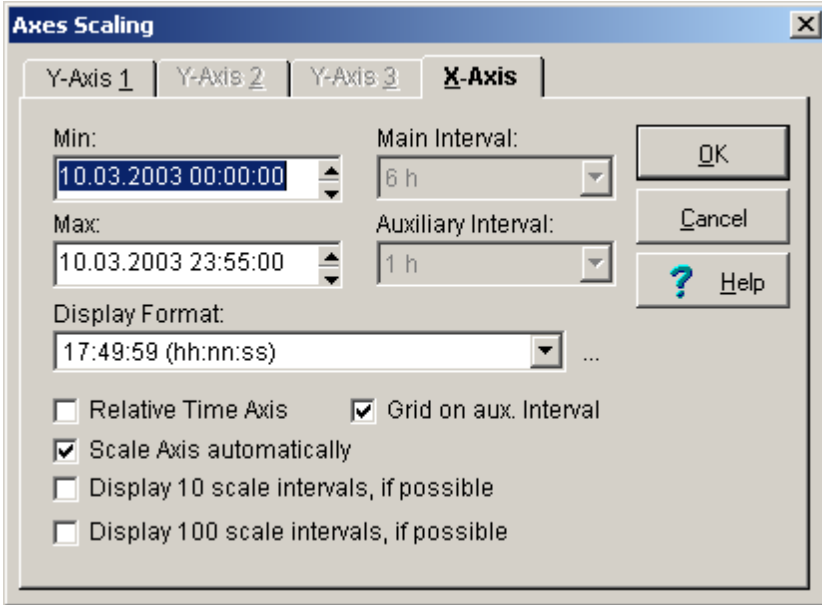
For the **Format** of the values on the axes you may choose from 0 to 4 decimal places or you may choose the exponential form.

Activating the option **Axis automatic scaling**, the program calculates the main and auxiliary intervals automatically with respect to the Axis limit. The user cannot modify the values.

Activating the **Y-Axis Adjustment during online measurement**, will automatically adjust the axis of the current channel in the diagram at a value set in **Adjust at about**, if the measuring values go out of the previous range.

Scaling the X-Axis in Y/t-Diagram

The measurement data segment of the X-Axis may be set exactly as follows: A double click with the left mouse button at the Y- or X-axes labels of the diagram, opens the dialog box **Axes Scaling**.



Select the **X-Axis** and enter the desired limits for your diagram manually or scroll the corresponding arrow buttons. Choose the interval for the graduation of the X-Axis from the interval boxes. The **Main Interval** marks the distance of one value to the next on the X-axis.

The **Auxiliary Interval** divides the main interval into its corresponding subdivisions. The main intervals are labeled the auxiliary intervals are not. Activate the **Grids on the auxiliary interval** to create additional grid lines. If needed switch ON the additional options 10th-graduations or 100th-graduations. Main and auxiliary interval are adjustable to the following values:

1 s	10 min
2 s	15 min
5 s	20 min
10 s	30 min
15 s	1 h
20 s	2 h
30 s	6 h
1 min	12 h
2 min	1 day
5 min	

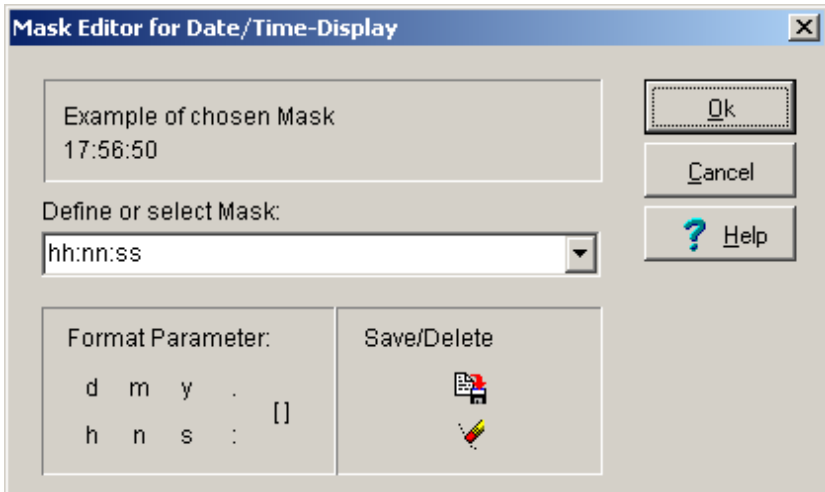
If the **relative time axis** is active, the diagram sets the chosen values to 00:00:00 hours. The date is no longer active. For periods greater than 24 hours the program will show the number of days passed and time, written day/time, e.g. 1/00:00:00. In the **measurement data list** the relative data are also listed.

Activating the option **Axis automatic scaling**, the program calculates the main and auxiliary intervals automatically with respect to the Axis limit. The user cannot modify the values.

Select one of the predefined **Display Formats** for the axes marking. The button



opens the dialog-box for the individual time format on the X-Axis.



Select the desired **time format** for the X-Axis. The selected format will be shown as example and appears on the diagram. With the **Format Parameters** you may generate your individual format. Choose one from the parameter box by clicking with the left mouse button. The corresponding format appears on the display box.

These symbols are defined as follows:

d	Day
m	Month
y	Year
h	Hour
n	Minute
s	Second
.	(Separator)
:	(Separator)
[]	Blank

The format parameters have the following definition:

d	represent the day as a number without zero preceding (1-31).
dd	represent the day as a number with zero preceding (01-31)
ddd	represent the day as abbreviation (Sun-Sat).
dddd	represent the day with its whole name (Sunday-Saturday).
m	represent the month as a number without zero preceding (1-12). If m is directly followed by h or hh the minutes will be displayed instead of the month.
mm	represent the month as a number with zero preceding (01-12). If mm is directly followed by h or hh the minutes will be displayed instead of the month..
mmm	represent the month as abbreviation (Jan-Dec).
mmmm	represent the month with its whole name (January-December).
yy	represent the year in 2 digits (00-99).
yyyy	represent the year in 4 digits (0000-9999).
h	represent the hour without zero preceding (0-23).
hh	represent the hour with zero preceding (00-23).
n	represent the minute without zero preceding (0-59).
nn	represent the minute with zero preceding (00-59).
s	represent the seconds without zero preceding (0-59).
ss	represent the seconds with zero preceding (00-59).

All others are represented in its entry form.



Saves the displayed time format



Deletes the displayed time format

The Overview Diagram of Y/t-Diagram

The **overview diagram** is only valid for Y/t-diagrams. You may switch the Overview Diagram ON/OFF via **local menu**.

In the Overview Diagram is the entire measurement range displayed. The current selected data section is high lightened. Click with the left mouse button in the overview diagram and draw a boundary square to choose a different or another data section. The new selected section will be displayed in the measuring data segment.

The Legend of Y/t-Diagram

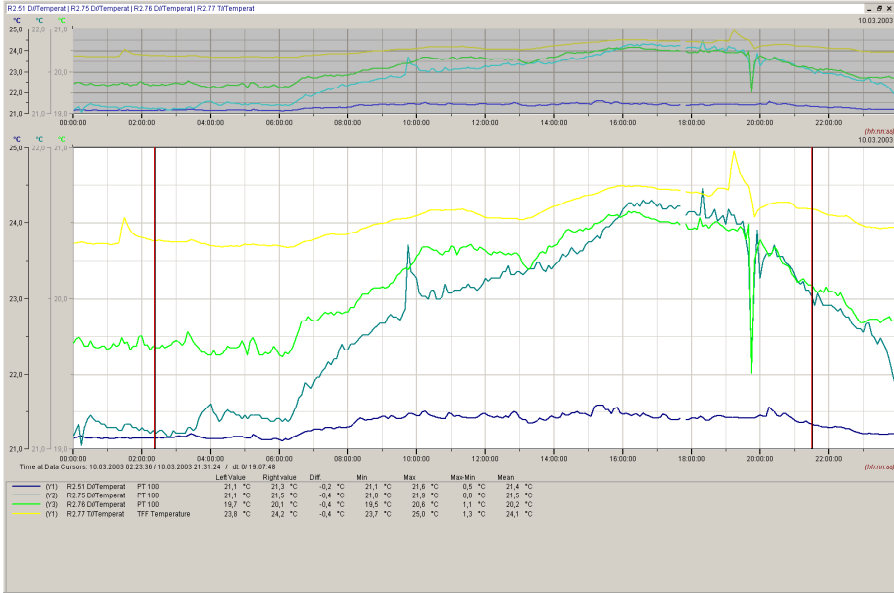
The **Legend** may be switched ON/OFF via **local menu**.

The legend contains detail information about the measurement lines such as line type, measuring device, channel, measurement values at the measuring cursor and description.

A double click with the left mouse button in the measuring data segment resets the **Data cursor**. The corresponding measurement values of each measurement lines appear in the legend as numbers with the assigned units. The measuring cursor is valid only for Y/t-diagram and disappears in the measuring data segment, if the legend is turned off.

The second data cursor of the Y/t-Diagram

The **second data cursor** may be switch ON/OFF via the **local menu**. Instead of one data cursor in the diagram, two data cursors will be displayed.



The legend covers first of all general information about the measurement lines like line type, measuring devices, measurement channels and sensor designations.

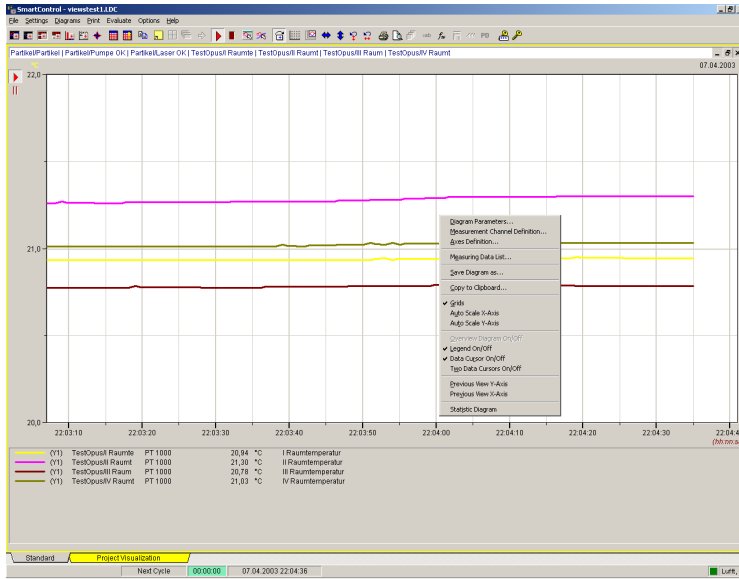
Then the measurement values on both data cursor are shown and also the difference between the two measurement values. Furthermore the program calculates the minimal-, maximal- and the mean value of the channels between the two cursors and the difference of the minimal- and maximal values and charts it on the diagram.

If you wish to **move one of the data cursor**, direct the mouse to the cursor and hold the left mouse button pressed while moving. The corresponding measurement values of each measurement lines will be displayed in the legend as numbers with the corresponding unit.

Note: The data cursor is available only for the Y/t-diagram and disappears from the measurement data segment, if you switch off the legend or the data cursor via the local menu.

The Functions of the Y/t-Diagram during Measurement Operation (Trend Display)

If you use the Y/t-diagram diagram during the measuring process for trend display and online-visualization the **function buttons** and **symbols** will appear on the left border of the diagram.



With this button you may again start a locally stopped or hold diagram. The button **start measuring** is valid only locally. The button is not valid for the higher global function **start measuring** in the tool bar.



If you press this button, **updating of the data in a diagram will be discontinued** (Pause button). This enables you to do zooming or evaluation within the diagram. To update data, press the start button again. The diagram displayed looks like as if the pause button has never been pressed.



If this symbol appears a **sensor rupture** occurred in at least one channel of the diagram. The symbol is red if a sensor rupture currently happened and yellow, if sensor rupture happened in the past.



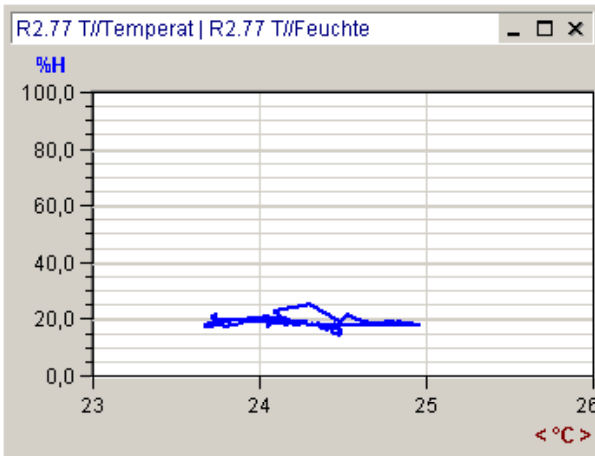
If this symbol appears, **limits are exceeded** in at least one channel of the diagram. The symbol turns red if the limit is currently exceeded and yellow, if the limit violations happened in the past

Note: During the measuring process the Y/t-diagram does not have an overview diagram and data cursor.

The X/Y-Diagram

The X/Y-Diagram in Partial View

Um Select in the main menu **Diagrams** the item **New X/Y-Diagram** and assign your desired channels. The X/Y-Diagram appears in this **Partial View**, if you chart historic data - already recorded and stored data. By clicking and moving the border or corner of the diagram with the mouse, you may modify the diagram size.



To show a **Part** of your measurement and evaluation data in an enlarged form, move the mouse in the diagram, press and hold the left mouse until you have the desired diagram section, then release the mouse. The selected diagram part will be shown in its enlarged view.

A double click at the **Axes Labels** opens a control box, where you can enter the exact limits of the diagram section in the Y- and X-direction. Using the arrow keys in the toolbar, you may scale back the Y- and the X-axes to its maximum values.

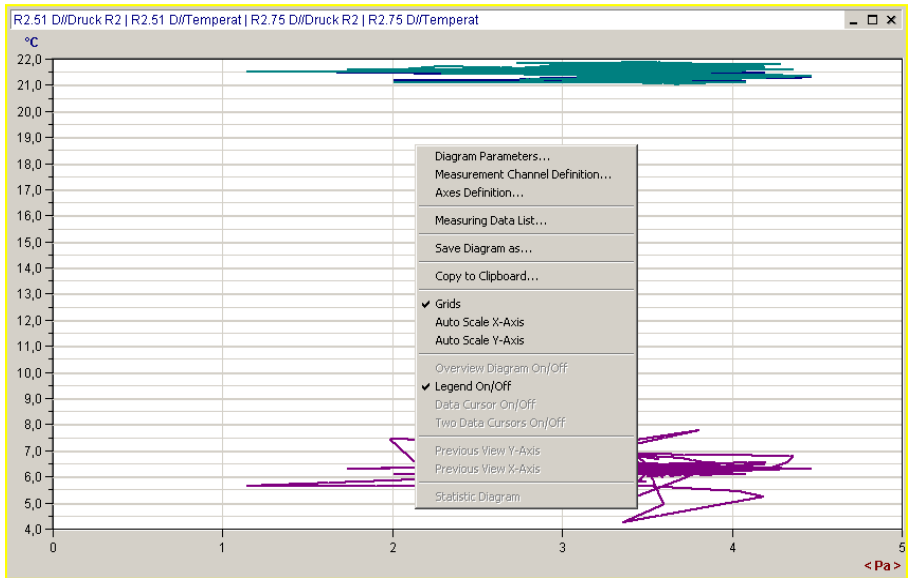
Other **Diagram Parameters** may be activated by double clicking the diagram title with the left mouse button.



Creates a new X/Y-Diagram via the tool bar.

Further details are described together with the **Entire Screen View** of the diagram in the next pages. For explanations of further functions of the diagrams during the **ONLINE-measurement**, please refer to the corresponding chapters in this manual.

The X/Y-Diagram in Entire Screen View



Press this button in the tool bar for an **Entire Screen View** or choose in menu **Diagram** the command **Dia-Zoom to Maximum**. Pressing this button again will turn the diagram view back to its original size.

- The **Measurement Data Segment** shows your desired range of measurement data.
- The **Legend** below contains detail information of the measurement lines. You may switch the legend ON/OFF via local menu and you may configure the diagram.
- clicking the right mouse button may activate the **Local Menu** related to this diagram.

The Measurement Data Segment in X/Y-Diagram

To select and to enlarge a **Measurement Data Segment**, move the mouse in the diagram, press and hold then move the left mouse button until you have the desired diagram segment. The selected diagram segment will be shown in its enlarged view.



Scales back the **X-Axis to maximum** (Auto scale X-Axis).



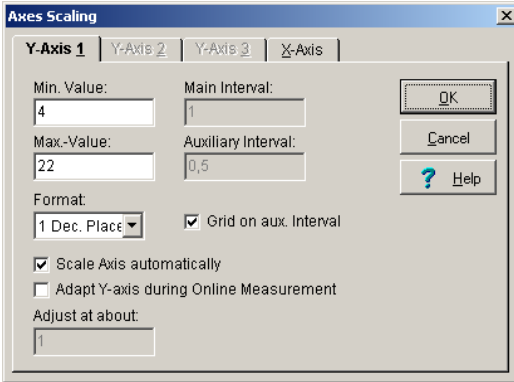
Scales back the **Y-Axis to maximum** (Auto scale Y-Axis).



Switch the **Grid ON/OFF**. You may also switch the grid ON/OFF via **Local Menu**.

Scaling the Y-Axis in X/Y-Diagram

The measurement data segment of the Y-Axes may be set exactly as follows: A double click with the left mouse button at the Y- or X-axis labels of the diagram, opens the dialog box **Axes Scaling**.



Select a **Y-Axis** and enter the desired limits manually for your diagram.

Enter the interval for the graduation of the Y-Axis. The **Main Interval** marks the distance from one value to the next on the Y-Axis. The **Auxiliary Interval** divides the main interval into its corresponding subdivisions. The main intervals are labeled the auxiliary intervals are not. Activate the **Grids on the auxiliary interval** to create additional grid lines.

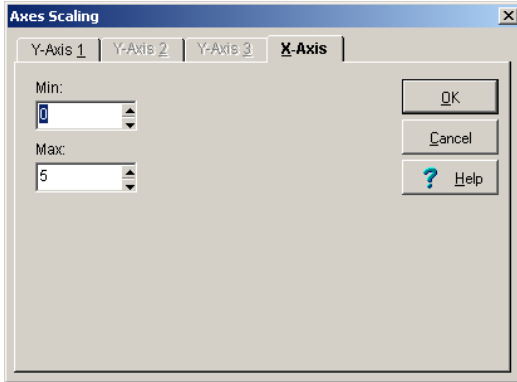
For the **Format** of the values on the axes you may choose from 0 to 4 decimal places or you may choose the exponential form.

Activating the option **Axis automatic scaling**, the program calculates the main and auxiliary intervals automatically with respect to the Axis limit. The user cannot modify the values.

Activating the **Adapt Y-Axis during online measurement**, will automatically adjust the axis of the current channel in the diagram at a value set in **Adjust at about**, if the measuring values go out of the previous range.

Scaling the X-Axis in X/Y-Diagram

The measurement data segment of the X-Axis may be set exactly as follows: A double click with the left mouse button at the Y- or X-axes labels of the diagram, opens the dialog box **Axes Scaling**.



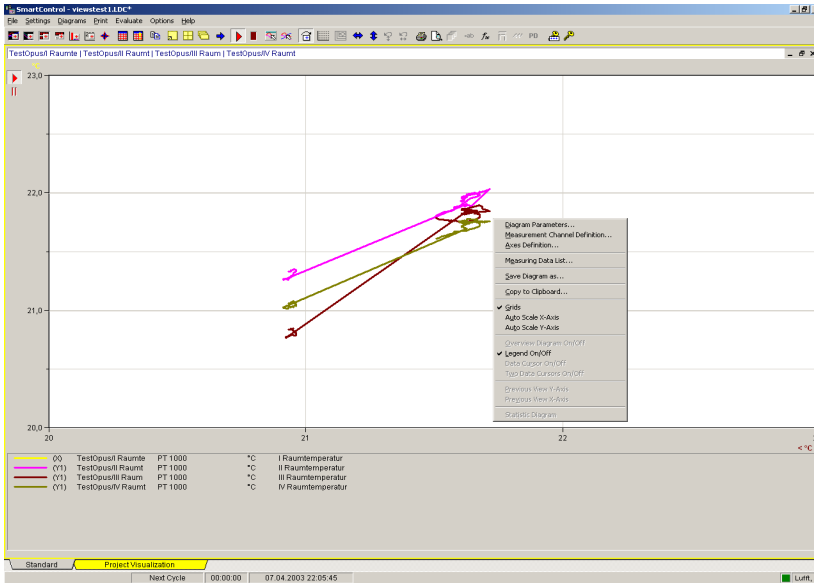
Select the **X-Axis** and enter the desired limits manually for your diagram. After all modifications are done, press OK to confirm and to enter these changes.

The Legend of X/Y-Diagram

The **legend** may be switched ON/OFF via **local menu** and may also be configured. The Legend contains detail information about the measurement lines such as line type, measuring device, channel and description.

The Functions of the X/Y-Diagram during Measurement Operation (Trend Display)

If you use the X/Y -diagram during the measuring process for trend display and online-visualization **function buttons** and **symbols** will appear on the left border of the diagram.



With this button you may again start a locally stopped or hold diagram. The button **start measuring** is valid only locally. The button is not valid for the higher global function **start measuring** in the tool bar.



If you press this button, **updating of the data in a diagram will be discontinued** (Pause button). This enables you to do zooming or evaluation within the diagram. To update data, press the start button again. The diagram displayed looks like as if the pause button has never been pressed.



If this symbol appears a **sensor rupture** occurred in at least one channel of the diagram. The symbol is red if a sensor rupture currently happened and yellow, if sensor rupture happened in the past.



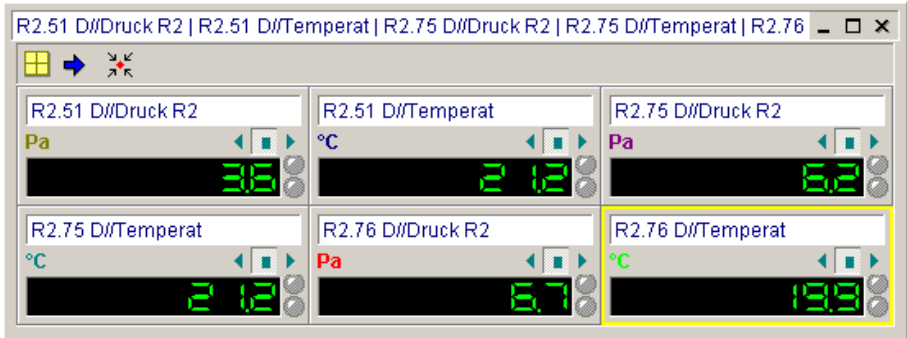
If this symbol appears, **limits are exceeded** in at least one channel of the diagram. The symbol turns red if the limit is currently exceeded and yellow, if the limit violations happened in the past.

The Column Monitoring Diagram

Column Monitoring Diagram Functions

The **Column Monitoring Diagram** is used for Online-Visualization of measurement values during the measuring process (trend display). It could also be used to activate historic data, but it however displays arbitrary value.

To create a column monitoring diagram select in the main menu **Diagrams** the item **New Column Monitoring** and assign your desired channels.



Creates a New Column Monitoring via the tool bar.



Press this button for an **Entire Screen View** or choose in menu **Diagram** the command **Dia-Zoom to Maximum**. Pressing this button again will turn the diagram view back to its original size.

The buttons in the toolbar within the diagram area are:



Positions your column display optimal within the display area.



Changes from one column display to the next display.



Fits your diagram area optimal to the channels to be displayed.

To change the **Settings of the Column Monitoring Diagrams** just double click the diagram title with the left mouse button. The dialog box with diagram options appears. Here you may change your diagram parameter settings and your measurement channel definition. This function is available via button in the tool bar in the main menu and in the local menu.

Digital Display Functions

In the **single digital display** the current measurement value is digitally shown.



If the measurement value exceeds the upper limit, the digital display turns to red, if the value is below the lower limit, the display turns to blue. If no exceeding of limits, the display remains green. The upper LED-indicating lamp signalizes a **Sensor Rupture**. The lower LED- indicating lamp signalizes **limit exceeded**. For the exact function of the single digital display in ONLINE-measurement process, please refer to the corresponding chapters in this manual.



Displays the maximum measuring value in the measuring cycle

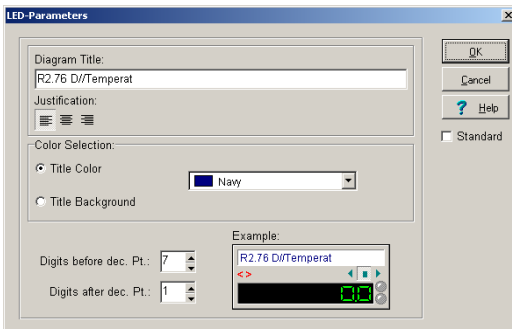
Displays the current average measuring value in the measuring cycle

Displays the minimum measuring value in the measuring cycle

Note: The device measures very often according to its scanning rate. From the scanning rate the average value is calculated via the measuring cycle for data recording and then displayed digitally.

Formatting Digital Display

To change the **Settings of the Digital Display** just double click the digital display title with the left mouse button. The dialog-box **LED-Parameter** appears. You may modify here the title, text color, text background color, text justification of your digital display and the digital display. The number of digits before the decimal point is limited to 8. The number of decimal places is limited to a maximum of 2.





Text **left justified**



Text **centered**



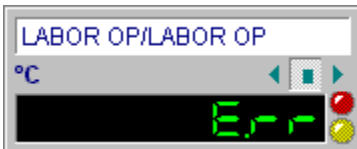
Text **right justified**

In the color selection item you may modify the color of the text title and the background color of the title. Activate the checkbox **Standard**, to set your chosen settings as standard for all other diagrams.

Note: Changes in the title description is valid only for the current measurement and will be overwritten during restart with data assigned in the sensor.

The Functions of the Digital Monitoring Diagram during Measurement Operation (Trend Display)

If you use the digital monitoring diagram during the measuring process for trend display and online-visualization **function buttons** at the right side of the digital display will be active.



In the single display of the channel is the **actual value** digitally displayed. If the measuring value exceeds the **upper limiting value** the digital display will turn to red and if the value remains below the **lower limiting value** the digital display will turn to blue. If there is no limiting value violation the digital display is green. If a **general error** exists like no connection to sensor, this will be displayed with **E.rr.**

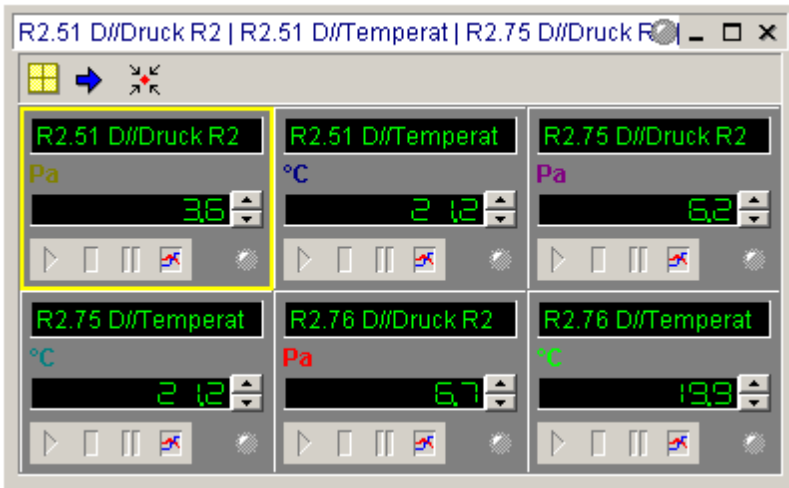
The upper LED-display indicates a **sensor rupture**. It lightens red if a sensor rupture exist and yellow if the sensor rupture occurred in the past.

The lower LED-display indicates a **limiting value violation**. It lightens red if a limiting value violation exist and yellow if the limiting value violation occurred in the past.

The Function Display Panel (Option PAS-ALARM)

Diagram Functions

The **function display panel** is used for Online-Visualization of measurement values during the measuring process (trend display). It could also be used to activate historic data, but it however displays arbitrary value. Select in the main menu **Diagrams** the menu item **new Function Display Panel** and assign your desired channels.



creates a **new Function Display Panel** via toolbar.



Press this button in the tool bar for the **Entire Screen View** or choose in the menu **Diagrams** the command **Dia-Zoom to Maximum**. Pressing this button again will turn the diagram view back to its original size.

The functions of the buttons in the tool bar within the function display panel are:



Positions your digital display optimal within the display area.



Changes from one digital display to the next display.

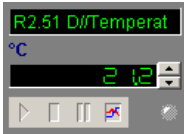


Fits your diagram area optimal to the channels to be displayed.

To change **Settings of the Function Display Panel** just double click the diagram title with the left mouse button. The dialog box with diagram options appears. Here you may change your diagram parameter settings and your measurement channel definition. This function is available via button in the tool bar in the main menu and in the local menu.

The Single Function Display

In the single **channel display** the actual measurement value is displayed digitally.

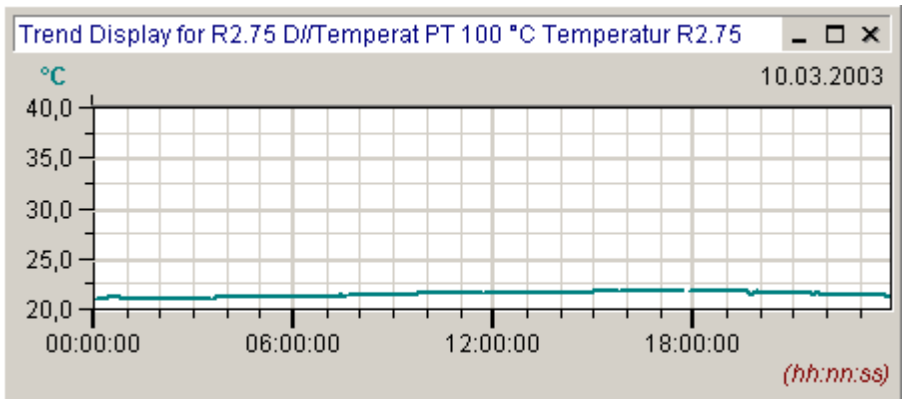


The first three buttons are in ONLINE-measuring process active. The fourth button opens a Y/t – diagram for this channel. The LED-display signalizes several informations. To display the **limiting values** please hold the arrow buttons pressed.



Trend Display in the Function Display Panel

The trend display in the function display panel is an Y/t-Diagram for each channel.



Note: The **Function scope for the trend display-diagram** corresponds exactly to a manually generated Y/t-Diagram. About the function details of the Y/t-Diagram please refer to the corresponding chapter in this manual.

The Functions of the Function Display Panel during Measurement Operation (Trend Display, Option PAS-ALARM)

If you use the function display panel **during the measurement process** for the trend display and Online-Visualization, **function buttons and symbols** at the lower edge of the channel will be active. The diagram could also be created during the measuring process.



The LED-display at the diagram heading lightens green if all channels are in the measuring process. It is white if the data recording for any channel is disrupted (stop button). It twinkles yellow if by pressing the break button the actualization of any display is discontinued. It twinkles red if an actual **limiting value violation** exists without acknowledgement.

In the channel display is the **actual value** I digitally displayed. If the measuring value exceeds the **upper limiting value** the digital display will turn to red. If the value remains below the **lower limiting value** the digital display will turn to blue. If there is no limiting value violation the digital display is green. If a **general error** exists like no connection to sensor, this will be displayed with **E.rr**.



To display the **limiting values** hold the arrow button pressed.



The LED-display lightens green during the measuring process. It is white if the data recording for any channel is disrupted (stop button). It twinkles yellow if by pressing the break button the actualization of any display is discontinued. It twinkles red if an actual **limiting value violation values** exist without acknowledgement.



With this button you may again start a locally stopped or hold channel display. The button **start measuring** is valid only locally. The button is not valid for the higher global function **start measuring** in the tool bar.

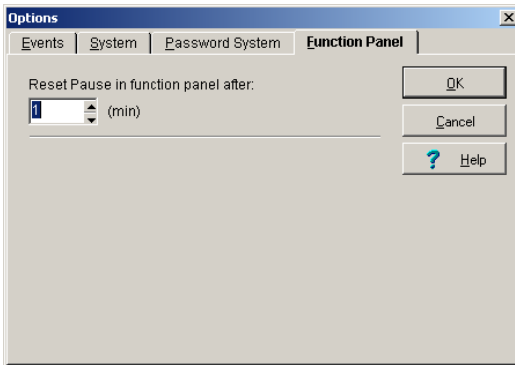


With this button you may **stop the measurement of the channel in the display** (Stop button). The LED will be white. While the channel display is being stopped no more data will be recorded for this channel. This is valid too, if you have assigned this channel to other diagrams. Press start button again for further data recording.



If you press this button, **updating of the data in the channel display will be discontinued** (break button). To update data, press the start button again. The diagram displayed looks like as if the break button has never been pressed.

The break function in the function panel will be automatically reset. As system administrator you may set the time. To do so select in the main menu **options** the item **system settings** and here the register **function panel**. The following dialog-box opens.



In the option **break function reset**, you may set the values between 1 minute and 60 minutes. The break function will be reset after this time has elapsed.

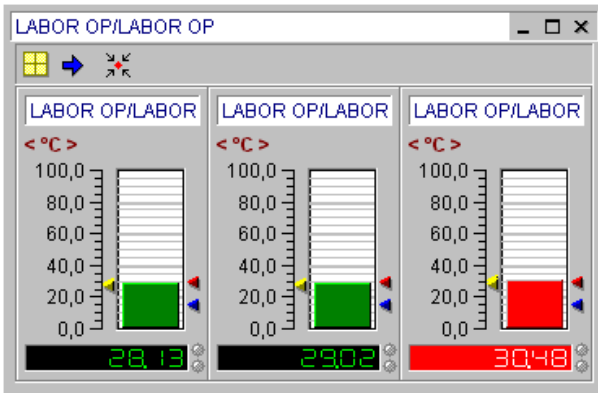


If you press this button, you will obtain the **Y/t-diagram for trend display** for each channel.

The Column Monitoring Diagram

Diagram Functions

The **Column Monitoring Diagram** is used for Online-Visualization of measurement values during the measuring process (trend display). It could also be used to activate historic data, but it however displays arbitrary value. Select in the main menu **Diagrams** the item **New Column Monitoring** and assign your desired channels.



Creates a New Column Monitoring via the tool bar.



Press this button for an **Entire Screen View** or choose in menu **Diagram** the command **Dia-Zoom to Maximum**. Pressing this button again will turn the diagram view back to its original size.

The buttons in the toolbar within the diagram area are:



Positions your column display optimal within the display area.



Changes from one column display to the next display.

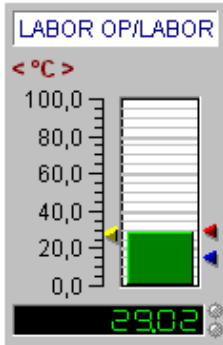


Fits your diagram area optimal to the channels to be displayed.

To change the **Settings of the Column Monitoring Diagrams** just double click the diagram title with the left mouse button. The dialog box with diagram options appears. Here you may change your diagram parameter settings and your measurement channel definition. This function is available via button in the tool bar in the main menu and in the local menu.

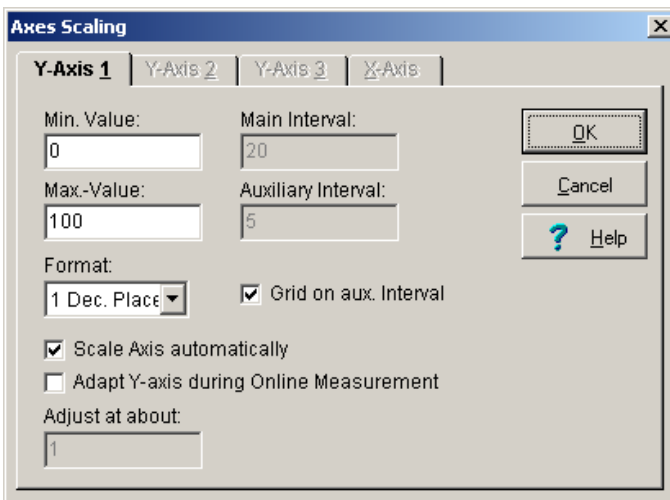
The Single Column Display

In the **single column display** the arrows left of column indicate the highest and the lowest measuring value. The current measuring value is digitally shown. The two arrows right of the column correspond to the upper and lower limits programmed in the sensor.



If the measurement value exceeds the upper limit the column color turns to red, if the value is below the lower limit, the column turns to blue. If no exceeding of limits, the columns remain green. The upper LED-indicating lamp signalizes a **Sensor Rupture**. The lower LED-indicating lamp signalizes **limiting value violation**.

To set the **display range of the column scale**, double click with the left mouse button on the axes labels. This opens the dialog box **Axes Scaling**. Enter here your desired diagram limits manually



Enter the interval for the graduation of the Y-Axis. The **Main Interval** marks the distance from one value to the next on the Y-Axis. The **Auxiliary Interval** divides the main interval into its corresponding subdivisions. The main intervals are labeled the auxiliary intervals are not. Activate the **Grids on the auxiliary interval** to create additional grid lines.

For the **Format** of the values on the axes you may choose from 0 to 4 decimal places or you may choose the exponential form.

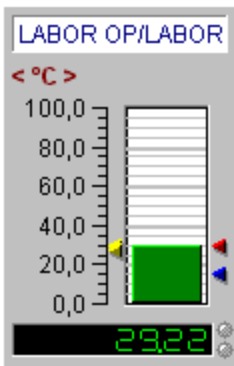
Activating the option **Axis automatic scaling**, the program calculates the main and auxiliary intervals automatically with respect to the Axis limit. The values cannot be modified by the use.

Activating the **Adapt Y-Axis during online measurement**, will automatically adjust the axis of the current channel in the diagram at a value set in **Adjust at about**, if the measuring values go out of the previous range

The Functions of the Column Monitoring Diagram during Measurement Operation (Trend Display)

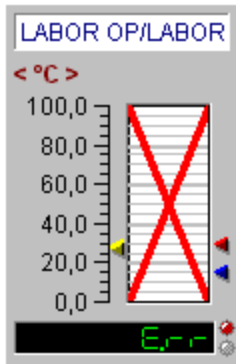
If you use the column-monitoring diagram **during the measurement process** for the trend display and Online-Visualization **function buttons and symbols** at the lower edge of the channel will be active. The diagram could also be created during the measuring process.

In the single display of the channel the **actual measuring value** is displayed as column and digitally. Arrow left of the column shows the prevailing **highest and lowest measuring values**. The two arrows in the right of the column correspond to the set **upper and lower limiting values**.



If the measuring value exceeds the **upper limiting value** the column color turn into red and if the value remains below the **lower limiting value** the column color is blue. If there is no limiting value violation the column color is green.

If a **general error** exists like no connection to the sensor, an **E.rr** will be shown in the display and the column is crossed out.



The upper LED-display signalizes a **sensor rupture**. It lightens red if an actual sensor rupture occurred and yellow if the sensor rupture occurred in the past.

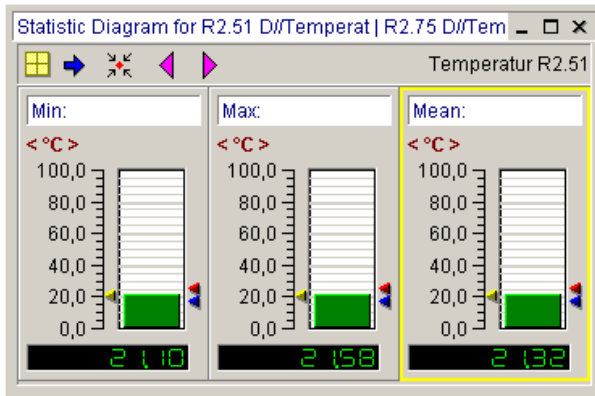
The lower LED-display signalizes a **limiting value violation**. It lightens red if an actual limiting value violation exists and yellow if the limiting value violation occurred in the past.

Note: Through a double click at the column in the display, the column will automatically be scaled to $\pm 10\%$ of the actual measuring value. Activate the option adapt Y-axis during ONLINE-measurement in the menu item Axes Scaling to adjust the axes automatically to the new measurement values.

The Statistic Diagram

Diagram Functions

The **Statistic Diagram** contains the minimum, maximum and mean value of a measurement line in a Y/t-diagram. **The diagram can only be created from an active Y/t diagram. To do so, click an existing Y/t diagram activate the „local menu“ with the right mouse button and create your desired statistic diagram.**



Press this button in the tool bar for an **Entire Screen View** or choose in menu „Diagram“ the command „Dia-Zoom to Maximum“. Pressing this button again will turn the diagram view back to its original size.

The buttons in the toolbar within the diagram are:



Positions your statistic display optimal within the display area.



Changes from one statistic display to the next display.



Fits your diagram area optimal to the statistic diagram to be displayed.



Previous measurement channel of the Y/t-diagram

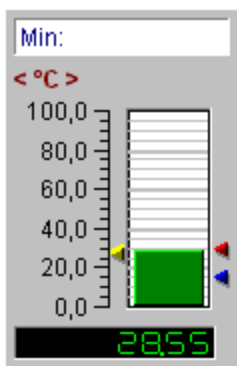


Next measurement channel of the Y/t-diagram

To change the **Settings of the Statistic Diagram** just double click the diagram title with the left mouse button. The dialog box with diagram options appears. Here you may change your diagram parameter settings and your measurement channel definition. This function is available via button in the tool bar in the main menu and in the local menu.

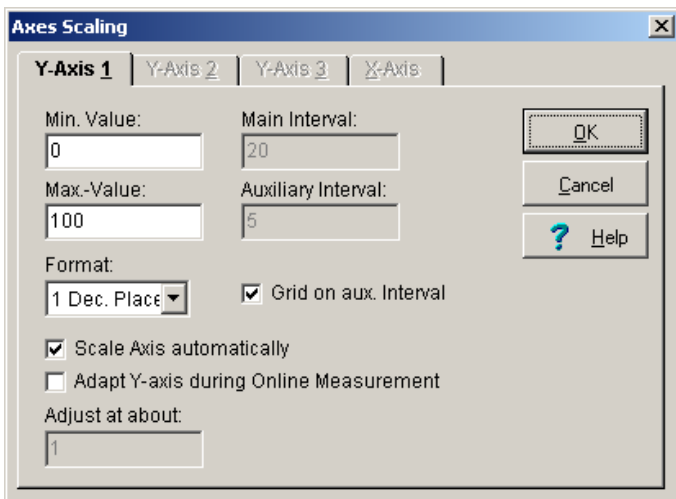
The Single Column Display of the Statistic Diagram

In the **single column display** the arrows left of column indicate the highest and the lowest measuring value. The current measuring value is digitally shown. The two arrows right of the column correspond to the upper and lower limits programmed in the sensor.



If the measurement value exceeds the upper **limit** the column color turns to red, if the value is below the lower limit, the column turns to blue. If no exceeding of limits, the columns remain green.

To set the display range of the statistic scale, double click with the left mouse button on the axes labels. This opens the dialog box **Axes Scaling**. Enter here your desired diagram limits manually.



Enter the interval for the graduation of the Y-Axis. The **Main Interval** marks the distance from one value to the next on the Y-Axis. The **Auxiliary Interval** divides the main interval into its corresponding subdivisions. The main intervals are labeled the auxiliary intervals are not. Activate the **Grids on the auxiliary interval** to create additional grid lines.

For the **Format** of the values on the axes you may choose from 0 to 4 decimal places or you may choose the exponential form.

Activating the option **Axis automatic scaling**, the program calculates the main and auxiliary intervals automatically with respect to the Axis limit. The user cannot modify the values.

Activating the **Y-Axis Adjustment during online measurement**, will automatically adjust the axis of the current channel in the diagram at a value set in **Adjust at about**, if the measuring values go out of the previous range.

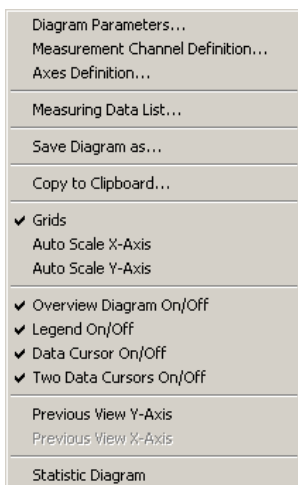
Note: Through a double click at the column in the diagram the column will automatically be scaled to $\pm 10\%$ of the actual measuring value.

The local Menu (Context menu of diagrams)

For every diagram is a **Local Menu** available. The diagram functions may be executed comfortably. Just activate with the **right mouse** button.

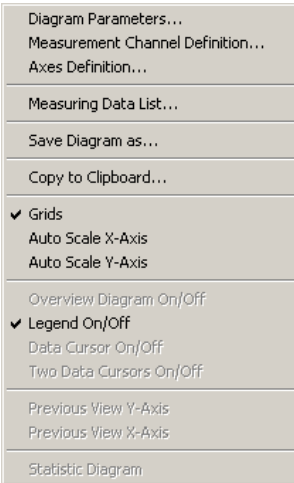
For a **Y/t-Diagram**, the following functions are available in the local menu:

- Diagram Parameter
- Measurement Channel Definition
- Axes Definition
- Measuring Data List
- Save Diagram
- Copy current diagram to the clipboard)
- Grids ON/OFF
- Auto scaling X-Axis
- Auto scaling Y-Axis
- Overview Diagram ON/OFF
- Legend ON/OFF
- Data Cursor ON/OFF
- Two Data Cursor ON/OFF
- Configure Legend
- Previous view Y-Axis
- Previous view X-Axis
- Statistic Diagram



For an **X/Y-Diagram**, only the following high-lightened functions are available:

- Diagram Parameter
- Measurement Channel Definition
- Axes Definition
- Measuring Data List
- Save Diagram
- Copy current diagram to the clipboard
- Grids ON/OFF
- Auto scale X-Axis
- Auto scale Y-Axis
- Legend ON/OFF
- Configure Legend



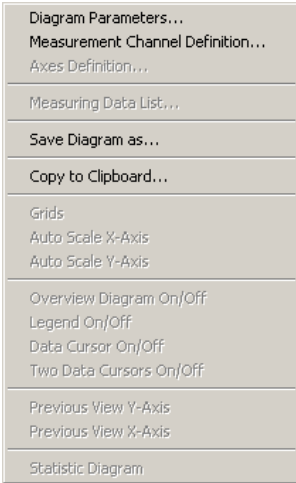
For a **Digital Monitoring Diagram**, for a **Function Display -Panel** or for a **Column Monitoring Diagram**, only the following high-lightened functions are available:

- Diagram Parameter
- Measurement Channel Definition
- Measuring Data List
- Save Diagram
- Copy current diagram to the clipboard

Diagram Parameters...
Measurement Channel Definition...
Axes Definition...
Measuring Data List...
Save Diagram as...
Copy to Clipboard...
Grids
Auto Scale X-Axis
Auto Scale Y-Axis
Overview Diagram On/Off
Legend On/Off
Data Cursor On/Off
Two Data Cursors On/Off
Previous View Y-Axis
Previous View X-Axis
Statistic Diagram

For a **Statistic Diagram** only the high-lightened functions are available in the local menu:

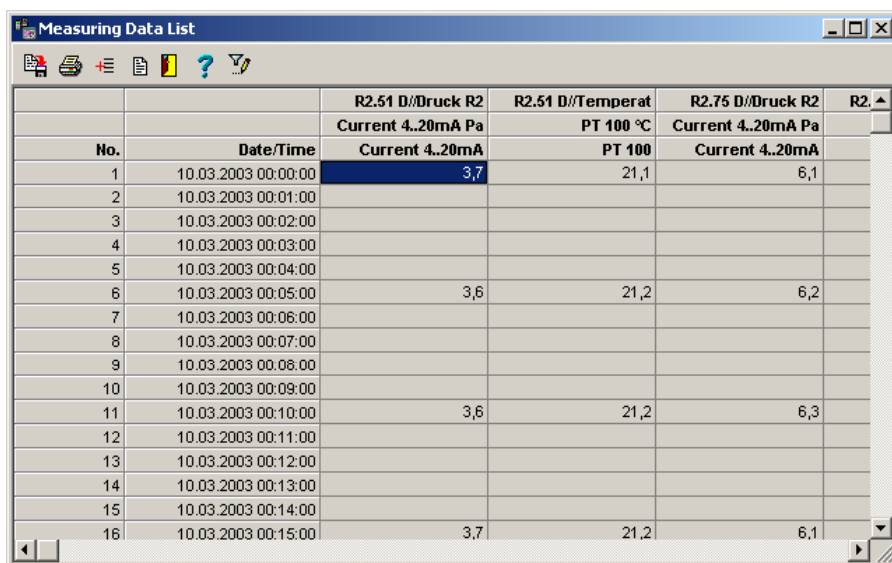
- Save Diagram
- Copy current diagram to the clipboard)



The Measuring Data Lists

The Global Measuring Data List

The program shows in the measuring data list all measuring data in a single list. Select in the main menu **Diagrams** the menu item **global measurement value list**, to write down all up to this point recorded measuring data in a single list. The measurement values are arranged according to **absolute time relation** (date and time).



The screenshot shows a window titled "Measuring Data List" with a toolbar containing icons for print, list, help, and search. The main area contains a table with the following data:

No.	Date/Time	R2.51 D//Druck R2 Current 4..20mA Pa	R2.51 D//Temperat PT 100 °C	R2.75 D//Druck R2 Current 4..20mA Pa	R2. ▲
1	10.03.2003 00:00:00	3,7	21,1	6,1	
2	10.03.2003 00:01:00				
3	10.03.2003 00:02:00				
4	10.03.2003 00:03:00				
5	10.03.2003 00:04:00				
6	10.03.2003 00:05:00	3,6	21,2	6,2	
7	10.03.2003 00:06:00				
8	10.03.2003 00:07:00				
9	10.03.2003 00:08:00				
10	10.03.2003 00:09:00				
11	10.03.2003 00:10:00	3,6	21,2	6,3	
12	10.03.2003 00:11:00				
13	10.03.2003 00:12:00				
14	10.03.2003 00:13:00				
15	10.03.2003 00:14:00				
16	10.03.2003 00:15:00	3,7	21,2	6,1	



With this button in the tool bar you may likewise activate the **global measurement value list**.

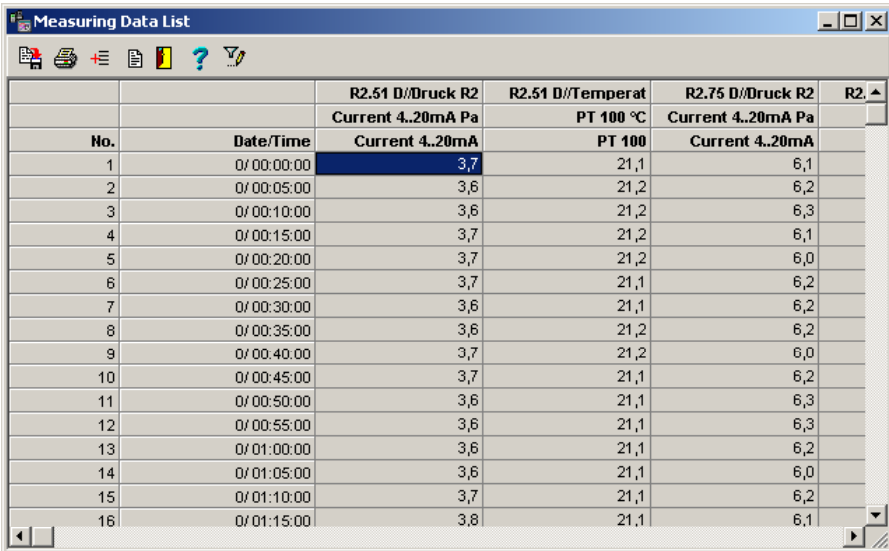
The Local Measuring Data List with Absolute Time Relation

In the local measuring data list, the program shows the measuring data of the actual chosen diagram. Set as standard is the local measuring data list with absolute time relation.

If you activate the measuring data list via the local menus of the diagram (with exception of the statistic diagram), you obtain the **local measuring data list with absolute time relation**. Each of this contains only the measuring values of all channels of the actual diagram with date and time of the measurement.

The Local Measuring Data List with Relative Time Relation

From the Y/t-Diagram you may additionally create a measuring data list with **relative measuring Date/Time**. To do so activate the option relative time axis in the X-axis scale. This list always starts at 00:00 hours and has no date display. This option allows you to display measuring series simultaneously if only the measuring progression is relevant and not the measuring time.



No.	Date/Time	R2.51 D//Druck R2 Current 4..20mA Pa	R2.51 D//Temperat PT 100 °C	R2.75 D//Druck R2 Current 4..20mA Pa	R2. ▲
1	0/ 00:00:00	3,7	21,1	6,1	
2	0/ 00:05:00	3,6	21,2	6,2	
3	0/ 00:10:00	3,6	21,2	6,3	
4	0/ 00:15:00	3,7	21,2	6,1	
5	0/ 00:20:00	3,7	21,2	6,0	
6	0/ 00:25:00	3,7	21,1	6,2	
7	0/ 00:30:00	3,6	21,1	6,2	
8	0/ 00:35:00	3,6	21,2	6,2	
9	0/ 00:40:00	3,7	21,2	6,0	
10	0/ 00:45:00	3,7	21,1	6,2	
11	0/ 00:50:00	3,6	21,1	6,3	
12	0/ 00:55:00	3,6	21,1	6,3	
13	0/ 01:00:00	3,6	21,1	6,2	
14	0/ 01:05:00	3,6	21,1	6,0	
15	0/ 01:10:00	3,7	21,1	6,2	
16	0/ 01:15:00	3,8	21,1	6,1	

Note: This option is valid only for Y/t-Diagrams and not for other diagram types!

Functions of the Measuring Data List

The Buttons in the tool bar of the measuring data list are:



Exports data from the measuring data list in EXCEL- or ASCII-Format



Prints table



Selects column title



Enters text for output



Exits measuring data list

Editing Column Heading in the Measuring Data List

Press the button **Column Heading** in the tool bar of the **measuring data list** to choose from the displayed column headings. Activate or deactivate the corresponding headings with the left mouse button.

The screenshot shows the 'Measuring Data List' window with a toolbar and a data table. A dialog box is open over the table, allowing the user to select which column headings to display. The table contains 17 rows of data with columns for 'Druck R2', 'R2.51 D//Temperat', 'R2.75 D//Druck R2', and 'R2'. The dialog box has three checked options: 'Device Address and Channel Number', 'Sensor Type and Unit', and 'Comment'. There is also an unchecked option with a yellow icon.

	Druck R2	R2.51 D//Temperat	R2.75 D//Druck R2	R2
	0mA Pa	PT 100 °C	Current 4..20mA Pa	
	4..20mA	PT 100	Current 4..20mA	
	3,7	21,1	6,1	
	3,6	21,2	6,2	
	3,6	21,2	6,3	
4	3,7	21,2	6,1	
5	3,7	21,2	6,0	
6	3,7	21,1	6,2	
7	3,6	21,1	6,2	
8	3,6	21,2	6,2	
9	3,7	21,2	6,0	
10	3,7	21,1	6,2	
11	3,6	21,1	6,3	
12	3,6	21,1	6,3	
13	3,6	21,1	6,2	
14	3,6	21,1	6,0	
15	3,7	21,1	6,2	
16	3,8	21,1	6,1	

Note: To modify the displayed **Column Width** in the table, point the mouse at the border of the column and move the column border with the pressed left mouse button to your desired width.

Data Entry for the Documentation of the Measuring Data List

To enter **data for the documentation of the output of the measuring data list**, press the data entry button. A dialog box appears where you may enter the heading or title of the list and other additional information. If the option user-defined heading is active, this information will then be printed out.

Documentation of the Measuring Data List for Printouts.

Text for Printouts:

Heading:

Information:

Print user defined Headings

OK

Cancel

Exporting Data from the Measuring Data List

To **export data from the measuring data list**, press the export button and select your desired export format. Enter in the text box the directory and the file name. At present export formats available are EXCEL- and ASCII-Format.

Measuring Data List

No.	Date/Time	R2.51 D//Druck R2 Current 4..20mA Pa	R2.51 D//Temperat PT 100 °C	R2.75 D//Druck R2 Current 4..20mA Pa	R2.75 D//Ten PT
1	10.03.2003 00:00:00				
2	10.03.2003 00:01:00	3,7	21,1	6,1	
3	10.03.2003				
4	10.03.2003				
5	10.03.2003				
6	10.03.2003				
7	10.03.2003				
8	10.03.2003				
9	10.03.2003				
10	10.03.2003				
11	10.03.2003				
12	10.03.2003				
13	10.03.2003				
14	10.03.2003				
15	10.03.2003				
16	10.03.2003				
17	10.03.2003				
18	10.03.2003 00:17:00				
19	10.03.2003 00:18:00				
20	10.03.2003 00:19:00				

Datei speichern unter

Speichern Export

Dateiname:

Dateityp: Microsoft Excel 5.0 (*.XLS)

Speichern Abbrechen

Extended Functions of the Measuring Data List (Option EMWL)

The measuring data list can be optionally delivered with additional functions.

- Measuring value display ON/OFF (row-wise, column-wise, individually)
- Measuring value process manually, individually
- Measuring value recalculate automatically (row-wise, column-wise, individually)

No.	Date/Time	R2.51 D//Druck R2 Current 4..20mA Pa	R2.51 D//Temperat PT 100 °C	R2.75 D//Druck R2 Current 4..20mA Pa	R2.75 D//Terr PT
1	10.03.2003 00:00:00	3,7	21,1	6,1	
2	10.03.2003 00:01:00				
3	10.03.2003 00:02:00				
4	10.03.2003 00:03:00				
5	10.03.2003 00:04:00				
6	10.03.2003 00:05:00	3,8	21,2	6,2	
7	10.03.2003 00:06:00				
8	10.03.2003 00:07:00				
9	10.03.2003 00:08:00				
10	10.03.2003 00:09:00				
11	10.03.2003 00:10:00		21,2	6,3	
12	10.03.2003 00:11:00				
13	10.03.2003 00:12:00				
14	10.03.2003 00:13:00				
15	10.03.2003 00:14:00				
16	10.03.2003 00:15:00	3,7	21,2	6,1	
17	10.03.2003 00:16:00				
18	10.03.2003 00:17:00				
19	10.03.2003 00:18:00				
20	10.03.2003 00:19:00				

The additional functions may be activated via buttons in the tool bar. The functions of these buttons are:



Measuring value display ON



Measuring values display OFF



Measuring value recalculate

Activate/deactivate Measuring values

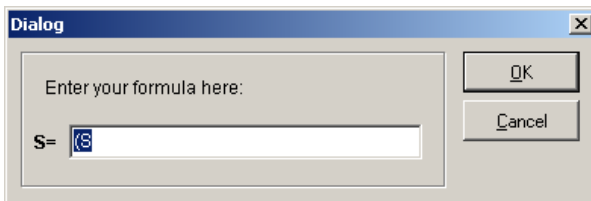
- If you wish to **activate/deactivate** your measurement series **row-wise**, click with the left mouse button the corresponding row in the field number or date. The measuring values of the chosen row will be colored red. Press the corresponding button for deactivating in the tool bar. The measuring values are then turned OFF and are colored yellow. To turn ON the values again which were previously turned OFF, mark the corresponding measuring values and then press the turn ON button.
- If you wish to **activate/deactivate** your measurement series **column-wise**, click with the left mouse button the corresponding column in the column heading. The measuring values of the chosen column will be colored red. Press the corresponding button for deactivating in the tool bar. The measuring values are then turned OFF and are colored yellow. To turn ON the values again which were previously turned OFF, mark the corresponding measuring values and then press the turn ON button.
- If you wish to **activate/deactivate single values**, double click with the left mouse button the corresponding value. The measuring value is then turned OFF and colored yellow. Double clicking the measuring value again will turn the value ON.
- To **activate/deactivate the whole table**, click with the left mouse button the upper left area of the table and then press the corresponding buttons.

Manual processing of a single measuring values

- To **modify single values in the measuring data list**, click a value with the left mouse button twice. Then you may directly overwrite the value. You may also activate here a processing menu with the right mouse button.

Recalculate measuring values automatically

- To **recalculate data in the measuring data list**, click the corresponding row or column or the single value with the left mouse button once. Then select the button for the recalculation. A dialog box appears for the formula entry.
- Enter here your formula. The **actual measuring value is predefined with S** and must be contained in the formula, if you want to modify the value. For the correct formulation and entry of the formula, please refer to the chapter formula entry in this manual.

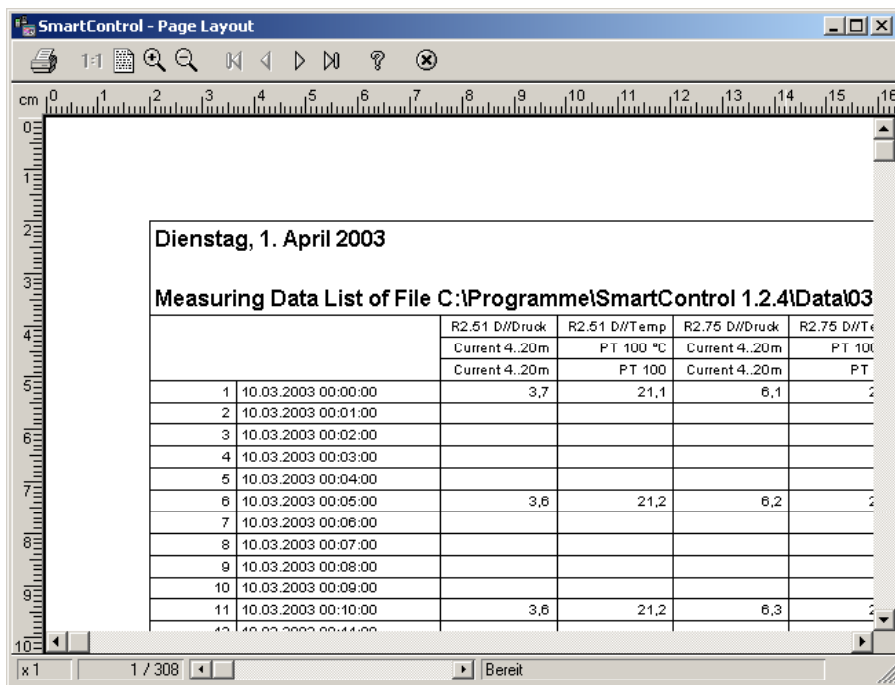


Printing Measuring Data List

Press the button **Print Table** to print the displayed measuring data list as a table. This hint box appears.



Finally an evaluation view opens where you may print your table.



The screenshot shows the "SmartControl - Page Layout" window. It features a ruler at the top and left. The main content area displays a table of measuring data for "Dienstag, 1. April 2003". The table title is "Measuring Data List of File C:\Programme\SmartControl 1.2.4\Data\03". The table has columns for time, current, and temperature. The status bar at the bottom shows "x1", "1 / 308", and "Bereit".

Dienstag, 1. April 2003		R2.51 D/Druck	R2.51 D/Temp	R2.75 D/Druck	R2.75 D/T
Measuring Data List of File C:\Programme\SmartControl 1.2.4\Data\03		Current 4..20m	PT 100 °C	Current 4..20m	PT 100
		Current 4..20m	PT 100	Current 4..20m	PT
1	10.03.2003 00:00:00	3,7	21,1	6,1	2
2	10.03.2003 00:01:00				
3	10.03.2003 00:02:00				
4	10.03.2003 00:03:00				
5	10.03.2003 00:04:00				
6	10.03.2003 00:05:00	3,8	21,2	6,2	2
7	10.03.2003 00:06:00				
8	10.03.2003 00:07:00				
9	10.03.2003 00:08:00				
10	10.03.2003 00:09:00				
11	10.03.2003 00:10:00	3,8	21,2	6,3	2
12	10.03.2003 00:11:00				

The Functions of the Measurement Data List during Measurement Operation (Trend Display)

In the following the functions of the measurement data list **during the measuring process** (trend display) are described.

In all measurement data lists, the actual **measuring values are inserted online at the end of the table**. The program determines automatically per channel the highest and lowest value and the average value of all measuring values.

		R2.51 D//Druck R2	R2.51 D//Temperat	R2.75 D//Druck R2	R2.75 D//Terr
		Current 4..20mA Pa	PT 100 °C	Current 4..20mA Pa	PT
No.	Date/Time	Current 4..20mA	PT 100	Current 4..20mA	
1423	10.03.2003 23:43:00				
1424	10.03.2003 23:44:00				
1425	10.03.2003 23:45:00	3,6	21,2	6,2	
1426	10.03.2003 23:46:00				
1427	10.03.2003 23:47:00				
1428	10.03.2003 23:48:00				
1429	10.03.2003 23:49:00				
1430	10.03.2003 23:50:00	3,5	21,2	6,4	
1431	10.03.2003 23:51:00				
1432	10.03.2003 23:52:00				
1433	10.03.2003 23:53:00				
1434	10.03.2003 23:54:00				
1435	10.03.2003 23:55:00	3,6	21,2	6,2	
1436	10.03.2003 23:56:00				
1437	10.03.2003 23:57:00				
1438	10.03.2003 23:58:00				
1439	10.03.2003 23:59:00				
	Min	1,1	21,1	4,2	
	Max	4,5	21,6	7,8	
	Mean	3,5	21,3	6,2	

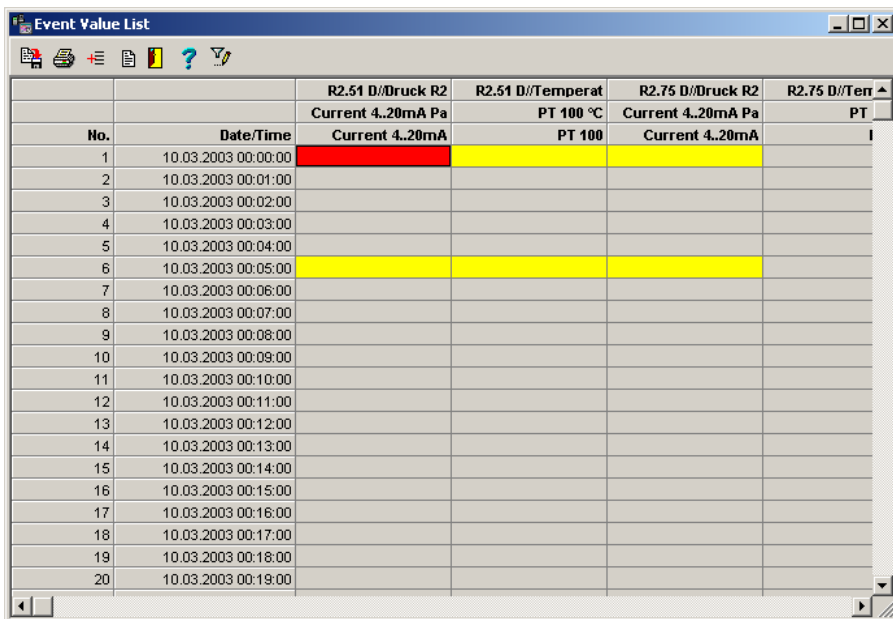
If the measuring value exceeds the **upper limiting value** list the text color will turn into red, if the value remain remains below the **lower limiting value** the text color is blue. If there is no limiting value violation the measuring values are black. If a **sensor rupture** occurred the program enters a dash in the measurement data list.

The Event List

The global Event list

The program displays in the global event list only the measuring data where an event occurred (limit value violation, sensor rupture). All measuring points with normal values are displayed off, so that you may obtain a quick overview about the time, the event occurred.

Select in the main menu **Diagrams** the item **Global Event List**, to display this overview. The measuring values are sorted according to the **absolute time relation** (date and time).



The screenshot shows a window titled "Event Value List" with a toolbar containing icons for print, add, save, help, and undo. The table below displays event data with columns for No., Date/Time, and various sensor readings. Row 6 is highlighted in yellow, and row 1 is highlighted in red.

No.	Date/Time	R2.51 D//Druck R2 Current 4..20mA Pa	R2.51 D//Temperat PT 100 °C	R2.75 D//Druck R2 Current 4..20mA Pa	R2.75 D//Tern PT
1	10.03.2003 00:00:00				
2	10.03.2003 00:01:00				
3	10.03.2003 00:02:00				
4	10.03.2003 00:03:00				
5	10.03.2003 00:04:00				
6	10.03.2003 00:05:00				
7	10.03.2003 00:06:00				
8	10.03.2003 00:07:00				
9	10.03.2003 00:08:00				
10	10.03.2003 00:09:00				
11	10.03.2003 00:10:00				
12	10.03.2003 00:11:00				
13	10.03.2003 00:12:00				
14	10.03.2003 00:13:00				
15	10.03.2003 00:14:00				
16	10.03.2003 00:15:00				
17	10.03.2003 00:16:00				
18	10.03.2003 00:17:00				
19	10.03.2003 00:18:00				
20	10.03.2003 00:19:00				

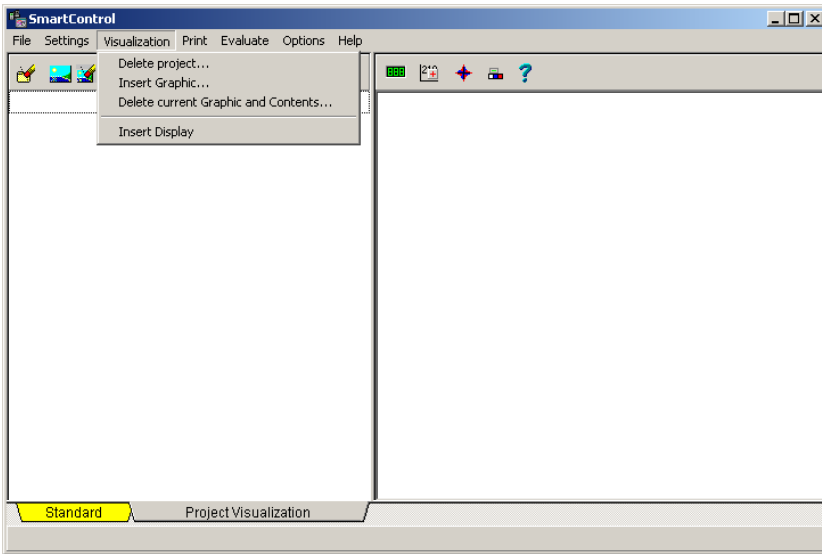








with this button in the toolbar, you may as well activate the **global Event List**.

The Project Visualization (Option PROVISU)

The Project Overview

For the visualization of measuring tasks, the program offers you the possibility to structure your measurement setup with graphic files in bitmap-Format (suffix *.BMP). To use this function go to the register **Project Visualization**. The display switches over and in the menu bar the menu visualization appears. Here you may choose your graphic and the measuring points with digital display to be shown in the project overview.



-  Delete Project
-  Insert Graphic
-  Delete current graphic and contents
-  Insert Display
-  Insert text with extended functions
-  Activates help

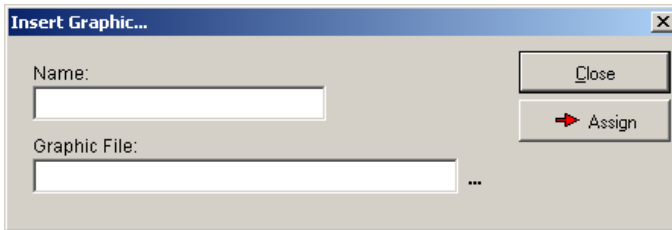
Insert Graphic

First step is to choose the menu item **Insert graphic** or press the button

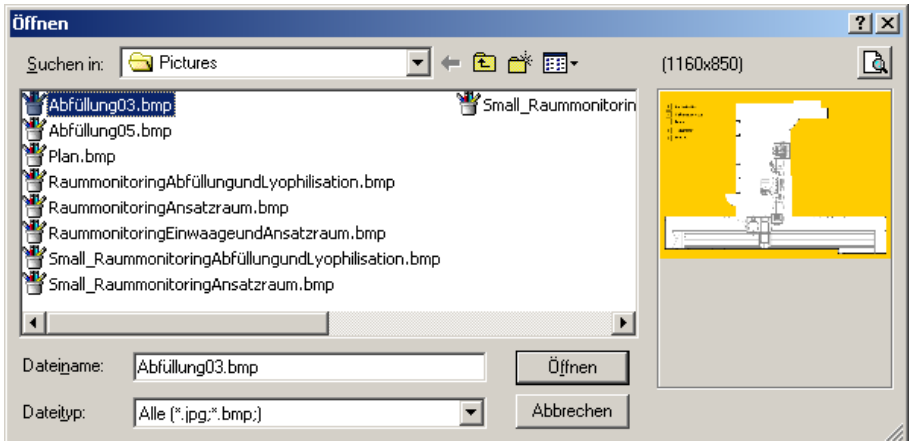


Insert Graphic

The following dialog-box appears. Enter in the field **Name** the name under which this equipment is to be administrated. This name appears in the structure tree of the display and cannot be modified anymore.

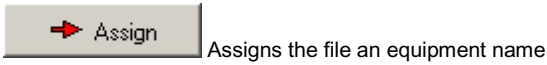


The button **...** opens the selection box. Here you may choose your graphic file in JPEG- or in Windows Bitmap-Format (*.jpg, *.bmp).



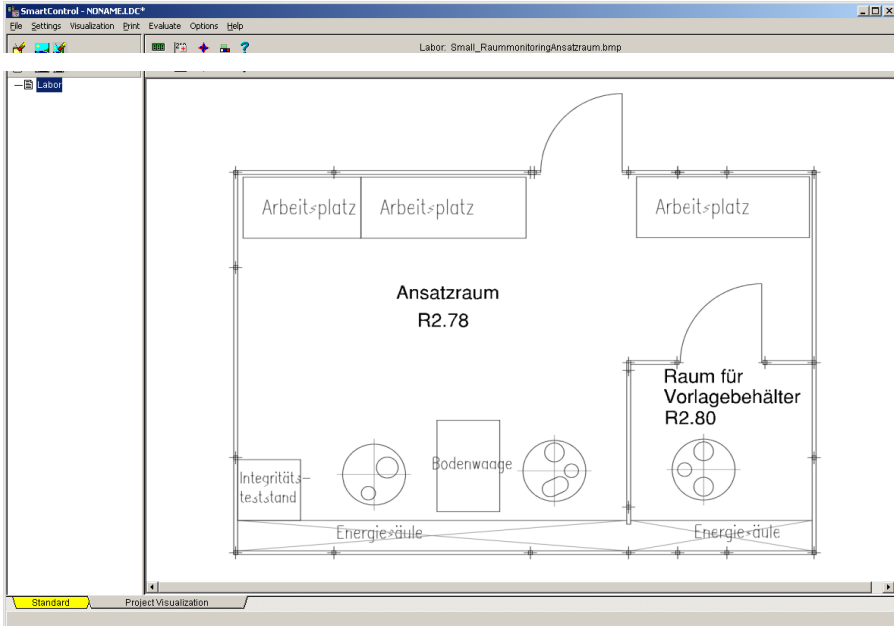
The pictures are shown on their front view.

Choose the desired file and assign the graphic an equipment name.



Assigns the file an equipment name

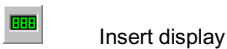
The graphic will be shown on the screen. The name of the equipment is shown at the left side in the structure tree.



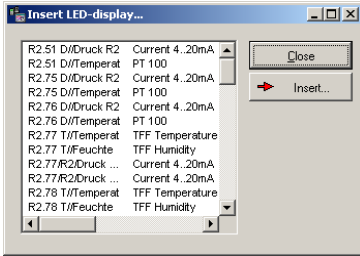
Note: If you delete equipment in the structure tree, no warning will appear. The equipment will be deleted immediately including graphic and the corresponding digital displays.

Insert display

After choosing the graphic for your equipment, you may now set the digital displays on each measuring point. Select here the button



A selection window opens for the channels of the current measurement configuration.



Choose the channel for the digital display. This will finally be inserted in your graphic.

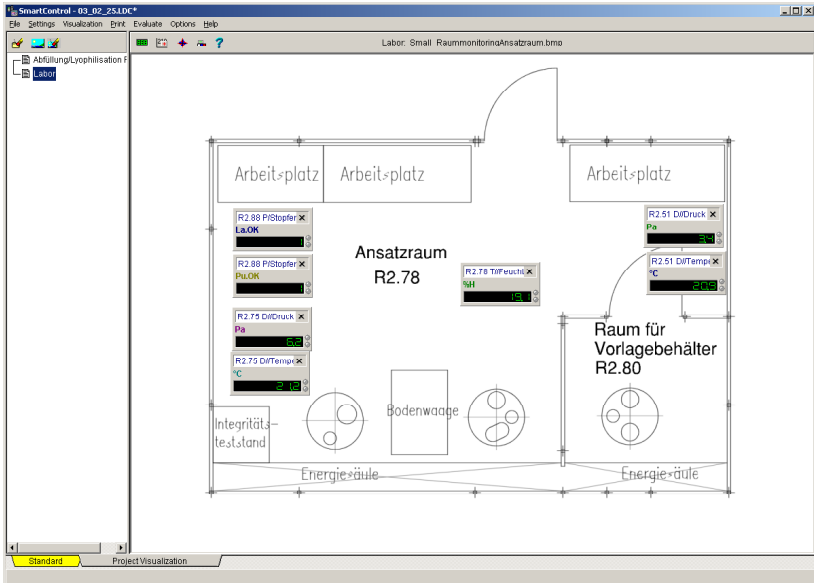


Insert a digital display

The measuring value will be inserted and shown digitally on the upper left of your graphic.



Drag the digital display with the pressed left mouse button at the desired place in the graphic. On online measurements the digital displays are permanently actualized.



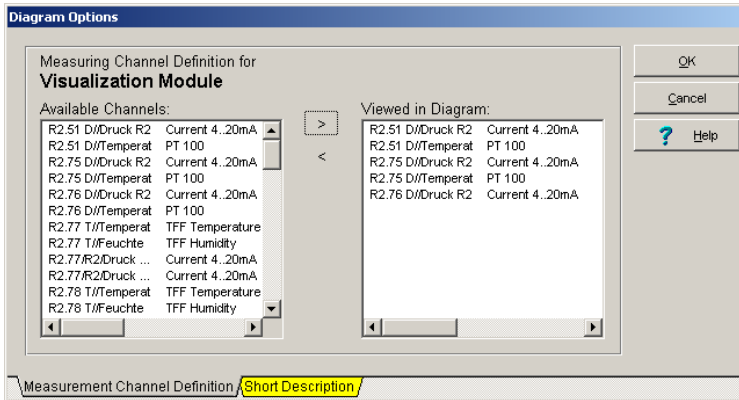
Insert text field

In addition or alternative to digital display, you may also insert **text field** with several channels and extended functions in the graphic. To do so please select the button

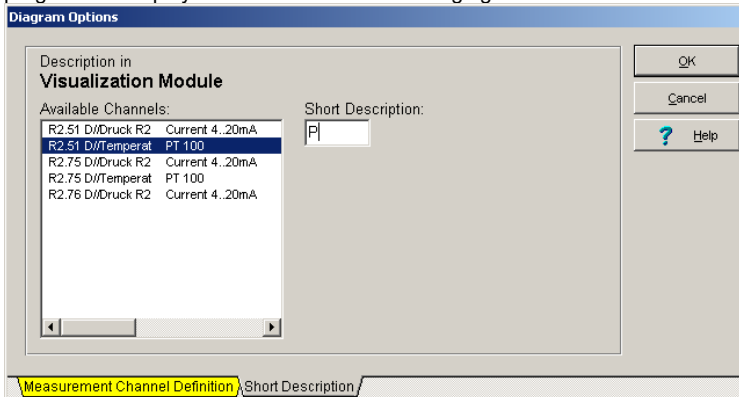


Insert text field with extended functions

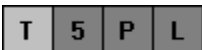
A selection box with channels of the actual measurement configuration opens up. Select the channels to be shown together in a text field with extended functions.



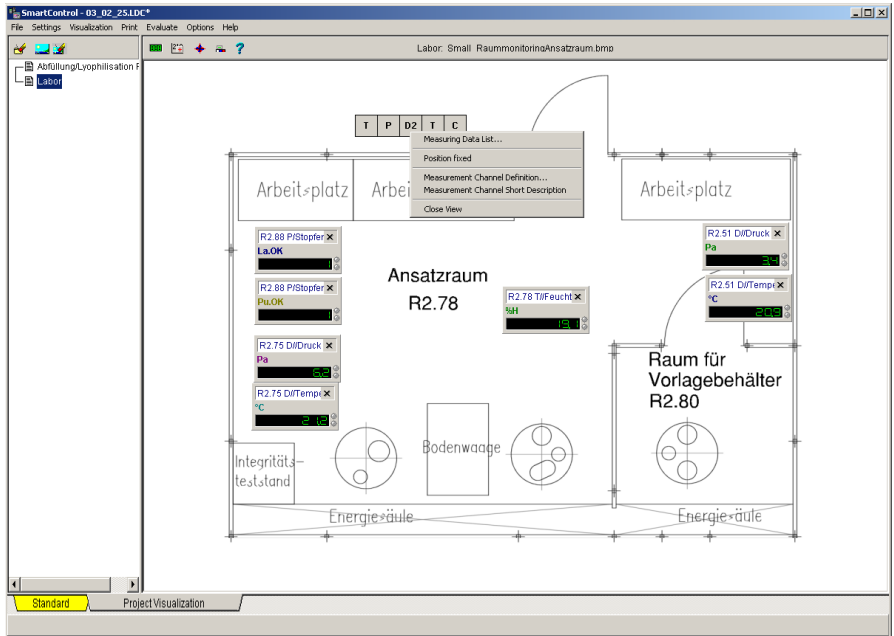
Then open the register **short description**, to enter the short description of the channels. The program will display the chosen channels belonging to the text field.



Assign for each channel a numerical or an alphabetical short description that should appear in the text field. After confirming with **OK**, the program transfers the text field in the graphic.



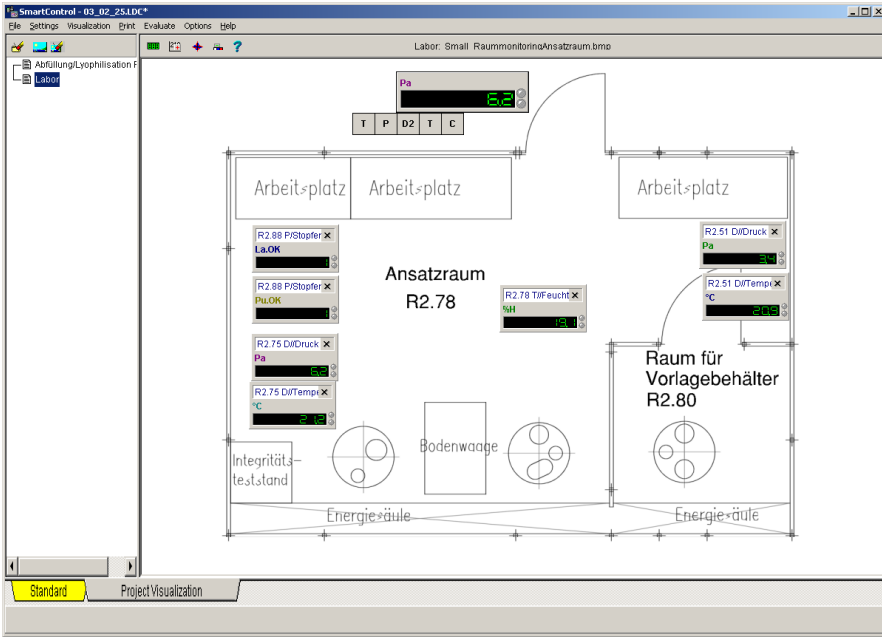
Drag the text field by holding the left mouse pressed to the desired location in the graphic.



With the right mouse, you may activate the menu **edit text field**. The following functions are available:

1. The function **measurement data list** activates the measuring data list. The list contains measuring data of the defined channels belonging to the text field.
2. The function **fix position** fix up the text field in the desired location in the graphic.
3. Through the function **measurement channel definition** the number of shown channels in the text field may be modified.
4. Through the function **measurement short description**, you may modify the shown short description belonging to the text field.
5. The functions **close view** delete the entire text field together with the defined channels.

A double click with the left mouse on a channel activates the corresponding digital display. To close the digital display again, click the display with the right mouse and then press the button **close view**.



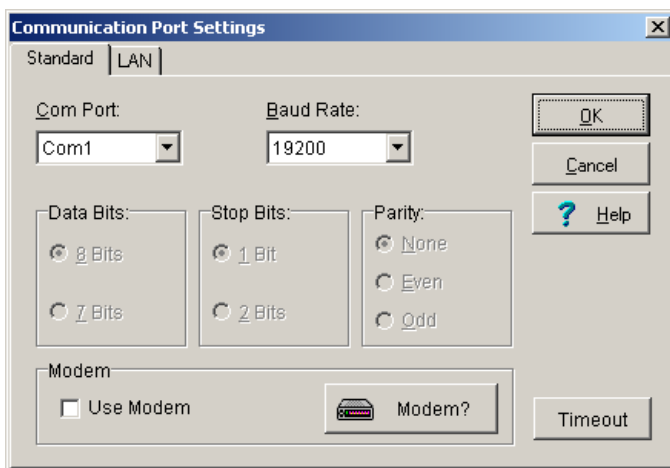
Hint: Text fields could be created several times to enable modifications in the channel grouping. The succession of the channel selection determines the succession of the display in the graphic from left to right.

The Data Transfer

Data Transfer with serial interface

For the data transfer between program and measuring devices, you may establish a direct connection via the serial interface RS232.

Select in the main menu **Settings** the command **Communication port** to set your serial RS232-communication port parameters for the connection between computer and devices. Here you may choose between direct communication or communication via modems.



The standard settings of the program for direct connection are:

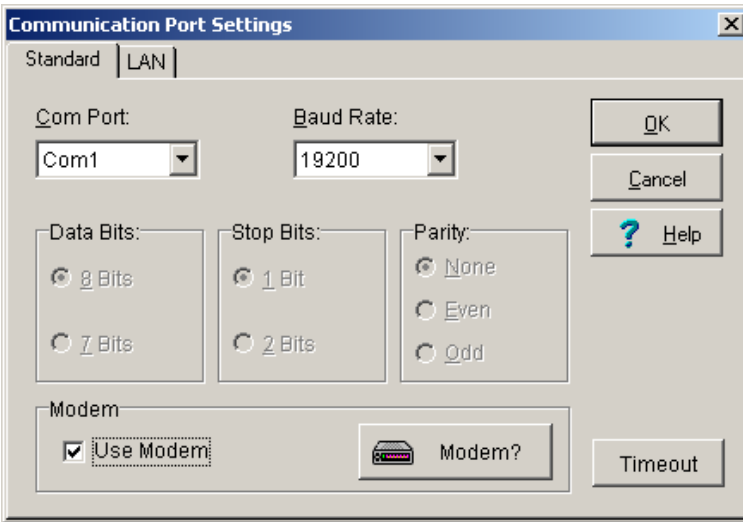
Interface:	Com2
Baud Rate:	19.200 Baud
Data Bits:	8 Bits (not editable)
Stop Bits:	1 Bit (not editable)
Parity:	None (not editable)

Note: The program settings and the settings of the measuring device interface must be exactly the same otherwise communication is not possible!

Data Transfer with Modem

For the data transfer between program and measuring devices, you may establish a remote connection with a modem, which is to be connected to a serial interface RS232.

If you want to choose a modem for communication between Computer and measuring devices, please check mark the field **Use modem** and enter the corresponding parameters via the button Modem. The program establishes a connection anytime of an access to the serial interface. The subscriber may be chosen from the program internal **Phone book**. In case no modem is available at the corresponding communication port, the dialing will be discontinued with an error message.



Hint: The data transfer with a **Baud rate of 19200 bit/s** is pre-set for **Standard-Modems**. Other transfer rates may lead to problems in the data transferring and are not recommended for standard modems. However if you want to use **GSM-modem**, you must set the **Baud rate to 9600 bit/s**.

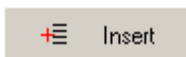
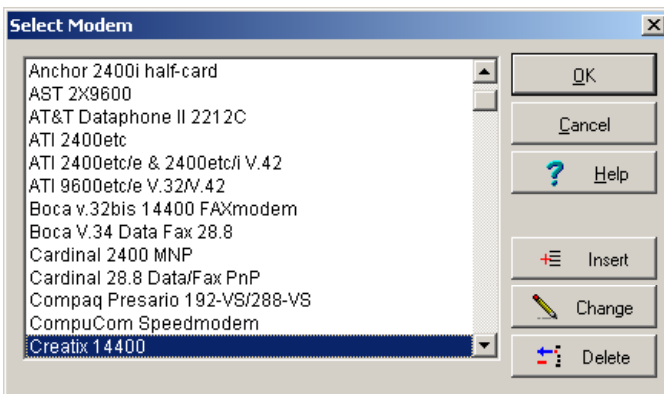
The program settings and the measuring device settings must be exactly the same to establish a data connection!

Modem at Computer

For the data transfer between computer and measuring devices a modem may be used. Connect the modem to your computer and select in the main menu **Settings** the command **Modem Settings**, to choose your modem and to define the corresponding data transfer parameters. The **List** contains common modem types. You may however add more modem types anytime.



Opens a list of modems to select from.



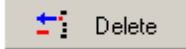
Insert

Adds a new modem.



Change

Changes settings of available modems.



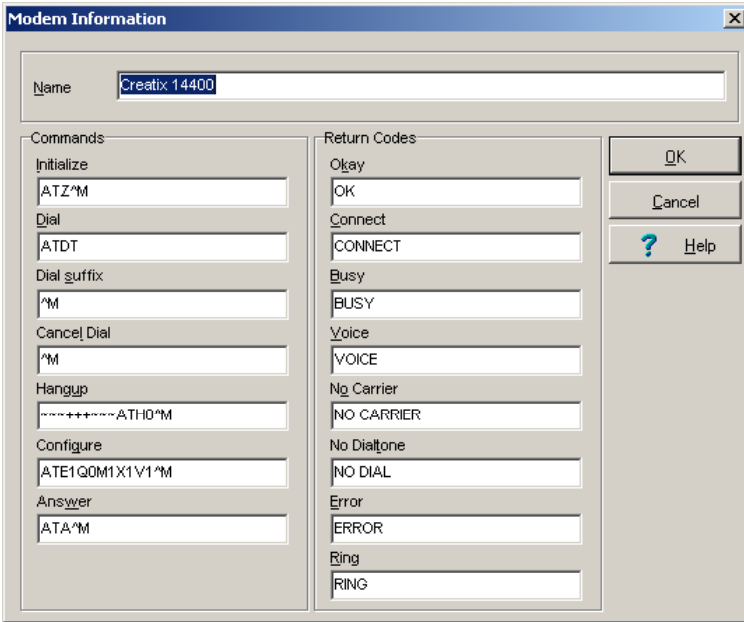
Delete

Deletes selected modem.

Note: In the **Communication Port Settings** the option **Use Modem** must be active to realize data connection using the modem line!

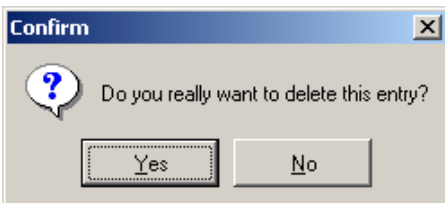
Clicking the button **Change** in the dialog box for selecting modems, the dialog box will be opened. You may modify here your modem settings.

Clicking the button **Insert** will turn all entry fields empty. Enter first a modem name and then press OK to close. The program will set standard values, which are compatible to Hayes-modem. Modify the commands if necessary according to your modem manual.



Attention: The command to be entered here for disconnecting your modem must be exactly the same as stated in your modem manual, otherwise it may happen that the program sends the disconnecting command to the modem, but the line is still active after terminating the modem connection. In case this happens, please check if your modem terminates the connection by deactivating the DTR-line. If yes, enter here the command DTR.

Confirm this security check to finally **delete** a modem type.



Modem at Remote Measuring Device

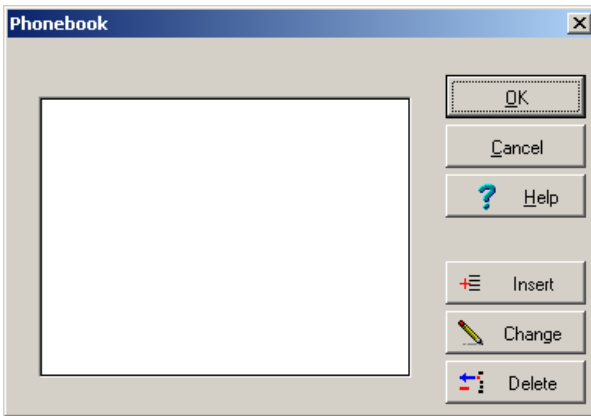
To be able to communicate through distance query with the OPUS-measuring devices, devices at the local station must be connected to a modem. For the modem you may use the following devices:

- Standard-Modem
- GSM-Modem

The modem settings are done in the **OPUS-configuration** and are described in the corresponding chapter of this manual.

Phone Book

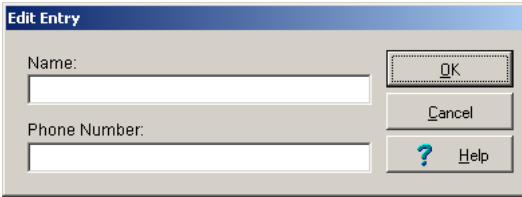
By clicking the **phone book** in the main menu **Settings**, the dialog box as shown appears. Here you may enter the phone numbers, which may be automatically dialed by the program.



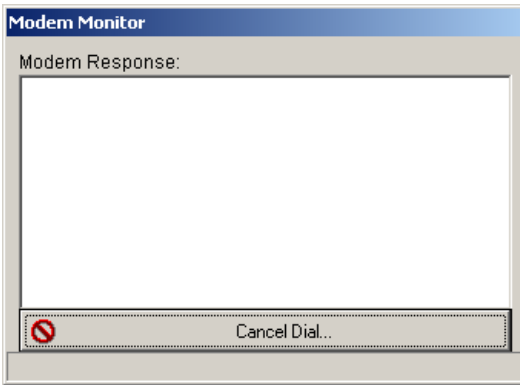
For **automatic calling of a subscriber** from the phone book the option **Use Modem** must be activated in the Communication port settings.

	Insert	Adds name of a subscriber
	Change	Changes the subscriber data
	Delete	Deletes the marked subscriber

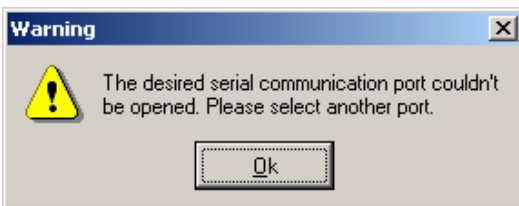
Click the buttons **add or change** to open the edit entry box as shown. You may enter and change here the name and phone number of a subscriber. A warning appears before a subscriber will be finally **deleted**.



After selecting the desired subscriber from the phone book the communication via Modem will be supervised by **Modem-Monitor**.



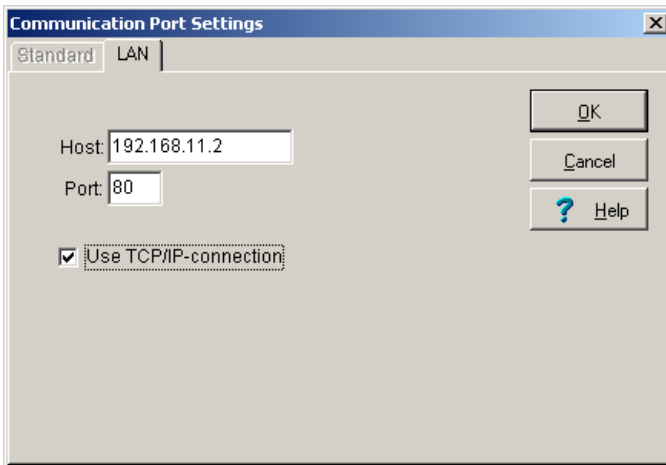
A warning appears if no communication could be set up during the **remaining dial time**.



Data Transfer with Network and TCP/IP (Option AL-EMAIL)

For the data transfer between program and measuring devices, a remote connection may be established using network and the TCP/IP – protocol.

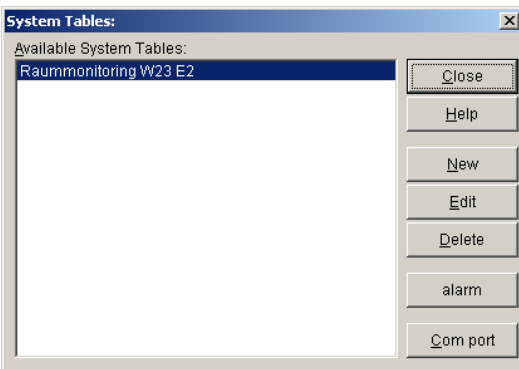
If you want to use a network with the TCP/IP – protocol for the data transfer between your computer and measuring devices, activate the field **LAN** and set the corresponding parameters of the network connection. The program scans the entire network automatically and establishes the connection to the subscribers. If no network access is available, the dialing will be cancelled with an error message.



The Measurement Configuration

Measurement Setup

In the **measurement setup** you may define your new system table or edit an existing one. A **system table** covers under a unique definition at least one OPUS-measuring device or several OPUS-measuring devices in a network with its connected sensors and defined processing functions for the measurement values. All measuring devices are listed in the device table; its sensors and formulas are in the channel list. Select in main menu **Settings** the command **Measurement Setup**, to create a new system table or to edit an existing one. An overview mask with the system table will appear.



The buttons of the overview mask mean:

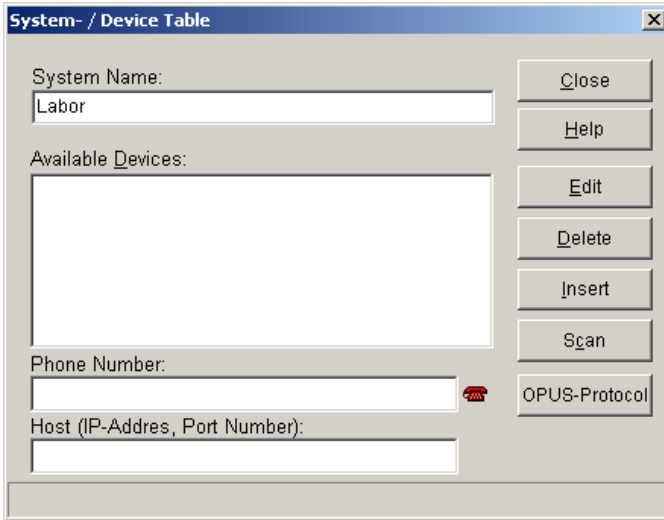
<u>C</u> lose	Closes the mask of the system table
<u>H</u> elp	Activates help of the system table
<u>N</u> ew	Creates a new system table
<u>E</u> dit	Edits an existing system table
<u>D</u> elete	Deletes an existing system table
alarm	Suppresses alarm window
<u>C</u> om port	Enters interface parameters

Create New System Table

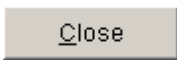
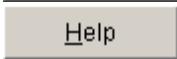


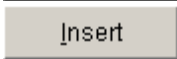
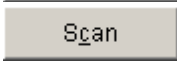
Select in the overview mask of the system table the button



, to create a **new system table**. A device table will appear for the listing of devices of a measuring system, which may consist of one or several OPUS measuring devices.

A dialog box titled "System- / Device Table" with a close button (X) in the top right corner. It contains several input fields and buttons. The "System Name:" field contains the text "Labor". The "Available Devices:" field is empty. The "Phone Number:" field is empty and has a small red telephone icon to its right. The "Host (IP-Address, Port Number):" field is empty. On the right side, there is a vertical stack of buttons: "Close", "Help", "Edit", "Delete", "Insert", "Scan", and "OPUS-Protocol".

The buttons in the entry mask mean:

	Closes the device table
	Activates help of the device table
	Activates the OPUS-Configuration
	Deletes OPUS-device
	Inserts OPUS-device
	Scans OPUS-Network



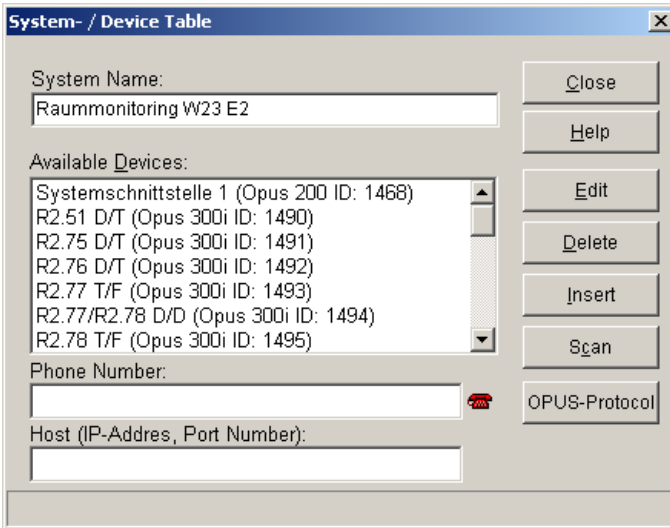
Activates the phone book

Scan Device

First of all, enter in the field **system name** the name for the new system table. Then press the button

The image shows a rectangular button with the word "Scan" in a serif font, centered within the button.

to scan the network for available devices. The **available devices** will be listed first and then subsequently manage in a device pool at the background .

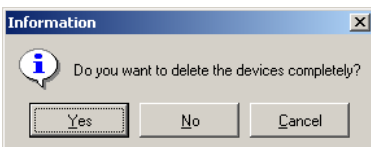
The image shows a dialog box titled "System- / Device Table". It has a "System Name:" field containing "Raummonitoring W23 E2". Below it is a list of "Available Devices" with entries like "Systemschnittstelle 1 (Opus 200 ID: 1468)", "R2.51 D/T (Opus 300i ID: 1490)", etc. To the right of the list are buttons for "Close", "Help", "Edit", "Delete", "Insert", "Scan", and "OPUS-Protocol". At the bottom, there are fields for "Phone Number:" and "Host (IP-Adress, Port Number):".

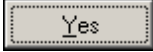
Finally, you have the possibility to delete unnecessary devices in your measuring system or to insert necessary ones from your device pool at the background.

Remove Devices

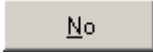
The image shows a rectangular button with the word "Delete" in a serif font, centered within the button.

To remove one or several devices from your measuring system, mark them out in your list of available devices and then select the button **Delete**. An information box appears, where you may choose how to delete the marked out devices.

The image shows an "Information" dialog box with a question mark icon and the text "Do you want to delete the devices completely?". Below the text are three buttons: "Yes", "No", and "Cancel".

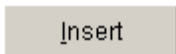


Choose "Yes", to delete the device from your **measuring system and from your device pool at the background**. This device is no longer available for other measuring systems.



Choose "No", to delete the device from your **measuring system only**. The device remains in the device pool at the background and is available still for other measuring systems.

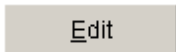
Insert Device



To insert one or several devices from your device pool at the background into your measuring system, select the button **insert**. The program will then insert all available measuring devices from the device pool into the measuring system.

Note: Some devices that are not supposed to be inserted are deleted as well in the device pool at the background. You may insert them again into your device pool easily by rescanning.

Edit Device



To edit the settings of a device, select the button **edit**. The program will activate the **OPUS-Configuration**. For detail information please refer to the corresponding chapter in this manual.

Assign Phone Number

For the remote query of measuring devices at different locations, you may assign phone number to each of your system table of your measuring system. This number will be dialed if a modem connection to the location of the measuring devices is being established.

Enter in the field **phone number** the corresponding phone number into the system table. The button



Activates the phone book. Here you may comfortably dial the phone number per mouse click.

Edit System Table

Choose in the overview mask of the system table the button


Edit

to edit an existing system table. A device table with listing of devices of the selected measuring system appears.

System- / Device Table

System Name:
Raummonitoring W23 E2

Available Devices:
Systemschnittstelle 1 (Opus 200 ID: 1468)
R2.51 D/T (Opus 300i ID: 1490)
R2.75 D/T (Opus 300i ID: 1491)
R2.76 D/T (Opus 300i ID: 1492)
R2.77 T/F (Opus 300i ID: 1493)
R2.77/R2.78 D/D (Opus 300i ID: 1494)
R2.78 T/F (Opus 300i ID: 1495)

Phone Number: 

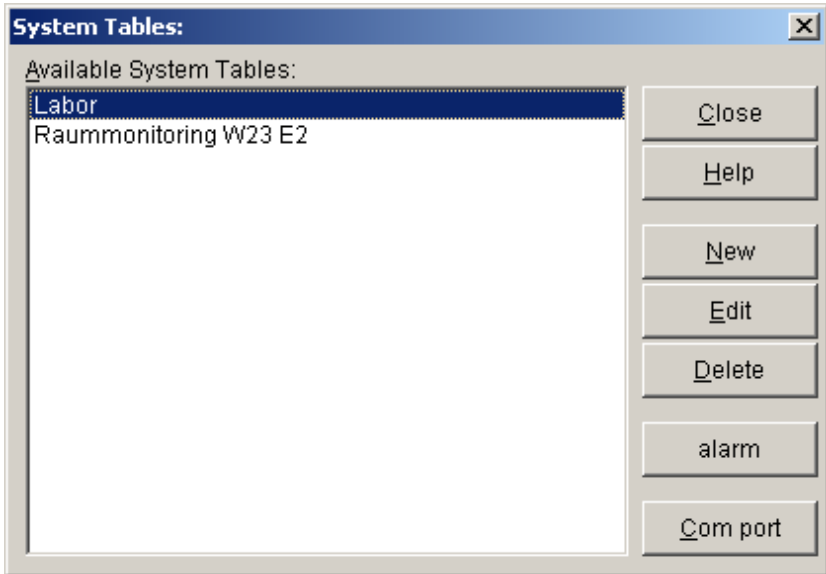
Host (IP-Adress, Port Number):

Buttons: Close, Help, Edit, Delete, Insert, Scan, OPUS-Protocol

Further procedure corresponds to the steps of creating a new system table. Please refer to the corresponding chapter in this manual.

Delete System Table

Choose in the overview mask of the system table the button

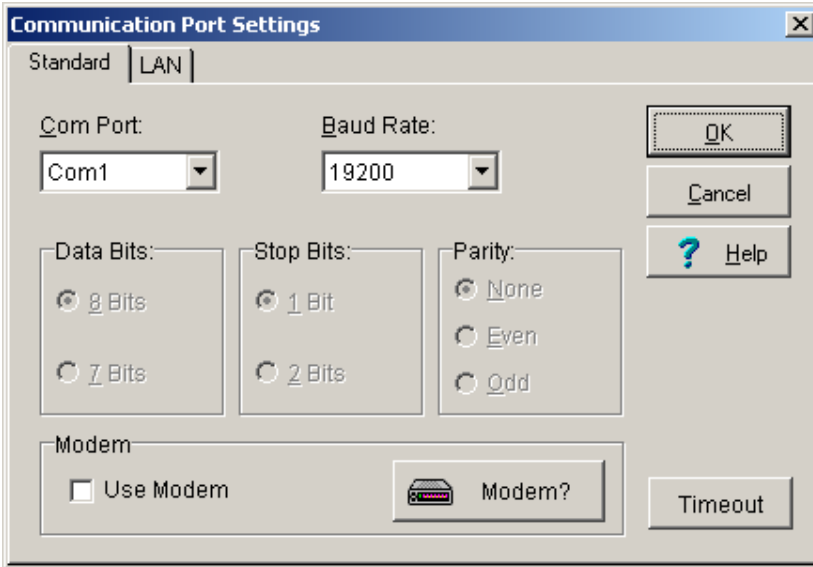


Note: The system table will be **deleted without further notice**. Deleting cannot be automatically cancelled. In case you have deleted your measuring system accidentally, you must enter your data again!

Interface

Choose in the overview mask of the system table the button

 to enter the **interface parameter** for the data transfer. A dialog box pops out:



Note: You may set the interface parameter via the main menu Setting and do the editing in the sub item interface. If you want to use the **remote query** of the system table via the phone number, you must choose the option Use Modem and set the modem accordingly.

OPUS-Configuration

In the measurement setup you may read the settings of each OPUS-measuring device, set new parameter and save it again in the measuring device.

To configure an OPUS-measuring device, first select in the main menu **settings** the sub item **measurement setup**. From there you will come to the overview mask of the system tables. Mark out the system table of your measuring system and choose the button **edit**. A device table opens up containing the OPUS-measuring devices connected to the measuring system.

Mark out OPUS-measuring devices in the device table, which you want to configure and select the button **edit**, to activate the mask for the configuration of the OPUS-measuring devices.

At present the following types of OPUS-measuring devices are available:

- OPUS 200 and OPUS 200i (2 Measuring Channels)
- OPUS 300 and OPUS 300i (2 Measuring Channels)
- OPUS 208 (8 Measuring Channels)
- OPUS 208 (8 Measuring Channels) with Particle Counter

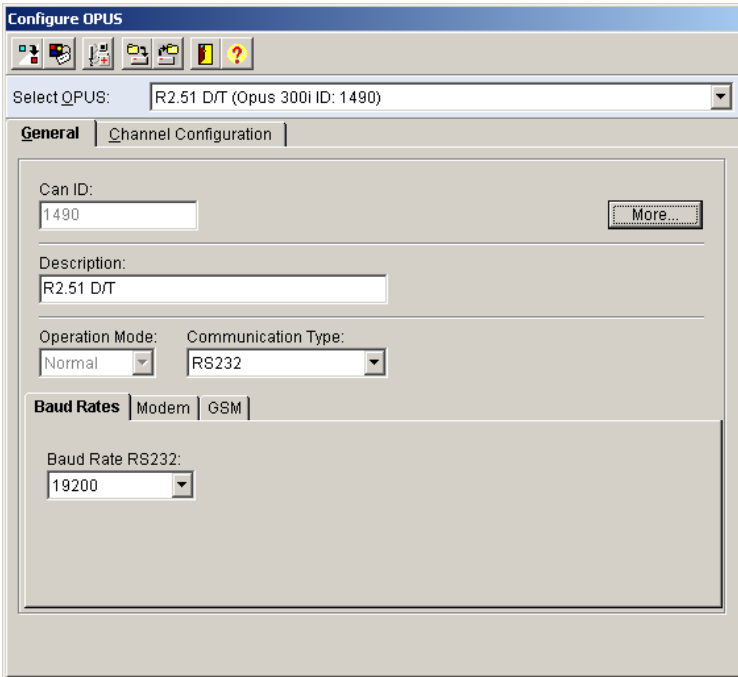
The measuring devices differ from each other in the technical parameters. The sequence for entering the parameter for the measuring devices is however almost the same.

The entry mask for the measuring devices OPUS 200, OPUS 200i, OPUS 300 and OPUS 300i are identical. The measuring device OPUS 208 is equipped with a higher number of entry parameters. This is the reason why the entry mask for this device differs from the other devices. In the following, the general sequence of the OPUS-Configuration is first described and then the difference between the two entry masks.

Sequence of the OPUS-Measuring Device-Configuration

For the configuration of an OPUS-measuring device, an entry mask is normally provided. The mask consist essentially of the following parts:

- OPUS-Selection with the possibility to configure each of the chosen system table
- General parameter for identification and description of the devices and also the settings of the device internal communication parameter
- Channel configuration with channel parameter, logging and relays parameter for the connected sensors of the measuring device



Via the **toolbar** you have the following selection possibility



- Copy the configuration from an existing OPUS-measuring device
- Program the current settings in the OPUS-measuring device
- Initialize user defined sensors
- Save current OPUS-Configuration
- Load saved OPUS-Configuration and program in the measuring device
- Close OPUS Configuration
- Help to OPUS Configuration

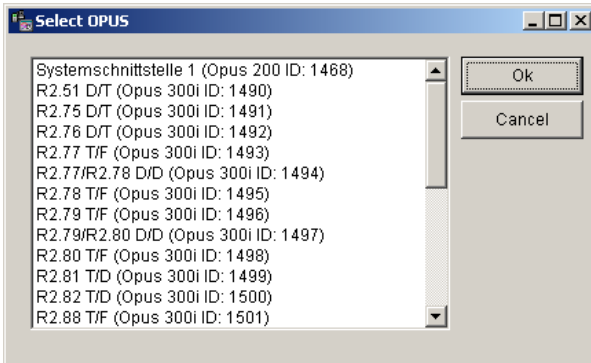
Copy OPUS-Configuration

To copy a configuration from an existing OPUS-measuring device in the currently shown device on the screen, select the button



Copy a configuration from an existing OPUS-measuring device.

The following selection box opens up. Mark out the OPUS-measuring device, whose configuration is to be copied to the current device and confirm your choice with OK.



The program transfers the settings from the chosen OPUS-measuring device into the entry mask and displays the parameter on the screen.

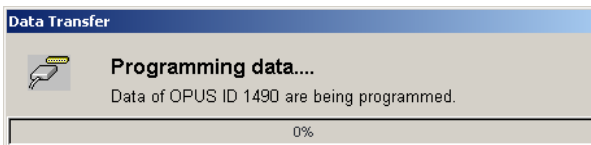
Program OPUS-Configuration

To program a modified configuration into the currently displayed measuring device on the screen, select the button



Programs the current settings into the OPUS-measuring device.

The program transfers the parameter into the measuring device. During data transfer the following message appears.



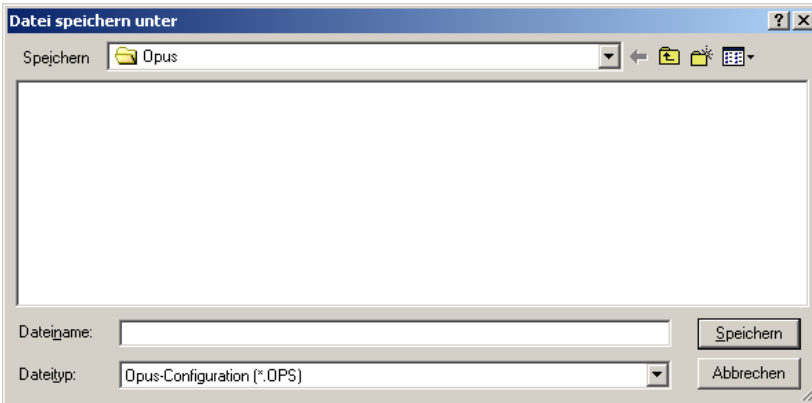
Save OPUS-Configuration

To save the currently displayed configuration on the screen for an OPUS-measuring device, select the button



Save the current OPUS-Configuration

A selection box for OPUS-configuration appears.



Enter here the name under which the current OPUS-measuring device configuration is to be saved. The files have the ending ***.ops and will be save in the path ...\opus**.

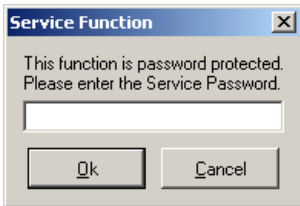
Load OPUS-Configuration

To load a saved configuration into the currently displayed OPUS-measuring device on the screen, select the button

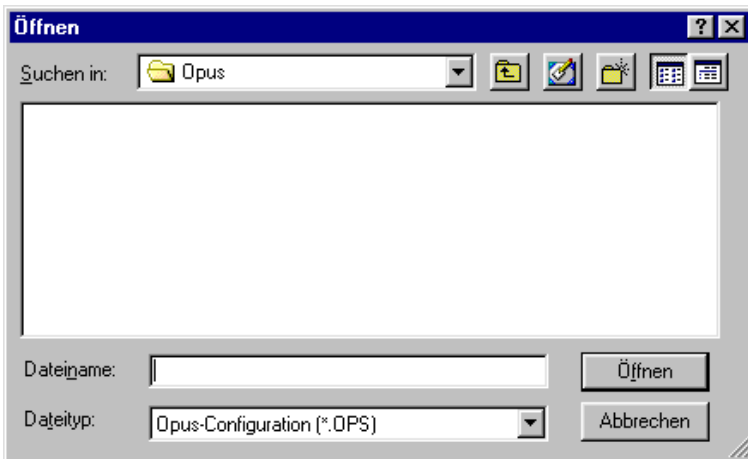


Load and program the saved OPUS-configuration

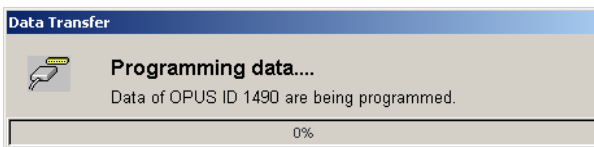
This function is system password protected and should be unlocked first.



After unlocking a selection box for saved OPUS-configuration opens up.



Choose here the configuration, which you want to load into the current OPUS-measuring device. A file with ending ***.ops** will open and will be loaded directly into the current OPUS-measuring device. During data transfer the following message appears.



General Parameter OPUS 200/200i and 300/300i


In the register card **general**, general parameters for the configuration of the measuring device series OPUS 200, OPUS 200i, OPUS 300 and OPUS 300i are listed.

The screenshot shows a software window titled 'General' with a sub-tab 'Channel Configuration'. It contains several input fields and dropdown menus:

- Can ID:** A text box containing '1490' and a 'More...' button to its right.
- Description:** A text box containing 'R2.51 D/T'.
- Operation Mode:** A dropdown menu set to 'Normal'.
- Communication Type:** A dropdown menu set to 'RS232'.
- Baud Rates:** A sub-tab containing a dropdown menu for 'Baud Rate RS232:' set to '19200'.

The fields **can ID** and **more** are purely information fields which could not be modified. The fields mean:

Can ID: Net work address of the respective devices

The button  **More...** activates additional information to the chosen measuring device. For the measuring device series OPUS 200i the parameters are as follows:

The screenshot shows a window titled 'Additional information' with a 'Close' button. It lists the following parameters:

- OPUS Type: Opus 300i
- Can ID: 1490
- Master ID: 3
- Current Number: 121
- Production (mmyy): 04/02
- Project number: 9904
- List of Parts: 5
- Wiring Scheme: 4
- Hardware Version: 1
- Software Version: 35
- E²-Version: 18

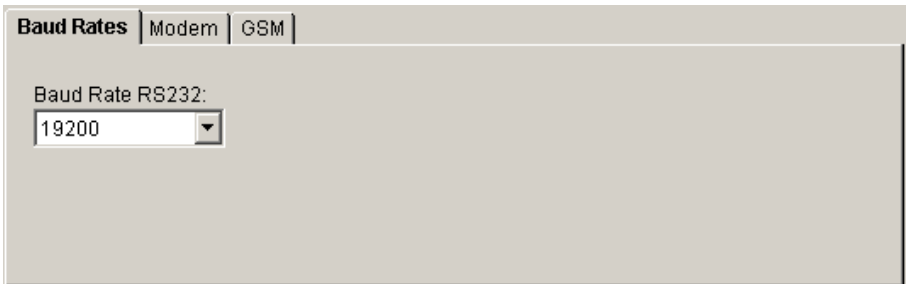
In the field **description** you may enter a new description to the OPUS device or modify an existing one.

The **operation mode** shows if an OPUS-measuring device is switched

- OFF
- Normal
- Sleep.

In the **communication type** you may decide through which transfer route the OPUS measuring device should communicate:

- RS232
- Modem
- GSM Modem



In the register card **baud rates** you may set the transfer rate for the RS232-interface with respect to the chosen transfer route in the communication type.

- 2400
- 4800
- 9600
- 14400
- 28800
- 57600
- 115200

Note: A data transfer with a **baud rate of 19200 bit/s** is predefined for use in **Standard-Modems**. Other transfer rates may lead to problems in the data transfer and are not recommended for standard modems. If you however want to use a **GSM-Modem**, you may at present use a **baud rate of 9600 bit/s**. **The settings of the measuring devices must be exactly identical with the program so that a data connection could be established!**

If you have chosen **modem** in the communication type, you may set here the parameters:

- Init-String for initialization
- End-String to end up the modem connection

Baud Rates	Modem	GSM
Initial String:		
<input type="text" value="ATS0=1E0&W"/>		
End String:		
<input type="text" value="ATH"/>		

Predefined are values of a standard-modem. The entries means:

- S0=1: automatic lifting of phone receiver after 1 ring
- E0: echo OFF
- &W: saving of the settings in the default-profile (for Modem-Reset)
- ATH: replace phone receiver

If you have chosen in the communication type **GSM-modem**, you may enter the pre-settings for use in the mobile radio network

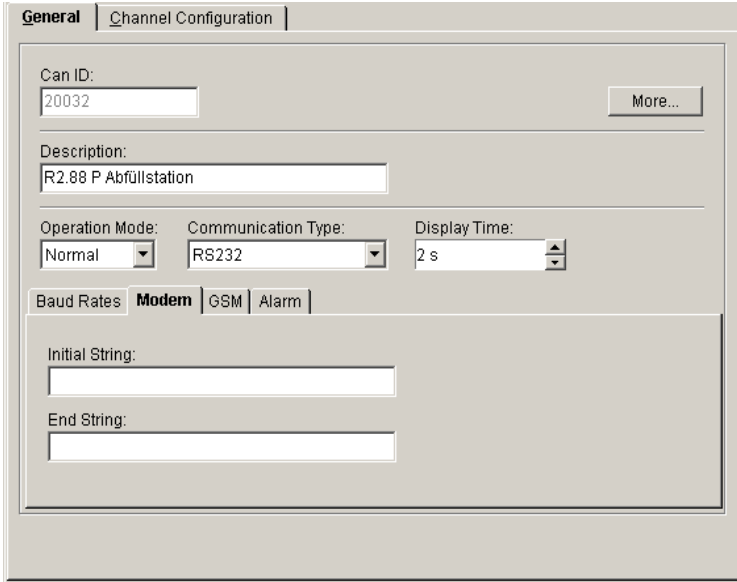
- Pin code, to activate device
- Query interval in minutes

Baud Rates	Modem	GSM
Pin Code:		Query Interval
<input type="text" value="0"/>		<input type="text" value="0"/>

Note: The **query interval** determines the period when the measuring device regularly checks if the GSM-modem is still booked in the radio network and if necessary do the reconnection to the net. You should in any case enter a value, because a modem behaves passive and in case of radio connection failure you cannot do remote dialing from the software

General Parameter OPUS 208

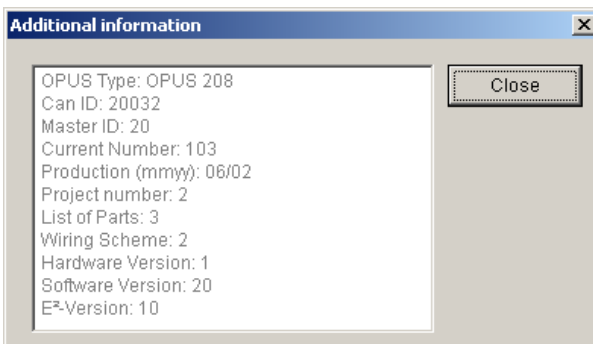
In the register card **general**, general parameters for the configuration of the measuring device series OPUS 208 are listed.



The fields **can ID** and **more** are purely information fields, which could not be modified. The fields mean:

Can ID: Net work address of the respective devices

The button **More...** activates additional information to the chosen measuring device. For the measuring device series OPUS 200i the parameters are as follows:



In the field **description** you may enter a new description to the OPUS device or modify an existing one.

The **operation mode** shows if an OPUS-measuring device is switched

- OFF
- Normal
- Sleep.

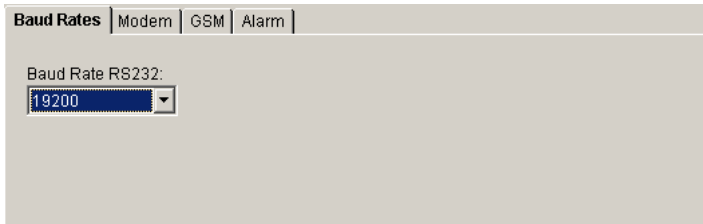
In the **communication type** you may decide through which transfer route the OPUS measuring device should communicate:

- RS232
- Modem
- GSM Modem

The **display duration** indicates in which speed the measuring values on device displays are to be shown successively. The following settings are possible

- 1 s to 60 s in seconds steps

Note: The OPUS-measuring device 208 is, unlike other OPUS-measuring devices provided with more than 8 channels but with only two display lines. To show all measuring values successively on the display, you should choose appropriate display duration.



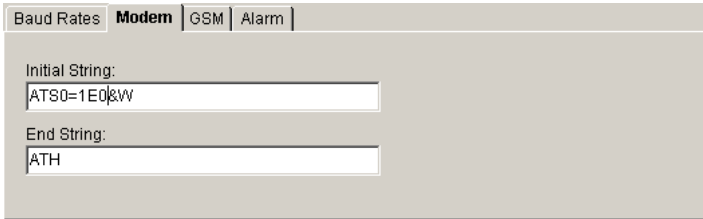
In the register card **baud rates** you may set the transfer rate for the RS232-interface with respect to the chosen transfer route in the communication type.

- 2400
- 4800
- 9600
- 14400
- 19200
- 28800
- 57600
- 115200

Note: A data transfer with a **baud rate of 19200 bit/s** is predefined for use in **Standard-Modems**. Other transfer rates may lead to problems in the data transfer and are not recommended for standard modems. If you however want to use a **GSM-Modem**, you may at present use a **baud rate of 9600 bit/s**. **The settings of the measuring devices must be exactly identical with the program so that a data connection could be established!**

If you have chosen **modem** in the communication type, you may set here the parameters:

- Init-String for initialization
- End-String to end up the modem connection



Baud Rates | **Modem** | GSM | Alarm

Initial String:

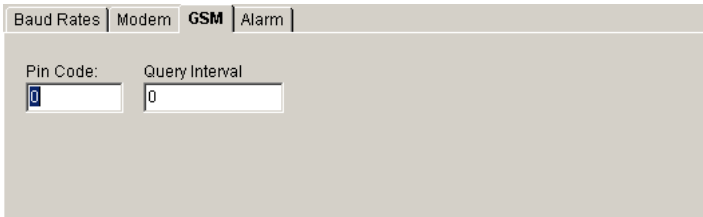
End String:

Predefined are values of a standard-modem. The entries means:

- S0=1: automatic lifting of phone receiver after 1 ring
- E0: echo OFF
- &W: saving of the settings in the default-profile (for Modem-Reset)
- ATH: replace phone receiver

If you have chosen in the communication type **GSM-modem**, you may enter the pre-settings for use in the mobile radio network

- Pin code, to activate device
- Query interval in minutes

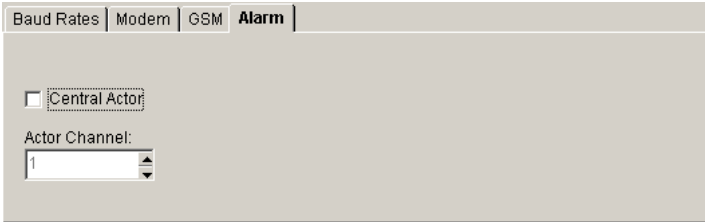


Baud Rates | Modem | **GSM** | Alarm

Pin Code: Query Interval:

Note: The **query interval** determines the period when the measuring device regularly checks if the GSM-modem is still booked in the radio network and if necessary do the reconnection to the net. You should in any case enter a value, because a modem behaves passive and in case of radio connection failure you cannot do remote dialing from the software

In the register card **alarm**, you may determine how the measuring device should behave in case of alarm.



Baud Rates | Modern | GSM | **Alarm**

Central Actor

Actor Channel:
1

Mark out the option **central actor**, if you want to use the chosen OPUS-measuring device as central actor in the network. Then select the actor channel. You may set values from 1 to 4, because the measuring device is provided with a total of 4 relay outputs.

The exact function of the central actor is described in the corresponding chapter of this manual.

Channel Configuration OPUS 200/200i und 300/300i

Measuring devices of the series OPUS 200, OPUS 200i, OPUS 300 and OPUS 300i have two measuring channels and two universal relay outputs. The relay outputs are permanently assigned to the measuring channels through the device internally.

In the registry card **channel configuration**, you may set the parameters for the channel configuration and for the relay outputs.

The screenshot shows a software interface for configuring a measuring channel. At the top, there are tabs: 'General', 'Channel Configuration' (selected), 'Logging Parameters', and 'Relay Output'. Below the tabs, there is a dropdown menu labeled 'Select Channel to be configured:' with 'Channel 1' selected. The main area is divided into several sections:

- Input:** Contains three dropdown menus: 'Sensor Type' (Voltage 0..1000mV), 'Connection Type' (4 Wire), and 'Polarity' (unipolar).
- Physical Units:** Contains two input fields for 'Min:' (0,00) and 'Max:' (1000,00).
- Measuring Quantity:** Contains two input fields for 'Min:' (0,00) and 'Max:' (1000,00), a dropdown for 'Unit:' (mV), and a spinner for 'No. of decimals:' (2).
- Others:** Contains two input fields: 'Offset:' (0,00) and 'Reaction Time:' (5 ms).
- Description:** A large empty text area at the bottom.

Select in the field **channel to be configured** the desired measuring channel. The configurable parameters are divided into sections

- Channel parameter
- Logging parameter
- Relay output

Channel Parameter

In the registry **channel parameter**, you may determine the physical characteristics of the connected sensors.

In the selection box **sensor type**, you may choose your desired sensor / measuring range. The following sensor types are pre-defined as standard:

Building humidity	Voltage 0(-20)..20 mV
Leaf moisture	Voltage 0(-40)..40 mV
Floor humidity	Voltage 0..1000 mV
Pressure	Current 0..20 mA
Frequency (I)	Current 4..20 mA
Frequency (U)	TFF Temperature
Impulse (I)	Thermo element E
Impulse (U)	Thermo element J
Combi Wind Speed 1	Thermo element K
Combi Wind Speed 2	Thermo element N
Laser status	Thermo element R
NTC 5K	Thermo element S
Particle 5.0	Thermo element T
Particle 5.0	UltraSonic Speed
PT 100	Resistance 0..100000 Ohm
PT 1000	Resistance 0..200 Ohm
Pump status	Resistance 0..2000 Ohm
Voltage 0(-100)..100 mV	Resistance 0..20000 Ohm

For **TFF-Sensors** calibration values must be entered:



Under the item **input**, the sensor type, the connecting technique and the polarity to be used are defined. In the **connection type**, **polarity** and **physical quantity** min or max are mostly predefined via the chosen sensor. Exceptions are listed as follows.

1. For sensors with resistance measuring range, frequency and impulse you may choose a connection type between
 - 4-conductor technique
 - 3-conductor technique
 - 2-conductor technique
2. For sensors with voltage measuring range you may choose a polarity between
 - Unipolar (0 to +V)
 - Bipolar (-V to +V)
3. For sensors with resistance measuring range, voltage measuring range, frequency and impulse and current measuring range and etc. the physical quantities may be entered. Common values are already predefined in the program.

In the **measuring quantity**, the MIN- and MAX-values and the corresponding unit for the scaling of the chosen measuring range are listed. These are valid for sensors with resistance measuring range, voltage measuring range, frequency and impulse and current measuring range. Common values are already predefined in the program. For example an output signal of 4 to 20 mA for an active temperature sensor corresponds to a measuring range of -25°C up to 150°C .

The **units** of the following quantity are already assigned in the program:

$^{\circ}\text{C}$	kJ/kg	mS	kW
%	l/h	MV	J
%H	l/min	Pa	kJ
$^{\circ}\text{F}$	l/m ²	ppm	hPa
bar	l/d	pH	Pulse
Ft	m	Ohm	km/h
g/kg	mA	V	$^{\circ}$
Degree	mbar	Stck	cB
Hertz	m ³ /h	m ³	
In	MPH	W	
K	m/s	W/m ²	

Further units may be entered if necessary via unit-editor. The button



Activates the unit editor. You may enter and save here further units. The exact function is described in the chapter "User defined sensors".

The number of **decimal places** of a measuring value may vary between 0 and 3.

In the entry field **offset**, a value with respect to a measuring quantity could be predefined as zero offset compensation.

In the entry field **reaction time** a value in milliseconds (ms) could be predefined as delaying time necessary until the measuring signal from AD-converter could be processed.

Under **description**, you may enter your text for the measuring channel.

Logging Parameter

In the registry card **logging parameter**, you may assign the settings for the data saving of the chosen channel.

The screenshot shows a software window titled "Logging Parameters" with three tabs: "Channel Parameters", "Logging Parameters" (selected), and "Relay Output". The window contains the following settings:

- Operation Mode: Inactive, Active
- Memory Organization: Ring Memory, Start/Stop
- Saving of: Mean, Min, Max, Sum
- Scan Rate: 1 s
- Saving rate: 1 min
- Start saving: 02.04.2003 21:56:43
- Time, until memory is full: 20/ 20:00:00

The option **operation mode** determines if the channel is to be measured and displayed on the measuring device or not. You may choose between:

Inactive: The measuring channel is turned OFF, that means no measuring and no readings on display

Active: The measuring channel is turned ON, that means the channel will be measured, saved and the readings will be displayed.

The option **memory organization** determines how the measuring device memory should be organized. You may choose between:

Ring memory: The existing data of the set measuring channel will be overwritten as soon as the measuring channel memory is full.

Start/Stop: The measuring process will stop as soon as the measuring channel memory is full.

Under **saving of**, you may choose which values should be saved. You may activate one, two or three standards for saving.

Average: Average of the measuring channel calculated from scanning rate
Min: Minimum value of the measuring channel with respect to scanning rate.
Max: Maximum value of the measuring channel with respect to scanning rate.

Using the arrow key may set the **scanning rate** and the **saving rate** for each channel. The measuring device measures the channel in the scanning rate and then determines the average within the scanning rate. If the scanning rate equals the saving rate, an average value cannot exist because the average value is the measuring value. You may set for both channels different scanning and saving rates.

The **scanning rate** is dependent on the chosen saving rate. The values could be set as follows:

- 1 s
- 10 s
- 30 s
- 1 min

The **saving rate** is dependent on the chosen scanning rate. The values could be set as follows:

- 1 s
- 10 s
- 30 s
- 1 min
- 2 min
- 3 min
- in minute steps until max. 24 h

Under **start saving**, you may set the time when to start saving a measuring channel. Choose start/stop in the item memory organization first. From the number of chosen measuring values that is dependent on the saving rate, the program calculates the time when the channel memory is full and when the measuring process automatically stops. The display 3/ 11:20:00 means, that the memory channel is full after 3 days, 11 hours and 20 minutes.

Note: You may avoid memory overflow if you set in the main menu "settings" a periodic "automatic query". For details please refer to chapter measurement operation.

Relay Output

OPUS-measuring devices of the series 200, 200i, 300 and 300i are provided with two universal relay outputs which could be configured as digital output as well as analog output. The relay outputs are permanently assigned to the measuring channels via device internally.

In the registry **relay output**, you may set the functions of the relay output.

Channel Parameters	Logging Parameters	Relay Output
Relay Mode: <input type="text" value="Active"/>		
Alarm Time: <input checked="" type="radio"/> at Saving Alarm Suppress: <input type="text" value="1"/> <input type="radio"/> at Scanning 00:00:00		
Relay Output: Lower Alarm Value: <input type="text"/> Upper Alarm Value: <input type="text"/> Alarm Hysteresis: <input type="text" value="0,00"/> °C		
Analog Output: <input type="radio"/> Off <input checked="" type="radio"/> Output 0 - 20 mA Min. Value: <input type="text" value="0,00"/> Max. Value: <input type="text" value="1000,00"/> °C <input type="radio"/> Output 4 - 20 mA Circuit sensor rupture: <input type="text" value="0,00"/> mA		

Under **relay mode** you may set the channel oriented relay output as digital output and determine its behavior:

- OFF The relay output is turned OFF
- Active The relay output is for the chosen channel active
- Central Actor The relay output is for other existing OPUS-measuring devices in the network active.
- Active+Central Actor: The relay output is for the chosen channel and for other existing OPUS-measuring devices in the network active.

Under **alarm time**, you may decide if the monitoring of the alarm will be dependent on the scanning rate or on the saving rate. If you choose the option **at saving**, you may set the time via **alarm suppress**, how long should an alarm be suppress before it signalizes and saves. By using the arrow key the alarm suppress time will be calculated as multiple of the set saving rate.

Under **relay output**, you may enter under which conditions the relay output should be controlled:

- Lower Alarm Limit: Measuring value < lower alarm limit – alarm hysteresis = relay output activated
- Upper Alarm Limit: Measuring value > upper alarm limit + alarm hysteresis = relay output activated
- Alarm Hysteresis Hysteresis value for the alarm limits
 With a Hysteresis of 2°C, a lower alarm limit of 15°C and an upper alarm limit of 35 °C, the relay output switches at 13°C and at 37°C

Under **analog output**, you may set the channel oriented relay output as analog output and may choose between three behaviors.

- OFF Analog output is turned OFF
- 0-20 mA Analog output corresponds to 0-20 mA
- 4-20 mA Analog output corresponds to 4-20 mA
 The standards for the measuring quantities from the channel configuration are automatically entered as minimum and maximum values. These can be change anytime.

Channel Configuration OPUS 208

Measuring devices of the series OPUS 208 have compared to OPUS 200/200i, OPUS 300/300i eight measuring channels and four universal relay outputs. The relay outputs are not permanently assigned to the measuring channels and could be assigned freely.

In the registry card **channel configuration**, you may set the parameters for the channel configuration and for the relay outputs.

The screenshot shows the 'Channel Configuration' dialog box for the OPUS 208 series. It features several tabs: 'General', 'Channel Configuration' (selected), 'Logging Parameters', and 'Relay Output'. At the top, there is a dropdown menu labeled 'Select Channel to be configured:' with 'Channel 1' selected. Below this, the 'Channel Parameters' section is active, containing three dropdown menus: 'Sensor Type' (set to 'Particle 0.5'), 'Connection Type' (set to '4 Wire'), and 'Polarity' (set to 'bipolar'). The 'Physical Units' and 'Measuring Quantity' sections are also visible, with 'Min' and 'Max' values of '0,00' and '85520,00' respectively, and a 'Unit' dropdown set to 'P 0.5'. The 'No. of decimals' is set to '0'. The 'Others' section includes 'Offset' (0,00) and 'Reaction Time' (0 ms). At the bottom, there is a 'Description' text field containing 'P 0.5µm Lyo 3'.

Select in the field **channel to be configured** your desired measuring channel. The configurable parameters are divided into sections

- Channel parameter
- Logging parameter
- Relay output

Channel Parameter

In the registry **channel parameter**, you may determine the physical characteristics of the connected sensors:

Channel Parameters | Logging Parameters | Relay Output

Input:

Sensor Type: Particle 0.5 | Connection Type: 4 Wire | Polarity: bipolar

Physical Units: Min: 0,00 | Max: 65520,00

Measuring Quantity: Min: 0,00 | Max: 65520,00 | Unit: P 0.5 | No. of decimals: 0

Others: Offset: 0,00 | Reaction Time: 0 ms

Description: P 0.5µm Lyo 3

In the selection box **sensor type**, you may choose your desired sensor / measuring range. The following sensor types are pre-defined as standard:

Leaf moisture	Current 0..20 mA
Floor humidity	Current 4..20 mA
Pressure	TFF Temperature
Frequency (I)	Thermo element E
Frequency (U)	Thermo element J
Impulse (I)	Thermo element K
Impulse (U)	Thermo element N
Combi Wind Speed	Thermo element R
NTC 5K	Thermo element S
PT 100	Thermo element T
PT 1000	U-Sonic Speed
Voltage 0(-100)..100 mV	Resistance 0..100000 Ohm
Voltage 0(-1000)..1000 mV	Resistance 0..200 Ohm
Voltage 0(-20)..20 mV	Resistance 0..2000 Ohm
Voltage 0(-40)..40 mV	Resistance 0..20000 Ohm

For **TFF-Sensors** calibration values must be entered:



Under the item **input**, the sensor type, the connecting technique and the polarity to be used are defined. In the **connection type**, **polarity** and **physical quantity** min or max are mostly predefined via the chosen sensor. Exceptions are listed as follows.

4. For sensors with resistance measuring range, frequency and impulse you may choose a connection type between
 - 4-conductor technique
 - 3-conductor technique
 - 2-conductor technique
5. For sensors with voltage measuring range you may choose a polarity between
 - Unipolar (0 to +V)
 - Bipolar (-V to +V)
6. For sensors with resistance measuring range, voltage measuring range, frequency and impulse and current measuring range and etc. the physical quantities may be entered. Common values are already predefined in the program.

In the **measuring quantity**, the MIN- and MAX-values and the corresponding unit for the scaling of the chosen measuring range are listed. These are valid for sensors with resistance measuring range, voltage measuring range, frequency and impulse and current measuring range. Common values are already predefined in the program. For example an output signal of 4 to 20 mA for an active temperature sensor corresponds to a measuring range of -25°C up to 150°C.

The **units** of the following quantities are already assigned in the program:

°C	kJ/kg	mS	kW
%	l/h	MV	J
%H	l/min	Pa	kJ
°F	l/m ²	ppm	hPa
bar	l/d	pH	Pulse
Ft	m	Ohm	km/h
g/kg	mA	V	°
Degree	mbar	Stck	cB
Hertz	m ³ /h	m ³	
In	MPH	W	
K	m/s	W/m ²	

Further units may be entered if necessary via unit-editor. The button



Activates the unit editor. You may enter and save here further units. The exact function is described in the chapter "User defined sensors".

The number of **decimal places** of a measuring value may vary between 0 and 3.

In the entry field **offset**, a value with respect to a measuring quantity could be predefined as zero offset compensation.

In the entry field **reaction time** a value in milliseconds (ms) could be predefined as delaying time necessary until the measuring signal from AD-converter could be processed.

Under **description**, you may enter your text for the measuring channel.

Logging Parameter

In the registry card **logging parameter**, you may assign the settings for the data saving of the chosen channel:

Channel Parameters | **Logging Parameters** | Relay Output

Display: Inactive Active

Operation Mode: Inactive Active

Memory Organization: Ring Memory Start/Stop

Saving of: Mean Min Max Sum

Scan Rate: 1 min

Saving rate: 2 min

Start saving: 02.04.2003 22:10:12

Time, until memory is full: 41/16:00:00

The option **display** of a channel determines if a channel in the display of the measuring device should be displayed or not. This is with the series OPUS 208 in contrast to the OPUS-measuring device series 200/200i and 300/300i possible. You may choose between:

Inactive: The reading of the measuring channels in the display of the OPUS-measuring device is switched OFF.

Active The reading of the measuring channels in the display of the OPUS-measuring device is switched ON

Note: Under the register general parameter, you may set via "display duration" in which speed the measuring values on device displays are to be shown successively. All channels except those extracted measuring channels will be displayed. Extracted measuring channels will still be measured and saved if the operation mode is switched active.

The option **operation mode** determines if a channel should be measured and displayed in the measuring device or not. You may choose between:

Inactive: The measuring channel is switched OFF, that means no measurement and no readings in display.

Active: The measuring channel is turned ON, that means the channel will be measured, saved and the readings will be displayed.

The option **memory organization** determines how the measuring device memory should be organized. You may choose between:

Ring memory: The existing data of the set measuring channel will be overwritten as soon as the measuring channel memory is full.

Start/Stop: The measuring process will stop as soon as the measuring channel memory is full.

Under **saving of**, you may choose which values should be saved. You may activate one, two or three standards for saving.

Average: Average of the measuring channel calculated from scanning rate

Min: Minimum value of the measuring channel with respect to scanning rate.

Max: Maximum value of the measuring channel with respect to scanning rate.

Using the arrow key may set the **scanning rate** and the **saving rate** for each channel. The measuring device measures the channel in the scanning rate and then determines the average within the scanning rate. If the scanning rate equals the saving rate, an average value cannot exist because the average value is the measuring value. You may set for both channels different scanning and saving rates.

The **scanning rate** is dependent on the chosen saving rate. The values could be set as follows:

- 1 s
- 10 s
- 30 s
- 1 min

The **saving rate** is dependent on the chosen scanning rate. The values could be set as follows:

- 1 s
- 10 s
- 30 s
- 1 min
- 2 min
- 3 min
- in minute steps until max. 24 h

Under **start saving**, you may set the time when to start saving a measuring channel. Choose start/stop in the item memory organization first. From the number of chosen measuring values that is dependent on the saving rate, the program calculates the time when the channel memory is full and when the measuring process automatically stops. The display 3/ 11:20:00 means, that the memory channel is full after 3 days, 11 hours and 20 minutes.

Note: You may avoid memory overflow if you set in the main menu "settings" a periodic "automatic query". For details please refer to chapter measurement operation.

Relay Output

OPUS-measuring devices of the series 208 are provided with four universal relay outputs, which could be configured as digital output as well as analog output. The relay outputs could be assigned to the measuring channels freely in contrary to the device series 200/200i and 300/300i.

In the registry **relay output**, you may set the functions of the relay output.

Channel Parameters | Logging Parameters | **Relay Output**

Alarm Output:

Output Channel active

Output Channel:
2

Alarm Time:

at Saving
 at Scanning

Alarm Suppress:
1
00:00:00

Relay Output:

Lower Alarm Value: Upper Alarm Value: Alarm Hysteresis: 0,00 °C

Under **alarm output**, you may activate one from four relay outputs and assigned the chosen measuring channel. In a relay output several measuring channels could be assigned.

Active: The relay output is switched ON for this measuring channel
Output channel: Designation of the relay output (1 to 4) to the chosen measuring channel

Under **alarm time**, you may decide if the monitoring of the alarm will be dependent on the scanning rate or on the saving rate. If you choose the option **at saving**, you may set the time via **alarm suppress**, how long should an alarm be suppress before it signalizes and saves. By using the arrow key the alarm suppress time will be calculated as multiple of the set saving rate.

Under **relay output**, you may enter under which conditions the relay output should be controlled:

Lower Alarm Limit: Measuring value < lower alarm limit – alarm hysteresis = relay output activated

Upper Alarm Limit: Measuring value > upper alarm limit + alarm hysteresis = relay output activated

Alarm Hysteresis Hysteresis value for the alarm limits
With a Hysteresis of 2°C, a lower alarm limit of 15°C and an upper alarm limit of 35 °C, the relay output switches at 13°C and at 37°C

Central Actor

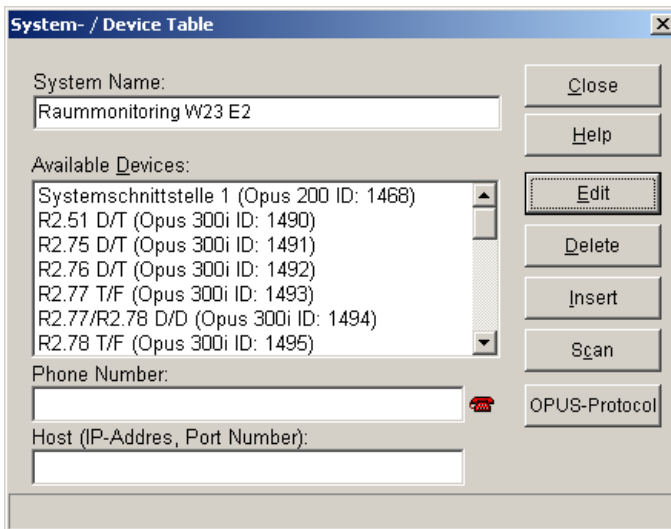
A central actor is a fault message collector module, which is actuated depending on the configuration of the measuring channels via OPUS-measuring devices by fault messages. The central actor signalizes a fault message for example a honk, through automatic transmittance to the fire brigade or to factory security officers. The central actor triggers a higher order alarm. Within a can-bus network, there is only one central actor.

For the technical realization, two possibilities are available:

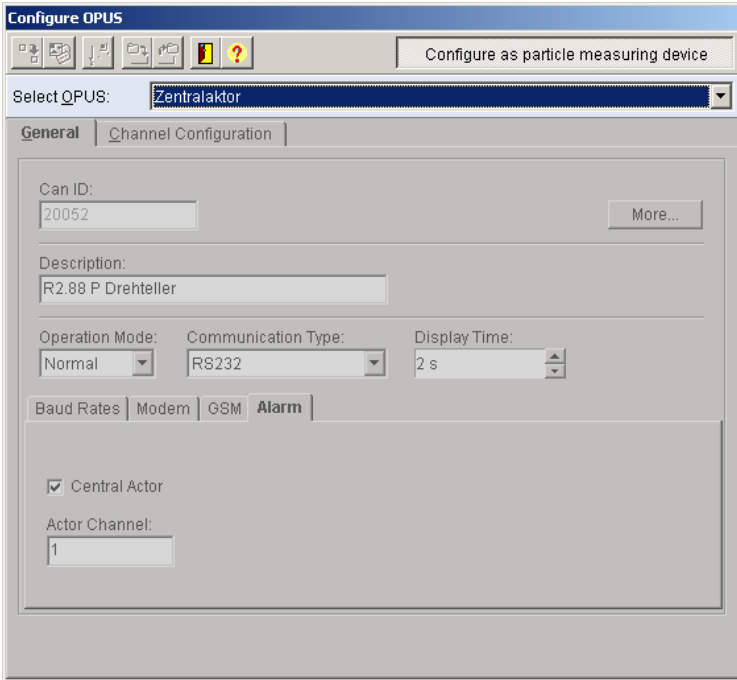
- Installing a central actor as additional component to OPUS-measuring device techniques (Hardware-Solution)
- Definition of an OPUS-measuring device as central actor through Software (Software-Solution)

Central Actor as Additional Component

For high safety requirements, the OPUS measuring technique could be supplemented with a central actor as auxiliary device (watch dog). This device is also in the can-bus network and has a fixed address – address cannot be modified. The auxiliary device triggers also alarm when voltage failure occurs. Within the software, the central actor is displayed in the system table.



Entering of parameter is however not possible. If you select central actor in the OPUS-configuration, several fields are colored grey and cannot be modified



Note: Since only one central actor within a can-bus-network is allowed, all software technical functions of the program, where the OPUS-device as central actor could be defined are in the Hardware Solution inactivated.

Central Actor as Software-Function

As alternative to central actor, every OPUS-measuring device could also software-technically be defined as central actor. You have however a limited function, for example when voltage failure occurs no alarm message will be triggered because the function is already designated in the device and the voltage supply is needed in the communication via the can-bus (no watch-dog-function).

OPUS 200, 200i, 300 and 300i as Central Actor

To define the **OPUS-measuring device of the series OPUS 200, 200i, 300 and 300i as central actor**, select within the OPUS-configuration a measuring device, set the register in channel configuration and choose under data block the data block relay mode then the item central actor or active+central actor.

Configure OPUS

Select OPUS: R2.51 D/T (Opus 300i ID: 1490)

General | **Channel Configuration**

Select Channel to be configured: Channel 1

Channel Parameters | Logging Parameters | **Relay Output**

Relay Mode:

- Active
- Off
- Active
- Central actor
- Active+Central actor

Alarm Time:

- at Saving
- at Scanning

Alarm Suppress: 1

00:00:00

Lower Alarm Value: 1,00 | Upper Alarm Value: 5,00 | Alarm Hysteresis: 0,00 Pa

Analog Output:

- Off
- Output 0 - 20 mA
- Output 4 - 20 mA

Min. Value: 200,00 | Max. Value: -200,00 Pa

Circuit sensor rupture: 22,00 mA

OPUS 208 as Central Actor

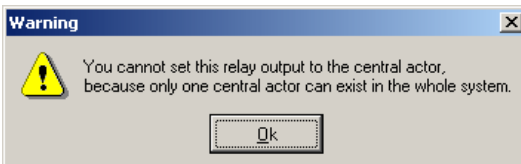
To define **OPUS-measuring device of the series OPUS 208 as central actor**, select within the OPUS-configuration a measuring device, set the register in general, activate in data block alarm the option central actor and choose one of those four relay outputs as actor channel.

The screenshot shows the 'Configure OPUS' window with the following configuration:

- Window Title: Configure OPUS
- Buttons: [Icons], [Configure as particle measuring device]
- Select OPUS: R2.88 P Drehteller (OPUS 208 ID: 20052)
- Tab: General | Channel Configuration
- Can ID: 20052 (with More... button)
- Description: R2.88 P Drehteller
- Operation Mode: Normal
- Communication Type: RS232
- Display Time: 2 s
- Sub-tabs: Baud Rates | Modem | GSM | **Alarm**
- Central Actor
- Actor Channel: 1

Software-technical Locking-up

Since only one central actor within a can-bus-network is allowed, the program functions for the central actor definition of an OPUS-measuring device in the software solution are inactivated. If you try to define another central actor, the program will give a warning message.



User-Defined Sensors

With the help of this function, you may declare new – up to this time unused sensors – as **user defined sensors**. You may define it according to your own standard and save it into the databank. These sensors will be directly available for selection in the OPUS channel configuration under channel parameter – sensor type via sensor name.

To setup a user-defined sensor, select first in the main menu **settings** the item **measurement setup**. From there you will have access to the overview mask of the system table. Mark out the system table of your measuring system and select the button **edit**. A device table opens up with a list of OPUS-measuring devices connected to the measuring system. Mark out in the device table the OPUS-measuring devices whose new sensor is to be setup. Then select the button **edit**, to activate the mask for the configuration of the OPUS-measuring devices.

Select in the toolbar of the OPUS-Configuration the button



Setup user-defined sensors

An entry mask opens up for setting new sensor.

User defined Sensors...

1 / 0

Close

Sensor Name

Temperature

Input:

Sensor Type: PT 100 Connection Type: 4 Wire Polarity: unipolar

Physical Units:

0-200Ohm Min: -200,00 Max: 450,00

Measuring Quantity:

Min: -200,00 Max: 450,00 Unit: Ohm ...

Under **sensor name**, assign a name first to the sensors to be used.

Under **input**, assign the sensor type, connection technique and polarity.

Via the selection box **sensor type**, select your desired sensor measuring range. The following measuring ranges are defined as standards:

- Current
- Voltage
- Resistance
- PT 100
- PT 1000
- Frequency (I)
- Frequency (U)
- Impulse (I)
- Impulse (U)

For the selection of the sensor type, the connection type, the polarity and the physical quantities are mostly predefined. The selectable parameters are listed as follows:

For sensors with voltage and resistance measuring ranges, the **connection type** could be chosen between:

- 4-conductor technique
- 3-conductor technique
- 2-conductor technique

For sensors with voltage measuring ranges, the **polarity** could be chosen between:

- Unipolar (0 to +V)
- Bipolar (-V to +V)

For **physical quantities** of the sensors, common values are already suggested in the program. The selection possibilities are listed as follows:


1. Measuring range **current**:
 - 0..20 mA
 - 4..20 mA
2. Measuring range **voltage**:
 - 0..20 mV
 - 0..40 mV
 - 0..80 mV
 - 0..100 mV
 - 0..160 mV
 - 0..320 mV
 - 0..640 mV
 - 0..1000 mV
 - 0..100000 mV
3. Measuring range **resistance**:
 - 0..200 Ohm
 - 0..2000 Ohm
 - 0..20000 Ohm
 - 0..100000 Ohm
4. For the measuring range **frequency and impulse** the min and max-values are pre-allocated.

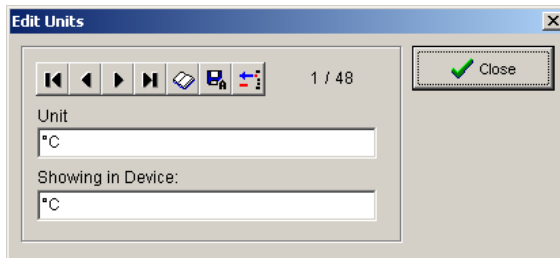
Under **measuring quantities** the min and max values and the unit for the scalation of the chosen measuring ranges are entered. Common values are predefined in the program.

The **units** of the following quantities are already assigned in the program:

°C	kJ/kg	mS	kW
%	l/h	MV	J
%H	l/min	Pa	kJ
°F	l/m ²	ppm	hPa
bar	l/d	pH	Pulse
Ft	m	Ohm	km/h
g/kg	mA	V	°
Degree	mbar	Stck	cB
Hertz	m ³ /h	m ³	
In	MPH	W	
K	m/s	W/m ²	

Further units may be entered if necessary via unit-editor.

 Activates the unit-editor.



To edit the units please use the listed buttons below. The number of the current data record and the total number of data record is shown in the dialog box.



Go to first data record



Go to previous data record



Go to next data record



Go to last data record



Create a new data record



Save the current data record



Delete the current data record

Measure with Software-Configuration

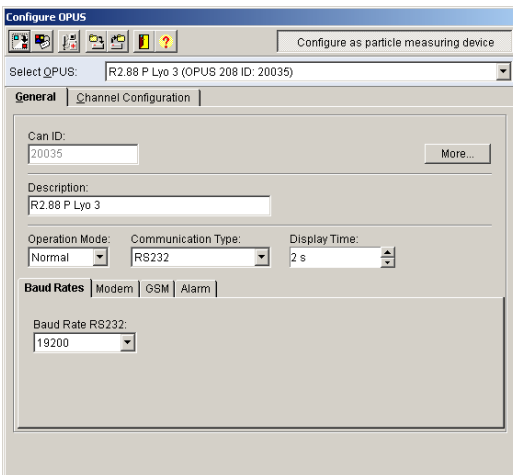
The program enables you to do measuring with the help of predefined configuration. In the **path ...\\CONFIG for configurations data**, configurations are normally saved here to be use for future measurements. The file type with ending „.ldc“ is preset by the program and cannot be modified. Through this function, your chosen file, devices and channels, file information and diagrams will be loaded. Measuring data, which are present in the file, will likewise be loaded.

Select in the main menu **file** the item **save configuration**, to save the configuration file. A dialog-box opens up where you can choose the corresponding files. In this file only configuration data are allocated. It does not contain measurement data.

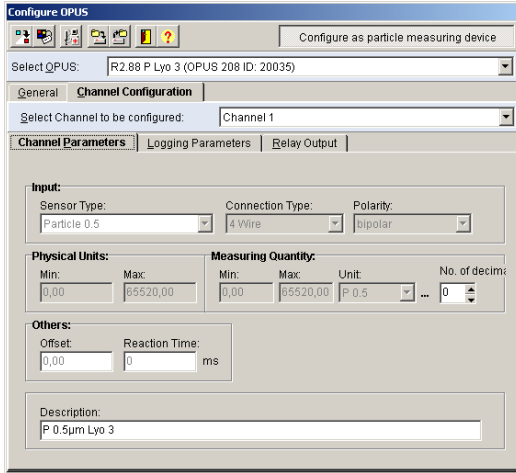
To load a configuration file, select in the main menu **file** the item **load configuration**. Then choose the corresponding files. A detailed definition of program file could be found in chapter "file".

Configuration of OPUS 208 as Particle Measuring Device

The measuring device OPUS 208 could be configured as particle measuring device. You only have to press the button „configure as particle measuring device“ in the OPUS-configuration. In the register **general parameter** modifications could be done.



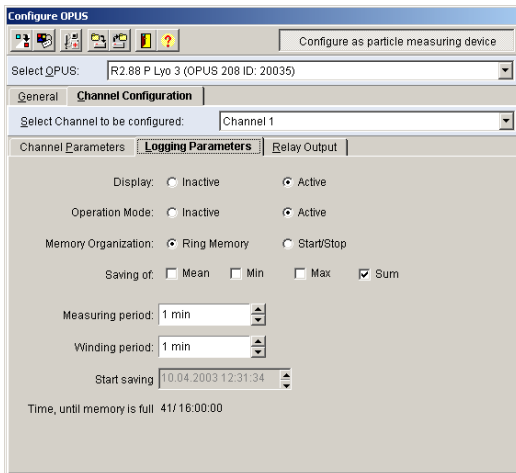
In the register **channel configuration**, necessary parameters are automatically allocated and are protected against manual modifications.



The following channels are allocated through configuration:

- Channel 1: Particle 0,5 micrometer
- Channel 2: Particle 5 micrometer
- Channel 5: Pump status (Start/Stop)
- Channel 6: Laser status (Start/Stop)

The **logging parameters** are set to fix values by the program.



The parameters for **relay output** are likewise set to fix values by the program.

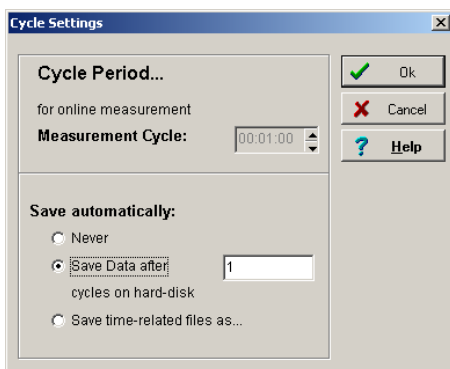
The screenshot shows the 'Configure OPUS' window with the following configuration details:

- Device: R2.88 P Lyo 3 (OPUS 208 ID: 20035)
- Channel: Channel 1
- Tab: Relay Output
- Alarm Output:**
 - Output Channel active
 - Output Channel: 2
- Alarm Time:**
 - at Saving
 - at Scanning
 - Alarm Suppress: 1
 - 00:00:00
- Relay Output:**
 - Lower Alarm Value: 0,00
 - Upper Alarm Value: 100,00
 - Alarm Hysteresis: 0,00 P 0.5

The Functions during Measuring Operation

Cycle Period and Cycle Control

Select in the main menu **Settings** the item **Cycle Control** to define the conditions of the measuring operation. Here you may set the cycle period and the starting conditions for your measuring operation and the options for data saving.



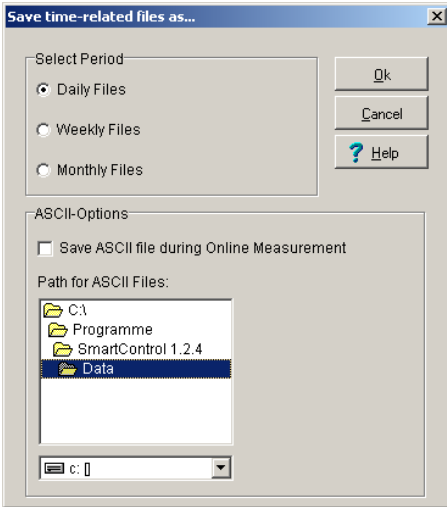
The **measuring cycle** for measurement values shows the saving rate in hours/minutes/seconds. The value can only be modified in the measuring device. 10 seconds is set as standard in the devices. During measuring process, data are save always in the OPUS measuring device memory according to the given saving rate of each measurement channel. The indicated measurement cycle results from the smallest saving rate, which is programmed, to a single OPUS or to an OPUS in network.

For **automatic saving** you may choose between the options

- Never save
- Save data after a given number of measurement cycles and
- Save file related to time and consecutively.

Saving Time Related Files (Option OP-TWMD)

Select in the dialog box **cycle control** the option **Save time-related Files as**, to save your data into several consecutive files automatically during measurement.



To define the saving period you may choose between

- Daily files
- Weekly files or
- Monthly files

Your data will be saved automatically after one measuring cycle. the format of the file names are as follows:

Daily Files: YY_MM_DD.LDC
(YY = Year, MM = Month, DD = Day)

Weekly Files: YY_WW_w.LDC
(YY = Year, WW = Week, w = week identification)

The following are to be considered in weekly files:

According to the rules for the calculation of the calendar weeks, week 1 may already start in the preceding year, i.e. a file may have the name 02_01_w.wdc, but the saved file may contain data from 12/31/2001.

In few cases a year may have 53 weeks. The program considers this.

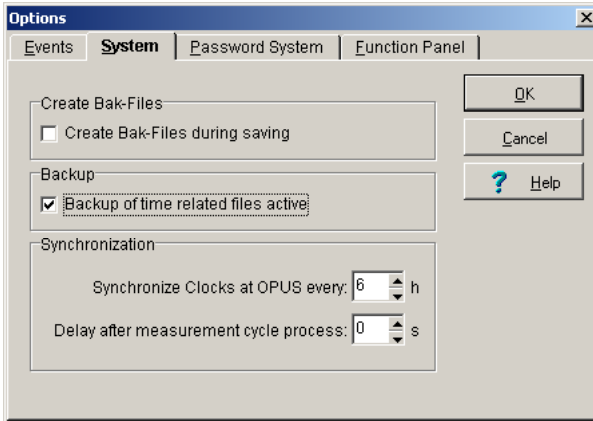
A calendar week starts according to the rule always on Monday and ends on Sunday. This is set as standard in the program and cannot be modified.

Monthly Files: YY_MM_m.LDC
(YY = Year, MM = Month, m = month identification)

Via the option **Save ASCII-Files during Online Measurement** you may generate an ASCII-Export file in addition to the time related file name with the same format, ending with *.TXT. In the selection box you may determine the path to save your ASCII-File..

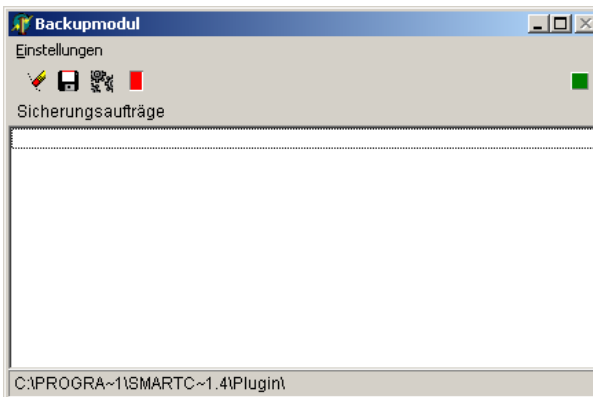
Generate Automatic Saving (Option OP-TWMD Backup)

In addition to automatic data filing, you can generate a safety file in a free settable path. To activate the additional automatic safety, select in the main menu **options** the item **system**. Activate here the option Backup of the TWMD-file.



The program will now copy the daily-, weekly and monthly files according to the settings of the backup-module.

To modify the settings of the backup-module, select in the main menu **settings** the item **backup-module**. The program opens an entry mask for the settings of the automatic safety copy.



Delete safety order



Select safety path



Reactivate truncated order

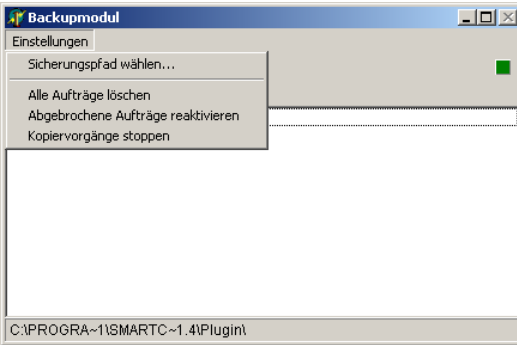


Start copy process

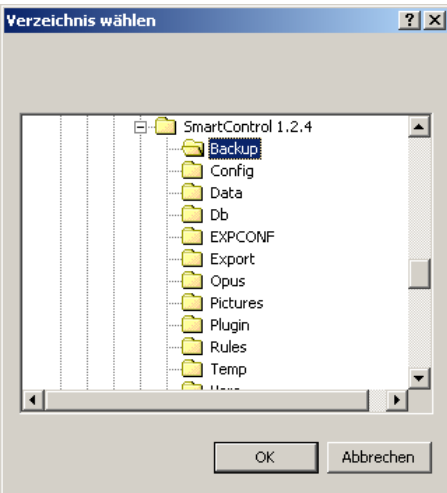


Stop copy process

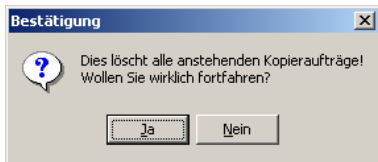
Using the respective menus may also activate each function.



To stop the safety path, activate the item **select safety path** or press the corresponding button in the toolbar. The program opens a box with a list of paths. Choose a path and confirm with Ok.



To delete all safety orders, activate the item **delete all orders** or press the corresponding button in the toolbar. A safety query appears before final deletion.



To reactivate truncated orders, activate the item **reactivate truncated orders** or press the corresponding button in the toolbar. The orders will be reactivated.

To start or to stop copying process, activate the item **start or stop copying process** or press the corresponding button in the toolbar. The program starts the copying process or stops depending on the current status. The status is displayed above right. If the LED glows red, the copying process has been stopped. If it is green the copying process has started.

Starting / Stopping the Measurement

Select in the main menu **Settings** the item **start measuring** or click the corresponding button in the toolbar to activate this function. The program starts measuring in the ONLINE-mode based on the pre-defined values. The connected devices will be initialized and the defined measurement data will be read and displayed, if the absolute minimum of cycle period is not violated. Activating the function **stop measuring** or corresponding button in the toolbar, the program stops the measuring process.

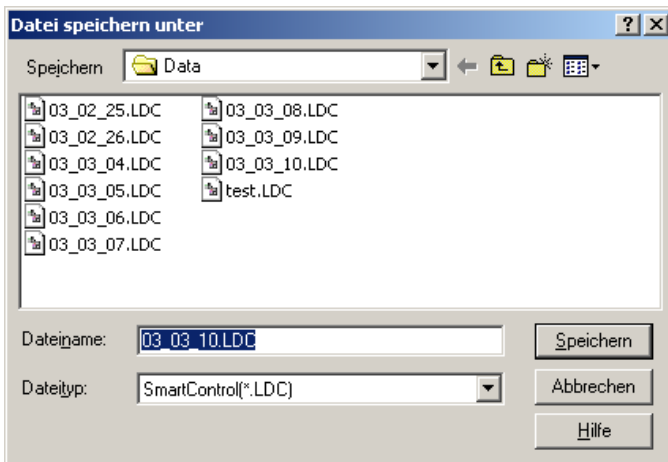


Start measuring

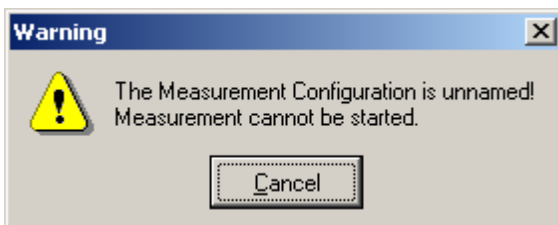


Stop measuring

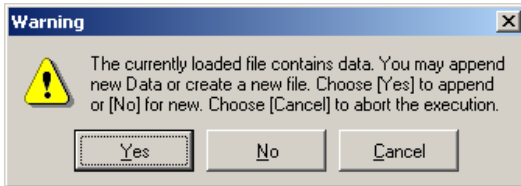
If you have not measured with the configuration yet, you will be asked to give the new measuring data a name, so it could be saved.



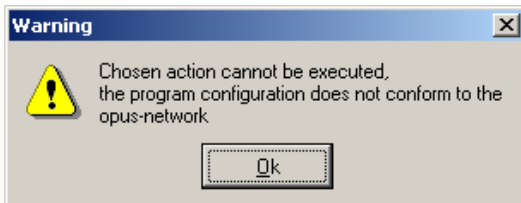
You must enter here a name because the data will be directly save in the file. If you stop naming the following message appears:



If you have opened a file that contains the correct measurement setup you may attach the data to the prevailing measurement values or create a new file. You will receive the warning shown on the box.



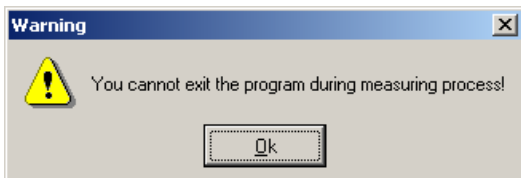
If in the program loaded configuration does not correspond to the current existing measuring device, a warning will appear. Check the measurement setup and set a new configuration if necessary.



Note: If you want to use an existing configuration file or attach a measuring data to an existing file, be sure not to do any modifications in the programming of the measuring devices. Every transferred change in the device – also sensor designation etc. – overwrites the complete settings in the device. The configuration does not correspond anymore to the configuration from the file. Thus a fault message appears although there are really no changes in the measurement setup.

If all settings are correct, the measuring process begins. After completing the measurement, activate the corresponding function in the menu stop to stop or press the button in the toolbar.

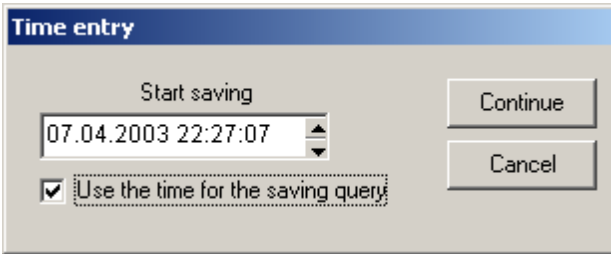
During a measurement process the program cannot be stop. A warning message will appear.



Reading Device Memory

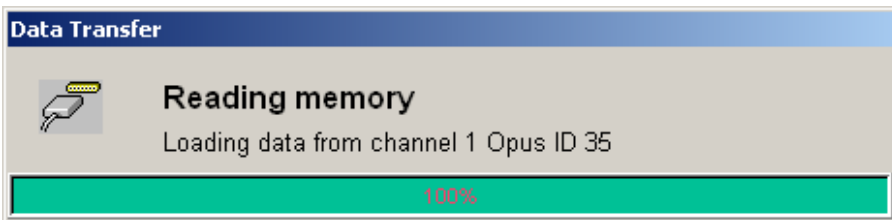
After measuring, activate the function **Read Device Memory** to automatically read the measurement data in your connected devices or network and to transfer the data into your program. To do so activate in the main menu **Settings** the item **Read device memory**.

After activating the function, a dialog box for entering the reading period appears. You may enter here the time for **start saving**. This way, you can directly address and read your desired data range.

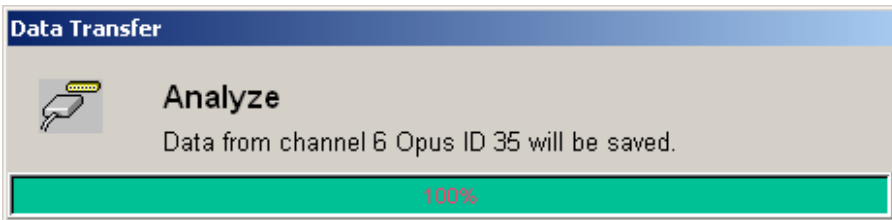


If you turn OFF the option "use time for memory query", the program reads the entire memory available.

During data transfer from measuring device to the program, the data for transferring appears per channel

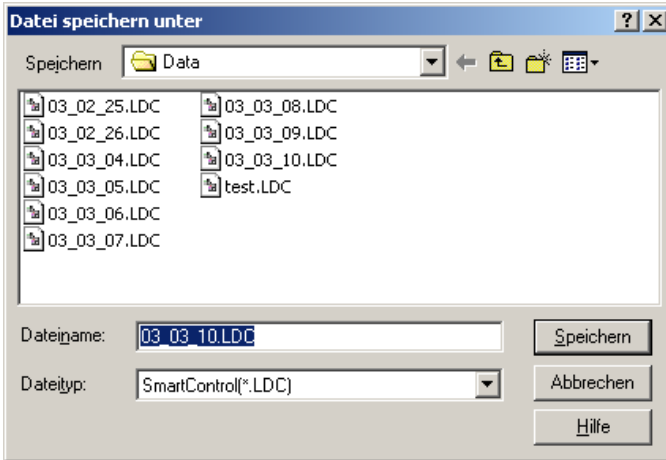


and then the data for transferring appears per analysis.



Note : The data for all channels of a system table will be read – likewise for data which are not permanently deleted and are still in the data pool at the background.

After data transfer, you will be asked to assign your new measuring file a name for saving purposes.

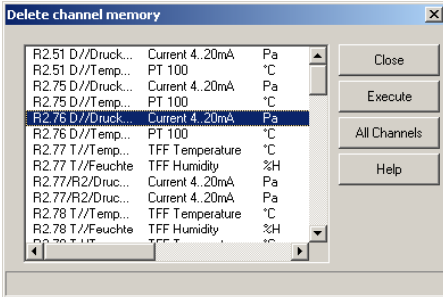


The data are now available for all further evaluations in the program.

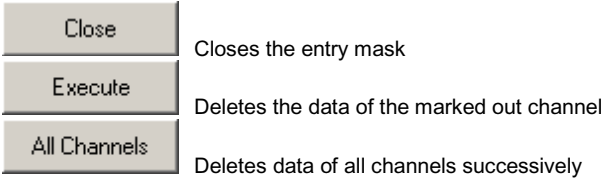
Note: To display your measurement data, select a diagram and set the respective parameters.

Deleting Device Memory

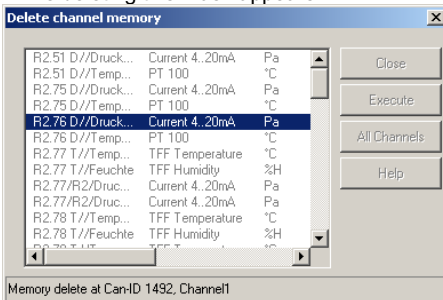
Using this function you may delete the measuring data memory of the OPUS-measuring device. Choose in the main menu **settings** the item **delete device memory**. The following selection mask with all the channels connected to the devices will appear. Select with the left mouse a channel whose values in the device should be deleted and execute the delete command.



The buttons of the selection mask means:



While deleting this mask appears.



Note: A double click with the left mouse on a channel directly deletes the data.

Synchronize Time

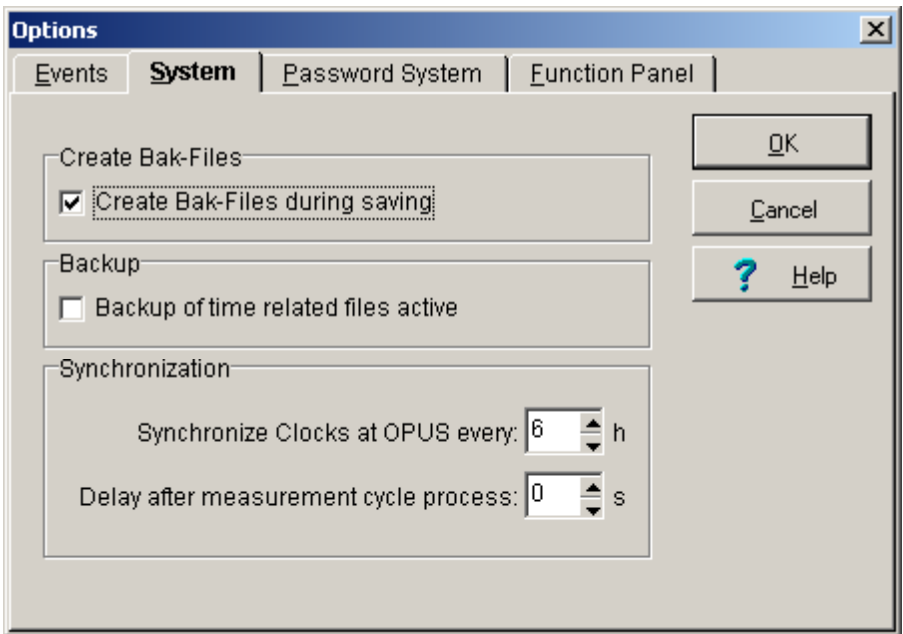
Using this function, all internal clocks of the OPUS-measuring device will be synchronized with the PC-clock. You may choose between manual and automatic synchronization.

Manual synchronization

To synchronize time in each OPUS-measuring device manually, select in the main menu **settings** the item time **synchronize**. The time will be synchronized. No hint will appear!

Automatic synchronization

Since the time in the measuring devices and the computer shows no difference, you may as well let the program do the synchronization automatically. Select in the main menu **options** the item **system settings** and then the register **system**.



As time steps for the synchronization, you may choose between 1 to 12 hours.

Particle Count Control

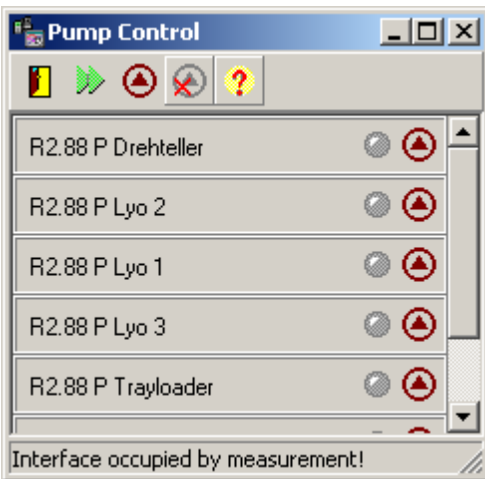
Measuring devices of the series OPUS 208 may be configured as **particle counter**. Select in the main menu **measurement setup** the item **system table** and then the sub item **system/device table** and define here one or several measuring devices as particle counter. The program activates the functions for the pump control of the particle counter.

The pump control for the particle counter could be activated via the toolbar. Pressing the button



Activates the pump control for the particle counter.

The program lists down all connected particle counter in a table.



Closes the pump control of the particle counter



Global query of pump conditions

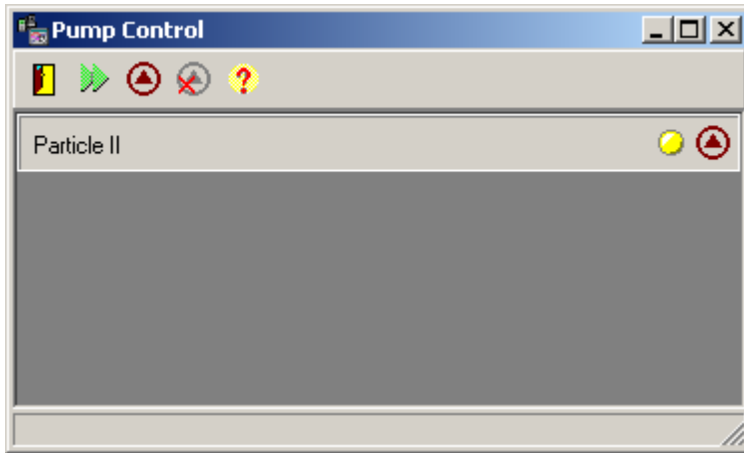


Global switching ON of all pumps



Global switching OFF of all pumps

After switching ON of all pumps, the program shows the operating conditions of each pump in the table. The LED glows yellow if the pump is in operation.



In this table you may switch each pump ON and OFF. Pressing the button



Switches a single pump ON and OFF.

If the pump of a particle counter is switched OFF, the program records for this measuring device no measuring data. The event protocol is likewise not active

The automatic Measuring Operation

The automatic Offline - Measurement

In the automatic offline-mode, the measuring operation runs in the measuring device or network internally without connection to the program SMART Control 1.24.

The automatic offline measurement operates in two parts. Part 1 is device programming. Part 2 is reading of the measurement data from the device memory for further data processing with SMART Control 1.24. During measurement, the measuring devices are not connected to the computer and program. For offline measurement proceed as follows:

Part 1: Device Programming

- Connect your sensors to your measuring device and connect your device via serial port RS 232 to your computer.
- Start the program SMART Control 1.24, to do all settings necessary for your measuring device and to finally do your measurement data evaluation.
- Set the communication port of your measuring device and the program of exactly the same value.
- Read the setup of your measuring device or network and add evaluation functions and diagrams in program.
- Save your measurement configuration in the configuration directory.
- Set your cycle period, start and stop measuring time, and transfer these data into your device.
- Exit the program and assemble your measuring devices at the location you want. You may use your computer during measurement for other purposes.

Part 2: Reading Device Memory

- After measuring, start your SMART Control 1.24 again and open either your configuration file or read your measurement setup again.
- Read your device memory.
- Save your measurement data in the measurement data directory.

After finishing your offline measurement, you may evaluate and represent your measurement values in diagrams and lists using SMART Control 1.24.

The automatic Online - Measurement

Unlike in automatic offline measurement, the measuring devices are connected during the entire measurement period to your computer and program SMART Control 1.24.

The automatic online-measurement is very practical, if your OPUS-measuring devices are situated in several locations and if you regularly need continuous data. To avoid doing manual query of your measuring device every time, you may define an **automatic remote query**.

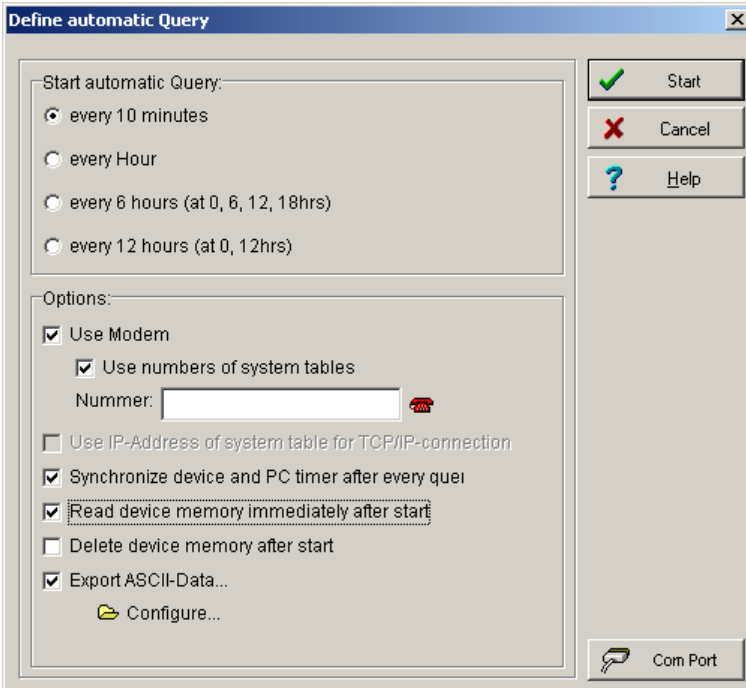
The program dials your different locations at regular intervals, reads the data of every measuring device each per channel corresponding to the configured settings and attaches the readings to the already in program existing measuring data. The measuring values appear at once in your diagrams and will be actualize. Formulas will likewise be calculated.

From the automatic online-measurement to the remote query, please proceed as follows:

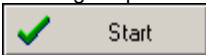
- Connect your sensors to your measuring device and connect your device via serial port RS232 to your computer.
- Start the program SMART Control 1.24, to do all settings necessary for your measuring device and to finally do your measurement data evaluation.
- Set the communication port of your measuring device and the program of exactly the same value.
- Read the setup of your measuring device or network and add evaluation functions and diagrams in program.
- Set your cycle period.
- Save your measurement configuration in the configuration directory.
- ct a file name for saving your measurement data in the measurement data directory.
- Define an automatic query to have cyclic access of data

Automatic Query

To do a cyclic remote query, select in the main menu **settings** the item **define automatic query**. The corresponding entry mask opens up.



You may control here the **cycle query**, the **connection settings**, the **memory handling** in the measuring devices and the **ASCII-Data export**. The entry parameters are described in the following chapter. The button

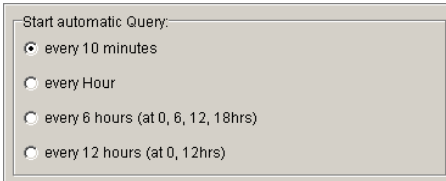


starts the automatic query with the entered parameters.

The entry of the parameter is described in the following chapters.

Query Cycle

First choose under the data block "start automatic query " the **query cycle**.



The screenshot shows a dialog box titled "Start automatic Query:". It contains four radio button options for the query cycle:

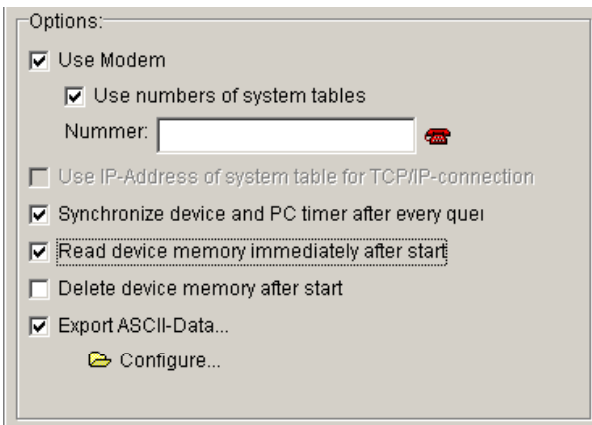
- every 10 minutes
- every Hour
- every 6 hours (at 0, 6, 12, 18hrs)
- every 12 hours (at 0, 12hrs)

The program automatically dials in the measuring process the measuring devices in this query cycle and transfers the data. During data transfer the program automatically recognizes, at what time the data are to be transferred and attaches these to the already existing readings.


Note: The program always set the query cycle time rounded. The entry "every 10 minutes" means that the program will read device at 19:00 hrs, then at 19:10 and at 19:20. If you start your query cycle at 18:57, the next query cycle will be at set at 19:00 hrs.

Remote Connection

Under the data block "options" you may determine how the **remote connection** should be setup.



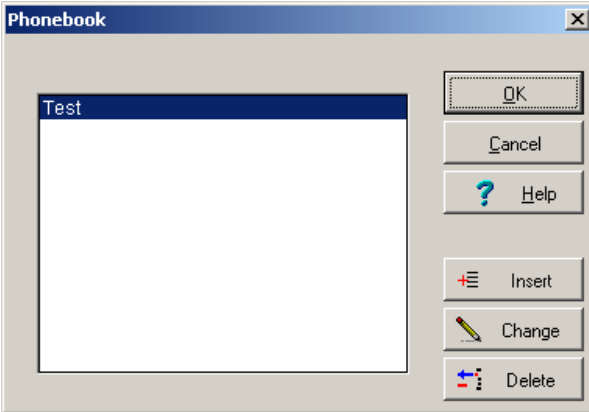
The screenshot shows a dialog box titled "Options:". It contains several checked and unchecked options:

- Use Modem
 - Use numbers of system tables
 - Number:
- Use IP-Address of system table for TCP/IP-connection
- Synchronize device and PC timer after every query
- Read device memory immediately after start
- Delete device memory after start
- Export ASCII-Data...
-  Configure...

If you want to use a modem activate the option **use modem** and enter the corresponding **global phone-number**, where your measuring device could be reach.



Activates the phone book:



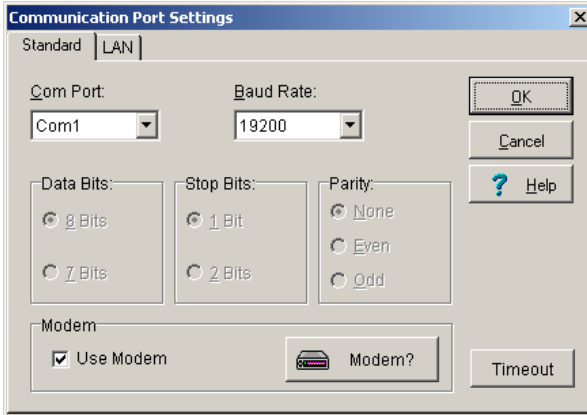
Activate the option **use (phone-) number of the system table**, to dial the specific phone number of each system table successively. The phone number of the system table has priority over the global phone number in the field number. The global phone number is now only active for all measuring devices not listed in the system table.

Note: Use the global phone number when all of your measuring devices are reachable in just one number – even if your devices are assigned in different system tables. If your measuring devices are in different locations, enter each phone number in the system table and leave the field global phone number empty. In case you have entered here a phone number, this will be valid for all measuring devices, which are not assigned to a system table and still in the data pool at the background.

Conform if necessary via the option **interface**, the connecting parameters of your interface.



Activates the entry mask for the interface.



You may now select if the **time after each query** should be synchronize or not. The program sends after data transfer the actual time to the measuring device and then break off the connection.

Now determine how to handle the data in the memory of the device as soon as you have pressed the start button and the automatic query begins.

Selecting the option **read immediately at start**, the program reads the actual data from device memory and attaches it to the existing measuring data.

As alternative you may choose the option **delete memory at start**, to, to delete memory before measuring starts. The program deletes the memory, break off the connection and dials again by the next query cycle. You will obtain the data between the deleting time and the next query cycle.

If you want to export your data after each automatic query directly from the program just click the option **ASCII-export of data**. Then configure the data export. Generally you are provided with two methods of automatic ASCII-data export:

- Standard-ASCII-data export
- Extended ASCII-data export

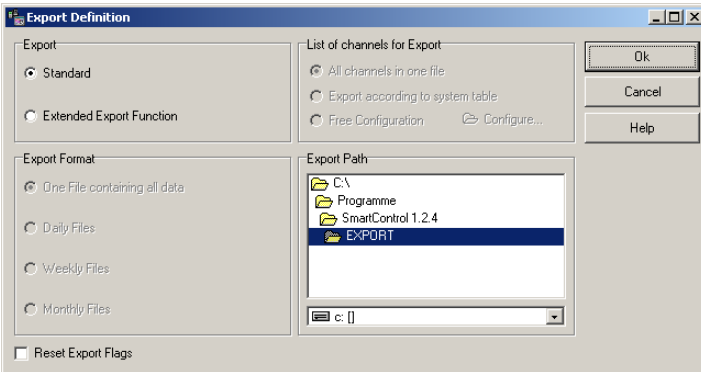
Standard-ASCII-Data Export

In the program the automatic **standard-ASCII-data export** is pre-set. To check out the settings, activate the configuration. The button



opens the dialog-box for the **export definition**

The following entry mask appears.



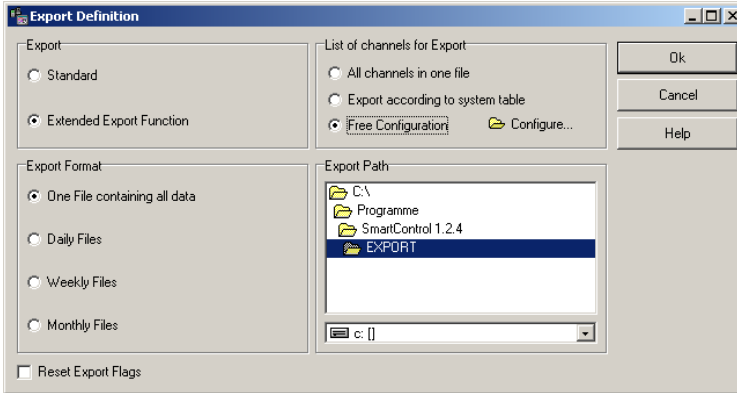
In the **standard-settings**, the program reads the data, attaches it to the existing measuring data and saves it with all other data together. The existing measuring data file will be overwritten.

Mark out the option **re-set export flag**, to force the program to re-read all existing measuring data in the device memory regardless of those already existing data in the program. The program ignores the internal data marking for the end of the data record and overwrites the already existing data in the program with the data from the device memory.

Note: **Re-set the export flag if you are doing the automatic query for the very first time!**

Extended ASCII-Data Export

To use the extended ASCII-data export, click the option **extended export function**. In the entry mask the fields for the extended function will be activated.



Channel Grouping

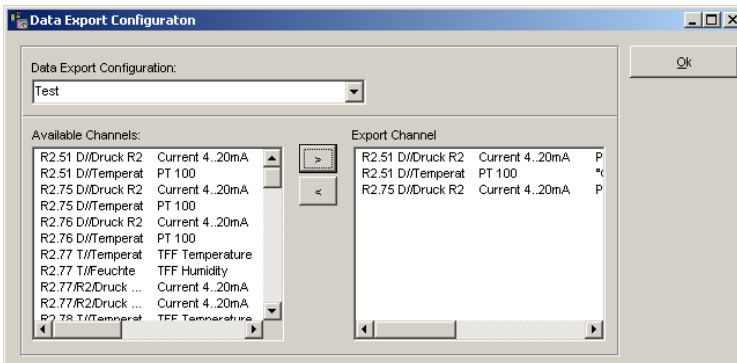
Select in **channel grouping for export** the channels, which should belong to the export file:

- All channels in a file
- Channel grouping corresponds to system tables
- Free configuration of channels

The button



activates the dialog-box for the **free configuration of channels**.



To group channels, you must first assign a name to the **export configuration**. This name is needed for the setting up of file names. You may group as many export configuration as you like, whereby single channels may also be assigned any number of export configuration.

File Configuration

Select in **export format**, how the data should be divided into different time-divisions automatically. The following divisions are possible:

A file with all data:

The file contains all data dependent on the channel grouping and starting from measurement begins.

Daily files:

The files contain daily data dependent on the channel grouping.

The file characteristic is YY_MM_DD
(YY = year, MM = month, DD = day)

Weekly files:

The files contain data of a calendar week dependent on the channel grouping.

The file characteristic is YY_WW_w

(YY = year, WW = Week, w = characterizes week-file)

For weekly files, the following should be observed:

According to the rules for the calculation of the calendar weeks, week 1 of a year may already start in the year before, that means a file with a name 02_01_w.TXT may contain data from 31.12.2002.

In few cases a year may have 53 weeks. The program considers this.

A calendar week starts according to the rule always on Monday and ends on Sunday.

This is set as standard in the program and cannot be modified.

Monthly Files:

The files contain data of a month dependent on the channel grouping.

The file characteristic is YY_MM_m

(YY = year, MM = month, m = characterizes monthly-file)

File Name

After all data entry is finished, the program generates during automatic query ASCII-files with file name combination described as follows: Generally the following file structure is valid:

File name = <Base>_<Addition>.<txt>

The **base** depends on the channel grouping. The following basic names are possible:

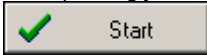
- File name if all channels are exported
- System table if single system tables are exported
- Export configuration if channels are freely grouped

The **Addition** depends on the grouping of data with respect to time. The following additional names are possible:

- No addition data in one file
- YY_MM_DD daily files
- YY_WW_w weekly files
- YY_MM_m monthly files

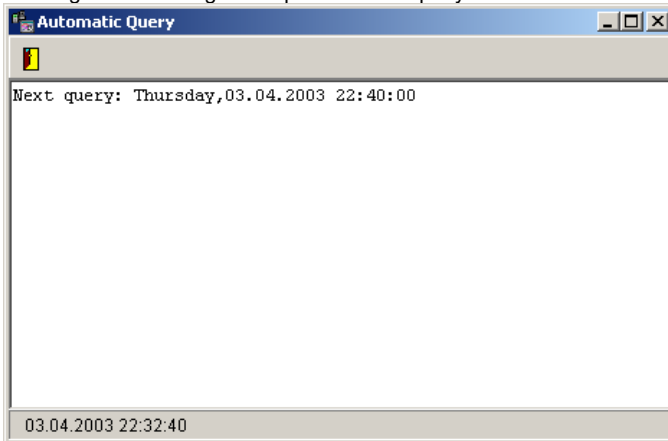
Data Transfer

When you start the automatic query, the program starts measuring with the set parameter correspondingly. The button

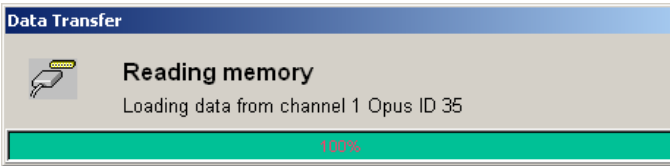


starts the automatic query.

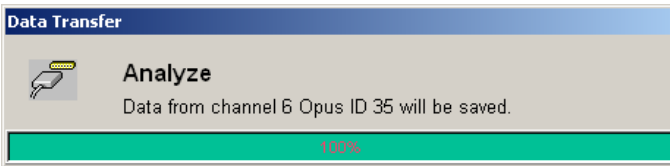
The program dials the device configuration successively, transfers the data into the open measuring data file and attach it to the existing data. At the background, a dialog box appears showing the chronological sequence of the query.



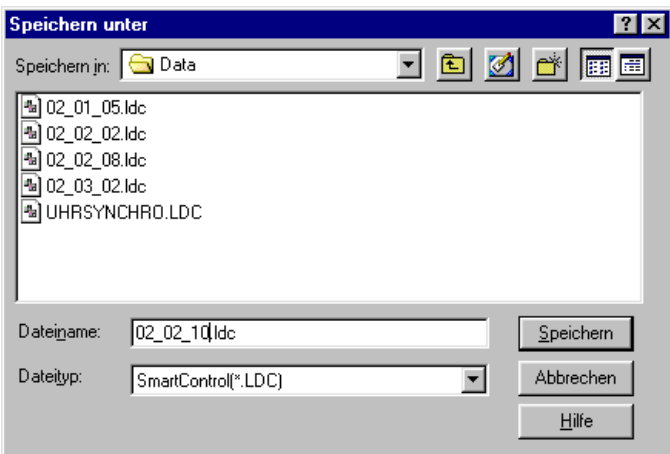
During data transfer, the program shows per measuring channel the current status of the data transfer. The following message appears.



After data transfer, the measurement data of each channel will be analyzed, processed and stored. The following message appears:



In case no measuring file with current valid measurement configuration was opened, the program will ask you, after data transfer to decide for a file name to save the measurement data. The following dialog box appears.



Assign a name for your measurement data file. The program will now save your measuring data.

The Password Protection (Option PAS-ALARM)

The User Administration

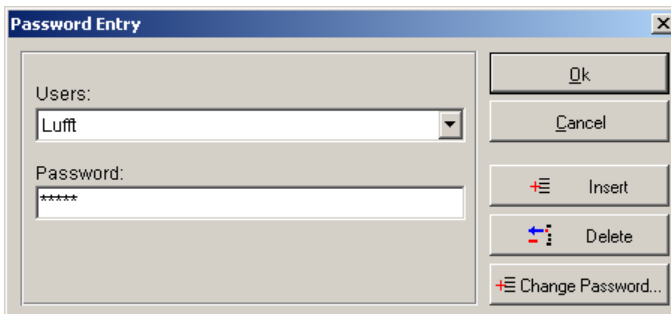
The program supports the administration of several users with different passwords. With the help of user names you may enter or cancel registration in the system. This serves to protect measurement from unintended or unauthorized access. If the program is locked up, entries are no longer possible.

The user administration is hierarchical in three levels. In the upper level the system administrator have the right to set up and delete pass word for the master user and for the lower level user. The pass words may be modified. On program delivery, the system administrator **Lufft** and the password „**lufft**“ are pre-set.

The logging IN/OUT of all users and their actions are documented in the event protocol. The tracking down of actions are hereby certain. The program uses here the levels

- Administrator = Level 1
- Master user = Level 2
- User = Level 3

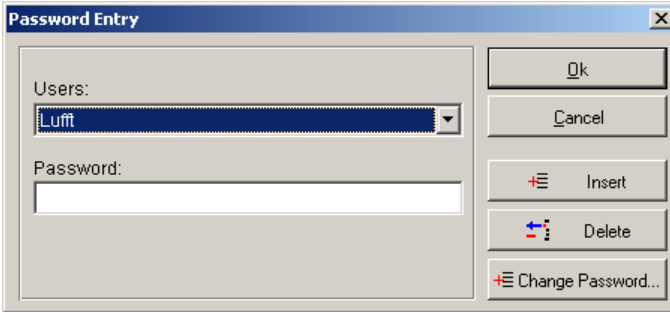
Select in the main menu the item **options** and then the menu item **password entry** to open the user administration. You may also use the corresponding button in the tool bar. Register first as system administrator.



Activates the dialog box for the password entry.

Register as System Administrator

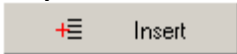
If you enter system administrator **Lufft** and the password „**lufft**“ in the password entry of your delivered program version, the next time you activate this menu you will be given the right to set up lower level main users and normal users, to delete and to assign passwords and to generate a new system administrator.



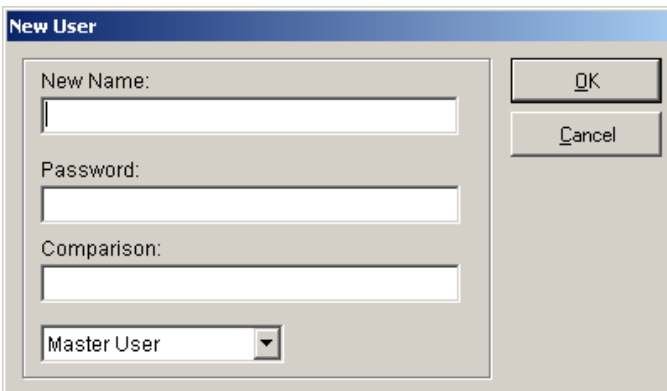
The buttons **insert**, **delete** and **change password** in the dialog box for password entry are then active.

Insert User

As system administrator, you may insert administrators, master users and users. The button



opens the dialog box **New users**



Enter a **new name** and the **password**. For comparison you must enter the password again.

To assign **access rights**, the following three possibilities are available:

- Administrator
- Master User
- User

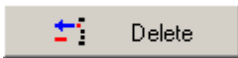
Choose the option **administrator**, if the user will have system administration rights in the future. The rights of the old system administrator will be reduced to normal user. A maximum of three users may have administrator rights.

Choose the option **master user**, if the user will have the right to designate other users in the future. The number of master user is not limited.

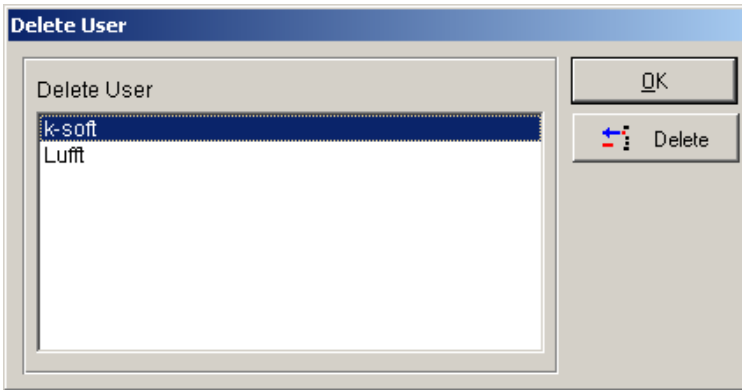
Choose the option **user**, if the user will have only rights of a normal user in the future. The number of normal user is not limited.

Delete User

As system administrator or master user you may delete normal user. The button



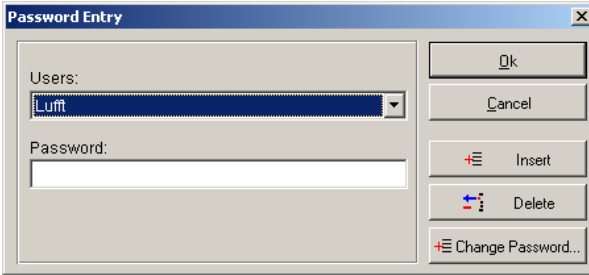
opens the dialog box **delete user**



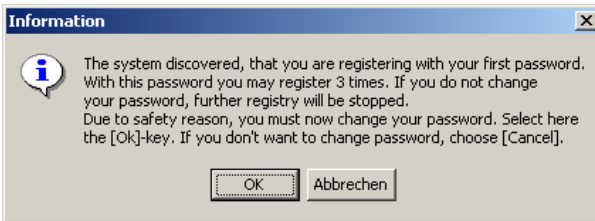
Select the user you want to delete and confirm your entry with **delete**. The system administrator itself cannot be deleted. System administrators can only delete master user.

Register as User

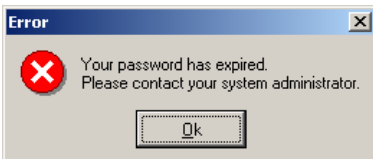
If you are registered as a user from a system administrator or master user, you may register to the system by entering a password. Choose a **user** then enter the corresponding **password**. Confirm your entry with Ok, to register to the system.



If the master user newly set up the user, the following hint appears during the first registration.



You must change the password because the master user knows the password. This means protection is no longer guaranteed. In case you registered three times and you did not change your password, the program will be locked up and the following message appears.

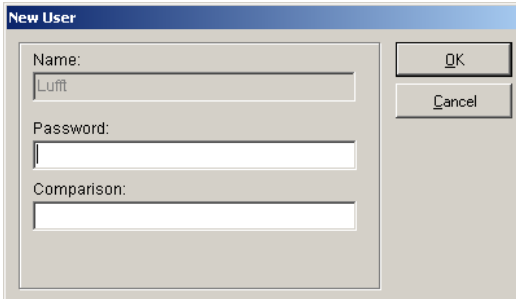


Change Password

As system administrator, master user and normal user you may change your own password. The button



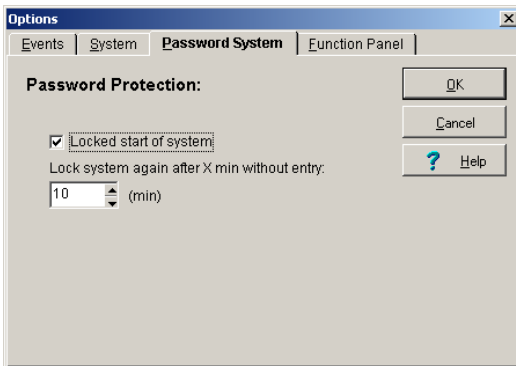
opens the dialog box **change password**

A dialog box titled "New User" with a blue header bar. The main area has a light gray background. It contains three input fields: "Name:" with the text "Luft" entered, "Password:" which is empty, and "Comparison:" which is empty. To the right of these fields are two buttons: "OK" and "Cancel".

Enter a **new password**. For safety reasons you must enter the password again for **comparison**. The password must have a minimum length of 6 characters. After 90 days your password expires. It is compulsory to enter a new password.

Automatic Locking at Program Start

The program is delivered unlocked. As system administrator you may decide if the program should be locked up right at the start. Select here **options** in the main menu, then the menu item **system settings** and then the register **password system**. Select the option if needed and enter the time when the program will lock up by itself again.

A dialog box titled "Options" with a blue header bar. It has a tabbed interface with tabs for "Events", "System", "Password System", and "Function Panel". The "Password System" tab is selected. The main area has a light gray background. It contains a section titled "Password Protection:" with a "Locked start of system" checkbox checked. Below this is a label "Lock system again after X min without entry:" followed by a spin box set to "10" and the text "(min)". To the right are three buttons: "OK", "Cancel", and "Help".

You may choose locking intervals in minutes – between 1 to 10 minutes. The pre-set standard locking time is 1 minute.

Due to safety reasons, an unlocked situation of ten minutes maximum is allowed. This means the system locks up after ten minutes and could only be unlocked again by entering a password.

Cancel Registration and Program Locking

Select in the main menu the item **options** and then the menu item **lock**, to cancel registration from system and to protect your measurement from further entry. You may also use the corresponding button in the toolbar.



Locks up the program.

You may then again run the program if you register yourself again as user or as system administrator via the password entry.

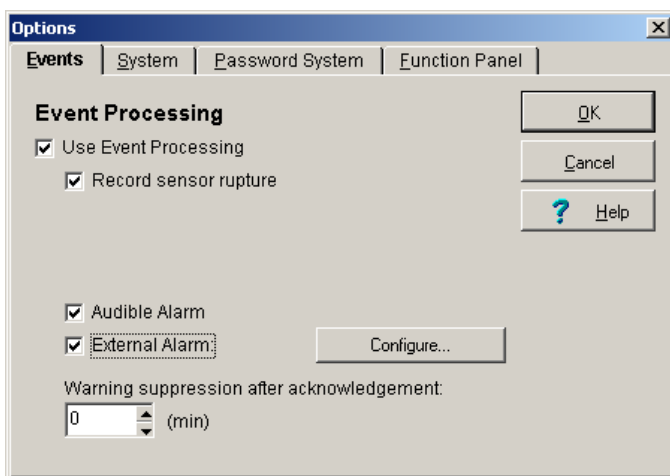


Activates the dialog box for the password entry.

The Event Processing (Option PAS-ALARM)

Activate Event Processing

As main user you may determine how the program should behave by the event processing. Select here the main menu **options** then the menu item **system settings** and then the register **events**. Here you may decide if the protocol should be generally used and which events should be reported.



With the option **suppress warning after acknowledgement**, you may determine how long should an alarm be suppress during limiting value violation or sensor rupture, to gain time for trouble shooting. You may set values between 1 minute and 60 minutes.

The Event Protocol

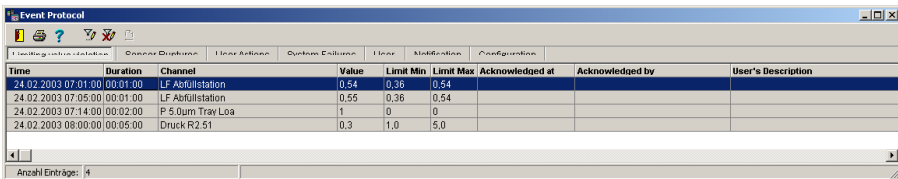
The program is capable of recording **event protocol** parallel to measuring process. The following events are documented:

- Limiting value violation.
- Sensor rupture.
- User-actions.
- System failure.
- Registration and cancellation of users.
- Notification by external alarm.
- Modifications of measuring device configuration .

Select in the main menu **options** the menu item **event protocol**, to activate the table with the corresponding protocol. The program takes down all event reports with date, report text and acknowledgement.

Limiting Value Violations

In the register **limiting value violation**, all limiting value violations that occurred during a measuring period are documented.



The screenshot shows a window titled "Event Protocol" with a table of data. The table has columns for Time, Duration, Channel, Value, Limit Min, Limit Max, Acknowledged at, Acknowledged by, and User's Description. The data rows are as follows:

Time	Duration	Channel	Value	Limit Min	Limit Max	Acknowledged at	Acknowledged by	User's Description
24.02.2003 07:01:00	00:01:00	LF Abfüllstation	0,51	0,30	0,54			
24.02.2003 07:05:00	00:01:00	LF Abfüllstation	0,55	0,30	0,54			
24.02.2003 07:14:00	00:02:00	P 5.Dum Tray Loa	1	0	0			
24.02.2003 08:00:00	00:05:00	Druck R2.51	0,3	1,0	5,0			

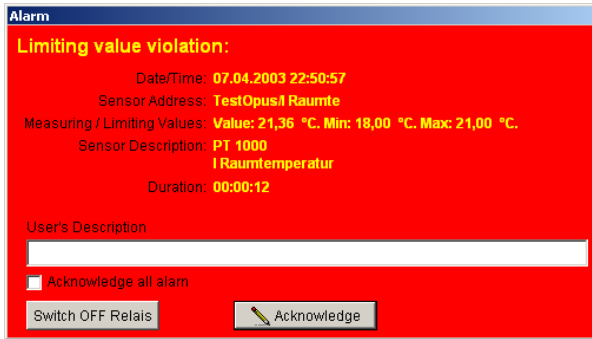
At the bottom of the window, it says "Anzahl Einträge: 4".

The fields of the event protocol for limiting value violation mean:

- Time:** Time of occurrence
Duration: Duration of limiting value violation
Channel: Channel, where the limiting value violation occurred
Value: Measurement value
Limit Min: Lower limiting value
Limit Max: Upper limiting value
Acknowledged at: Date and time of acknowledgement
Acknowledged by: Current registered user of the program
User Description: User specific reason/comments

Alarm by limiting value violation during measuring process

If the event protocol is turned ON and during the measuring process a limiting value violation occurred, the **alarm dialog box limiting value violation** appears.



Alarm

Limiting value violation:

DateTime: 07.04.2003 22:50:57

Sensor Address: TestOpus/I Raunte

Measuring / Limiting Values: Value: 21,36 °C. Min: 18,00 °C. Max: 21,00 °C.

Sensor Description: PT 1000
I Raumtemperatur

Duration: 00:00:12

User's Description

Acknowledge all alarm

Switch OFF Relais Acknowledge

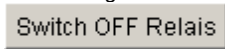
You must enter in the field **user description** a short fault description, to acknowledge an alarm (the entry field is only active with the option PAS-ALARM).

Choose the option **acknowledge all alarms**, to acknowledge limiting value violations and sensor ruptures on all measuring channels at the same time. The button



acknowledges alarm

Measuring devices are often through the relay of an audible or optical alarm post-switched for example at the switch cabinet. After localizing the trouble line, you may switch this warning mute. The relay reactivates itself to the next measuring cycle again as soon as you have acknowledged the alarm. The button

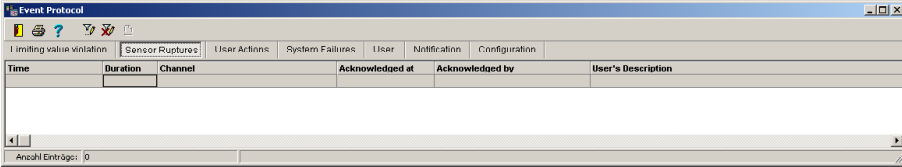


switches OFF the relay output of a measuring device for a moment

Note: If the alarm condition is switched off again during measurement, that means no more limiting value violations; the program closes the alarm window automatically (Auto Quit). The alarm will be listed in the unacknowledged alarm and could be acknowledged and described later. At the lower edge of the screen a red blinking column appears as a hint that a trouble occurred during measurement.

Sensor Rupture

In the register **sensor rupture**, all sensor ruptures occurred at a certain period are documented.



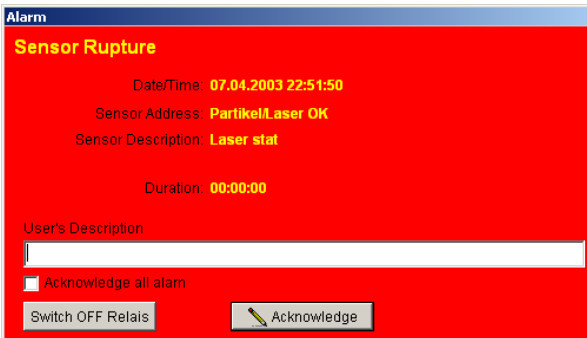
The screenshot shows a window titled "Event Protocol" with several tabs: "Limiting value violation", "Sensor Ruptures", "User Actions", "System Failures", "User", "Notification", and "Configuration". The "Sensor Ruptures" tab is active, displaying a table with the following columns: "Time", "Duration", "Channel", "Acknowledged at", "Acknowledged by", and "User's Description". The table is currently empty. At the bottom left, it says "Anzahl Einträge: 0".

The fields of the event protocol for sensor rupture mean:

Time:	Time of occurrence
Duration:	Duration of limiting value violation
Channel:	Measuring channel, where the sensor rupture occurred
Acknowledged at:	Date and time of acknowledgement
Acknowledged by:	Current registered user of the program
User Description:	User specific reason/comments

Alarm by sensor rupture during the measuring process

If the event protocol is turned ON and during the measuring process a sensor rupture occurred, the **alarm dialog box sensor rupture** appears. You must enter a short comment to be able to acknowledge the alarm report (the entry field is only active with the option OP-PANEL/ALARM).



The screenshot shows an "Alarm" dialog box with a red background. The title is "Sensor Rupture". The text inside reads: "Date/Time: 07.04.2003 22:51:50", "Sensor Address: Partikel/Laser OK", "Sensor Description: Laser stat", and "Duration: 00:00:00". Below this is a text input field for "User's Description". There is a checkbox labeled "Acknowledge all alarm" which is currently unchecked. At the bottom, there are two buttons: "Switch OFF Relais" and "Acknowledge".

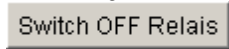
You must enter in the field **user description** short fault description to be able to acknowledge the alarm report (the entry field is only active with the option OP-PANEL/ALARM).

Choose the option **acknowledge all alarms**, to acknowledge limiting value violations and sensor ruptures on all measuring channels at the same time. The button



acknowledges alarm

Measuring devices are often through the relay of an audible or optical alarm post-switched for example at the switch cabinet. After localizing the trouble line, you may switch this warning mute. The relay reactivates itself to the next measuring cycle again as soon as you have acknowledged the alarm. The button

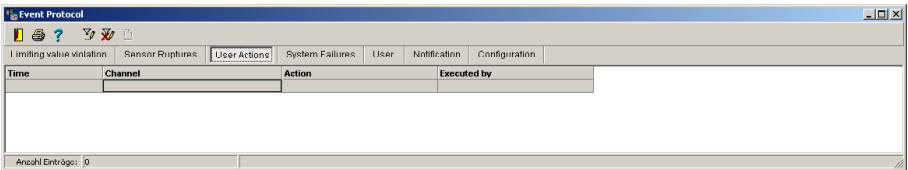


switches OFF the relay output of a measuring device for a moment.

Note: If the alarm condition is switched off again during measurement, that means no more limiting value violations; the program closes the alarm window automatically (Auto Quit). The alarm will be listed in the unacknowledged alarm and could be acknowledged and described later. At the lower edge of the screen a red blinking column appears as a hint that a trouble occurred during measurement

User-Actions

In the register **user-actions**, all user-actions that happened within a certain period will be documented.



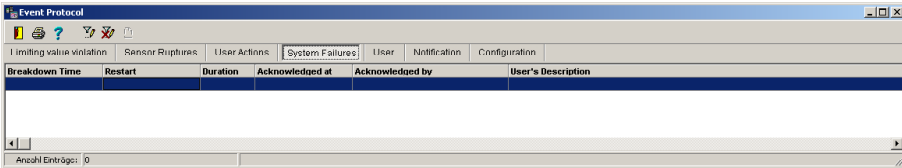
The fields of the event protocol for the user-actions mean:

- Time:** Time of occurrence
- Channel:** Measuring channel, where the user-action occurred
- Action:** Action description
- Executed by:** Current registered user of the program

User actions are not directly reported as alarm on the screen.

System Failure

In the register **system failure**, all system failures – for example voltage failure on computer – occurred at a certain period will be documented.



Breakdown Time	Restart	Duration	Acknowledged at	Acknowledged by	User's Description
----------------	---------	----------	-----------------	-----------------	--------------------

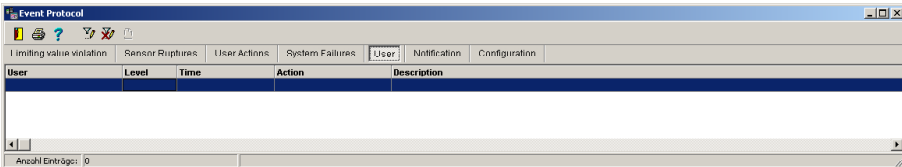
The fields of the event protocol for the system failure mean:

Breakdown time:	Time of system failures
Re-start:	Time of re-start
Duration:	Duration of system failure
Acknowledged at:	Date and time of acknowledgement
Acknowledged by:	Current registered user of the program
User Description:	User specific reason/comments

System failure is not directly reported as alarm on the screen.

User

In the register **User** entries about registration, cancellation of user as well as setting up of new user or changing of passwords are being entered. The user actions will not be reported directly on the screen as alarm.



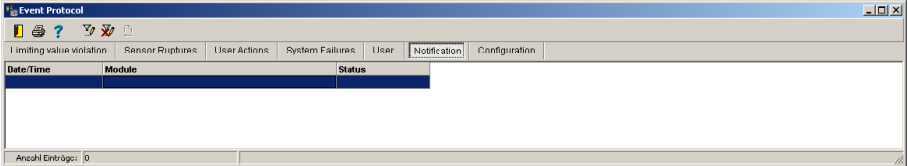
User	Level	Time	Action	Description
------	-------	------	--------	-------------

The fields of the event protocol for user mean:

User:	User name
Level:	User authorized level (1 = system administrator, 2 = master user, 3 = user)
Time:	Date and time of user action
Action:	User action (registering, canceling, setting up of user, changing password)
Description:	additional description of action

Notification

Under the register **Notification** all external notifications will be registered, successful and unsuccessful ones. Notifications are not directly reported as alarm on the screen.

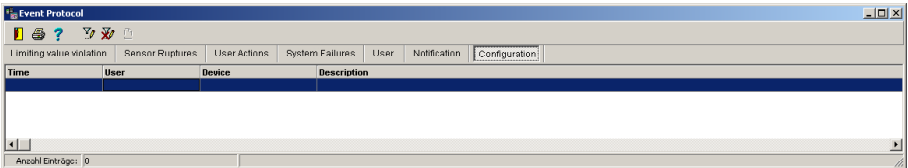


The fields of the event protocol for the notification mean:

Time: Notification time
Module: Notification module
Status: Notification status

Configuration

In the register **configuration** all modifications on the measuring device configuration are entered. Notifications are not directly reported as alarm on the screen.



The fields of the event protocol for the configuration modification mean:

Time: Notification time
User: User name
Device: Device number
Description: Modifications before / after

Apply Event Filter

For easy evaluation of events, you may apply **event filter**. The program provides the following possibilities:

- Filter events according to date and time
- Filter events for one day
- All events



Activate the setting mask of the event filter.



Cancel filter selection.



Stop filtering process.

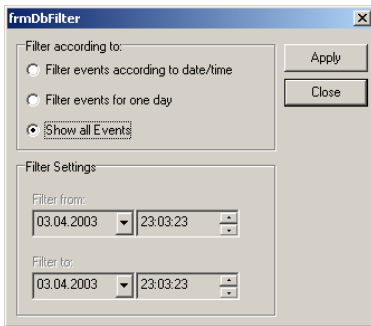
Choose in the item **Event according to date/time**, if you want to display events within a certain period.

The screenshot shows the 'frmDbFilter' dialog box. Under the 'Filter according to:' section, the radio button for 'Filter events according to date/time' is selected. The 'Filter Settings' section contains two rows of date and time pickers. The first row is labeled 'Filter from:' and has a date of '03.04.2003' and a time of '23:03:23'. The second row is labeled 'Filter to:' and also has a date of '03.04.2003' and a time of '23:03:23'. There are 'Apply' and 'Close' buttons on the right side of the dialog.

Choose in the item **events for one day**, if you want to display events within a certain day.

The screenshot shows the 'frmDbFilter' dialog box. Under the 'Filter according to:' section, the radio button for 'Filter events for one day' is selected. The 'Filter Settings' section contains a single row labeled 'Filter:' with a date picker set to '03.04.2003'. There are 'Apply' and 'Close' buttons on the right side of the dialog.

Choose all **events**, if you want to display all events within a file.



Press button **apply** to sort out the events list according to the set criteria. The button



Stop the filtering process.

Print Event Protocol



Activates the page preview, where you may print the **event protocol**.

The screenshot shows a window titled "SmartControl - Page Layout" with a ruler at the top and left. The main content area displays the following text:

Event Protocol
03.04.2003 23:07:51
Ausgedruckt von: Luftt
Ereignisse von: 07.03.2003 00:00:00 bis: 07.03.2003 23:59:00

Limiting value violations

Time	Duration	Channel	Value	Limit Min	Limit Max	Acknowledged at	Acknowledged by
24.02.2003 07:01:00	D0:01:00	LF Abfüllstation	0,54	0,36	0,54		
24.02.2003 07:05:00	D0:01:00	LF Abfüllstation	0,55	0,36	0,54		
24.02.2003 07:14:00	D0:02:00	P 5.0µm Tray Loa	1	n	n		
24.02.2003 08:00:00	D0:05:00	Druck R2.51					

At the bottom of the window, there is a status bar with "x 1", "1 / 1", and "Bereit".

Note: The event protocol will always be completely printed out – it contains all limiting value violations, eventually occurred sensor rupture, user-actions and system failures, change of users and notifications.

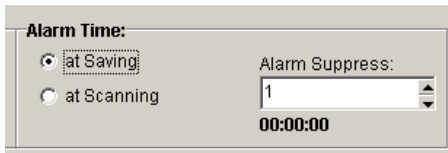
Alarm- and Warning Suppression

The program enables you to set the time for alarm or warning suppression.

Alarm Suppression

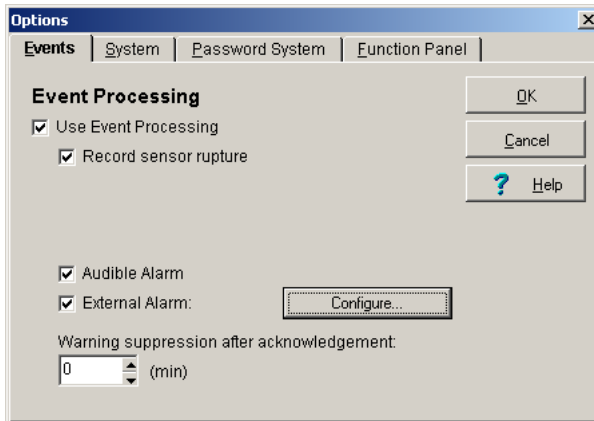
The alarm suppression could be used for suppressing undesired messages during transient process. Message shower could be avoided this way.

For each channel, you may enter a period for the **alarm suppression**. Select in the **OPUS-configuration** the item **channel configuration** and then the **relay output**, to set up the delay time. The program now records all events like limiting value violation after the set delaying time has elapsed. This function could be used for suppressing undesired messages during transient process.



Warning Suppression

To gain time for trouble shooting without being disturbed by new alarms constantly coming in and constantly appearing on the screen, define a warning suppression. Using this function, you may determine how long should an alarm be suppress within the program. Now select in the main menu **options** the item **system settings** and then the register **event**. The following dialog-box opens up.



Set in the option **warning suppression after acknowledgement**, the duration of the suppression. You may set values from 1 minute to 60 minutes. This function is only accessible for the system administrator.

Suppress Alarm Window

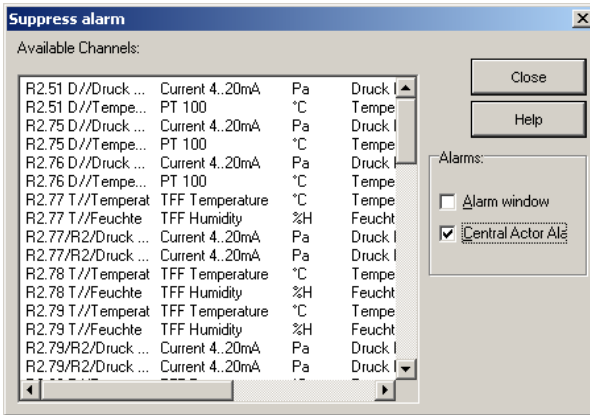
Normally all limiting value violations and sensor ruptures for each channel are indicated on the screen optically and audibly. The program however gives you the possibility to suppress alarm windows for selected channels.

Select in the main menu **measurement setup** the item **system table** and then the button



to choose which channel should the **suppress alarm window** be applied.

The program opens up the corresponding selection box with the available channels of all devices.

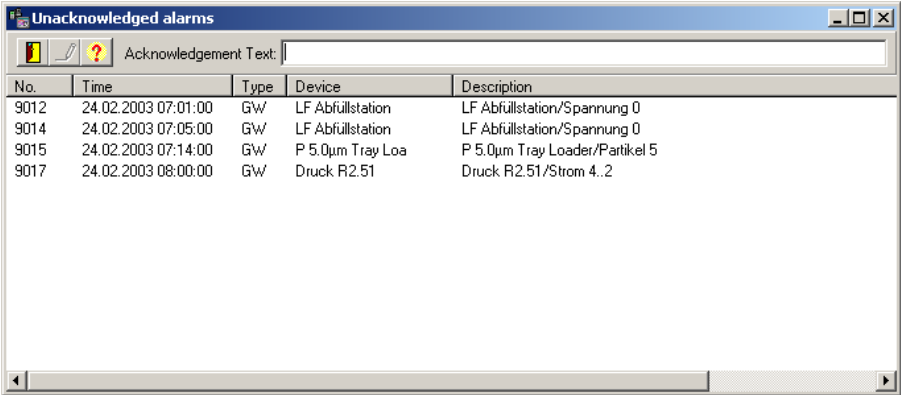


Normally all channels are marked out. The markings mean, in case of limiting value violation, sensor rupture etc., that the optical and audible signalization will be activated. Unmark the channels, which are not supposed to appear as alarm window on the screen.

Note: Only the alarm window on the screen will be suppress. Alarms for the channels are still there and will be listed in the event table as unacknowledged alarms. This could then be process manually. If fault occurs, the program indicates this through blinking horizontal bar at the lower edge of the screen.

Unacknowledged Alarms

All alarms, which are suppressed on the alarm window of the screen, and all alarms, which are during the measuring process time-limitedly indicated, are saved in the list of unacknowledged alarms. To acknowledge the alarms subsequently and to describe fault causes, select in the main **options** the item **unacknowledged alarms**. The program activates the entry mask containing all unacknowledged alarms.



No.	Time	Type	Device	Description
9012	24.02.2003 07:01:00	GW	LF Abfüllstation	LF Abfüllstation/Spannung 0
9014	24.02.2003 07:05:00	GW	LF Abfüllstation	LF Abfüllstation/Spannung 0
9015	24.02.2003 07:14:00	GW	P 5.0µm Tray Loa	P 5.0µm Tray Loader/Partikel 5
9017	24.02.2003 08:00:00	GW	Druck R2.51	Druck R2.51/Strom 4..2

Choose one or several messages, which you want to acknowledge and enter the acknowledging text. Then confirm your text using the button in the toolbar. This text will now be entered in the event list of the alarm messages.



Acknowledges the message(s) with its corresponding text



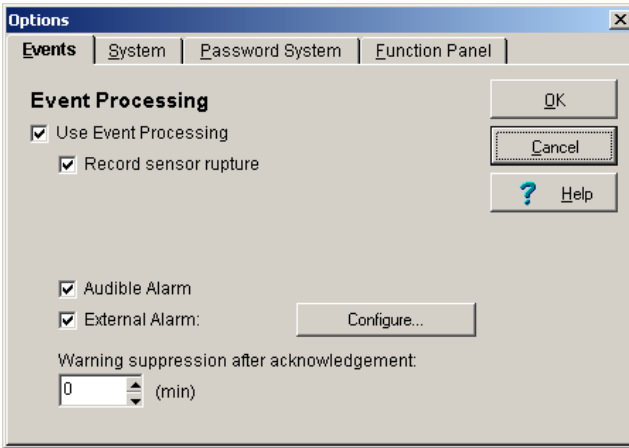
Closes the entry mask

Note: Choose several messages with the mouse, if all should have the same acknowledgement text. After confirming the acknowledgement text, all acknowledged messages in the list of the unacknowledged messages will be deleted. The text of all the chosen messages in the event list will be identically entered.

External Alarm

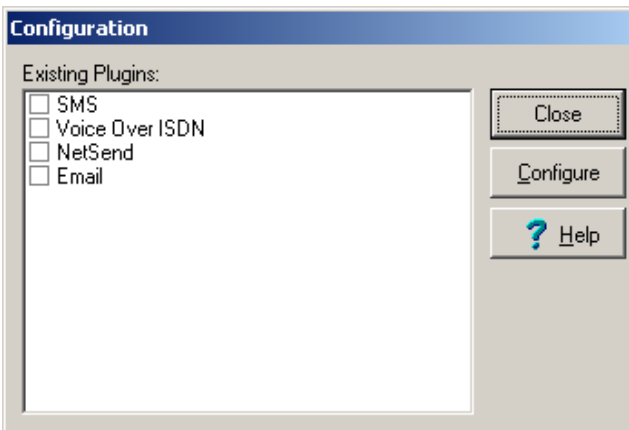
For the **external Alarm** the following protocols are available as plug in:

- Email (Option AL-EMAIL)
- SMS (Option AL-SMS)
- NetSend (Option AL-TCP/IP)
- Voice Over ISDN (Option AL-VOICE)



Configure...

Activates the dialog box for the external alarm configuration.



Alarm via Email

Please activate the Plug-in **Email**, if the program in case of alarm should automatically send an Email to an addressee. The program assumes a successful alarming if the Email is being transmitted.

Configure...

Activates the dialog-box for the configuration of the Email - parameters.

In this box you may enter the parameters for the alarm via Email.

EMail Configuration

With this plugin you may send an alarm message as an email to an SMTP-Server. Enter here your sender address, receiver address and the Host where the email is to be sent.

Select "Use Windows RAS " and your preferred access, if you use the RAS-Service Access for your internet to send an email.

From:

To:

Subject:

SMTP Server:

Message:

Use Windows RAS-Network:

Email Plugin active.

The fields of the Email – plug-in mean:

From:	Enter here the Email - Address of the sender
To:	Enter here the Email - Address of the receiver
Subject:	Subject of the Email
SMTP-Server:	Name or IP-Address of the Mail Server for outgoing Email
Message:	Enter Email message. The following formatting characters are possible: %%s% inserts automatically the channel description in the text %d% inserts automatically the Date/Time in the text

Checkmark the option **use windows RAS-network**, to choose a connection via the RAS-Network. The program dials this connection automatically and disconnects after sending the email automatically as well.

Checkmark the option **Activate Email Plug-in**, to use this function for alarming.

With the button **Test**, you may test the functionality and the correctness of your entered data.

Note: The Plug-in Email assumes a functioning access to an SMTP-Server in Intranet or Internet (Remote-connection to the Internet or MS Exchange Server). In case you cannot establish a connection, please contact your network administrator.

Alarm via SMS (Option AL-SMS)

Please activate the Plug-in **SMS**, if the program in case of alarm should automatically send an SMS to receiver with mobile phone. The program assumes a successful alarming if the SMS is being transmitted. The button:

Configure...

activates the dialog-box for the configuration of the SMS-Parameters.

In this box you may enter the parameters for the alarm via SMS (Short Message Service).

SMS Configuration

With this plugin you may send an alarm message as SMS via an ISDN adapter installed in your computer. Please enter here the mobile phone number of the SMS-Receiver and the SMS-Message to be sent.

SMS-Receiver:

SMS-Message:

Run at Private Branch Exchange

Exchange line:

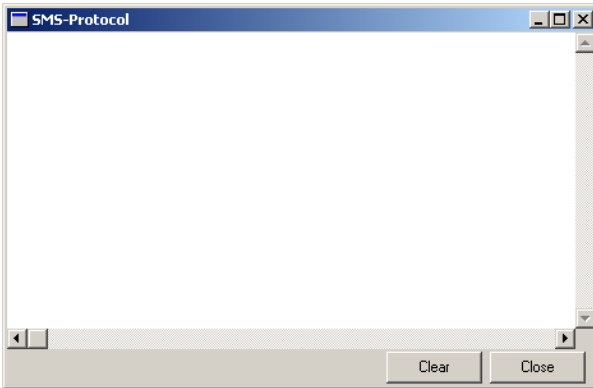
Create Protocol

SMS Plugin active.

The fields of the SMS-Plug-in mean:

- SMS-Receiver:** Enter here the mobile phone number of the receiver
SMS-Message: Enter here your SMS – Message with a maximum of 160 characters
Exchange line: Enter here the number of your Exchange line access

Checkmark the option **Create protocol**, if the program should protocol the sending of SMS. In case of uncertainty an exact analysis may be done through this protocol.



Checkmark the option **Activate SMS Plug-in** to use this function for alarming.

With the button **Test**, you may test the functionality and the correctness of your entered data.

Note: The Plug-in SMS assumes a functioning access to the phone network via ISDN-protocol. . An ISDN-card and the corresponding CAPI-drivers must be installed. In case you cannot establish a connection, please contact your network administrator.

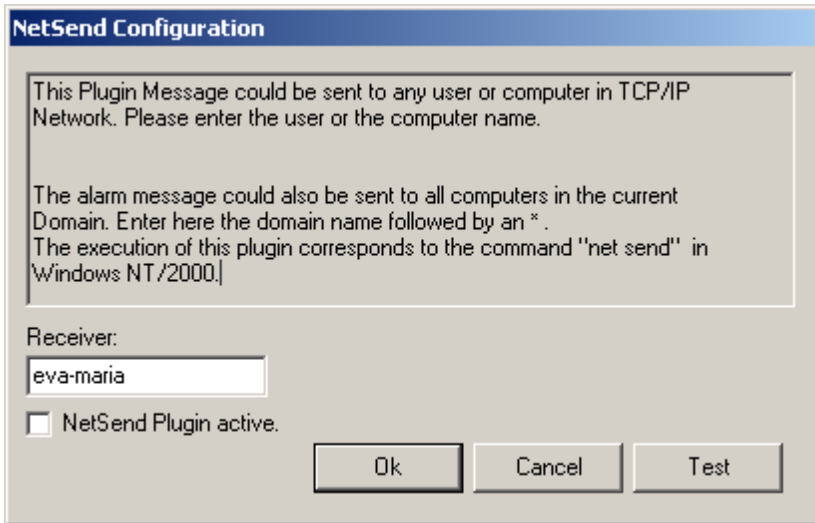
Alarm via NetSend (Option AL-TCP/IP)

Please activate the Plug-in **NetSend**, if the program, in case of alarm should automatically send a message to a receiver in the network. The program assumes a successful alarming if the NetSend message is being transmitted.



activates the dialog-box for the configuration of the NetSend - Parameters.

In this box you may enter the parameters for the alarm via NetSend.

A dialog box titled "NetSend Configuration" with a blue header bar. The main area contains instructional text: "This Plugin Message could be sent to any user or computer in TCP/IP Network. Please enter the user or the computer name." followed by "The alarm message could also be sent to all computers in the current Domain. Enter here the domain name followed by an * ." and "The execution of this plugin corresponds to the command 'net send' in Windows NT/2000." Below the text is a "Receiver:" label and a text input field containing "eva-maria". There is a checkbox labeled "NetSend Plugin active." which is currently unchecked. At the bottom are three buttons: "Ok", "Cancel", and "Test".

NetSend Configuration

This Plugin Message could be sent to any user or computer in TCP/IP Network. Please enter the user or the computer name.

The alarm message could also be sent to all computers in the current Domain. Enter here the domain name followed by an * .
The execution of this plugin corresponds to the command "net send" in Windows NT/2000.]

Receiver:
eva-maria

NetSend Plugin active.

Ok Cancel Test

The fields of the NetSend-Plug-in mean:

Receiver: Enter here the network address of the receiver

Checkmark the option **Activate NetSend Plug-in**, to use this function for the external alarming.

With the button **Test**, you may test the functionality and the correctness of your entered data

Note: The Plug-in NetSend assumes a functioning access to the network via TCP/IP-Protocol. In case you cannot establish a connection, please contact your network administrator.

Alarm via Voice Over ISDN (Option AL-VOICE)

Please activate the Plug-in **Voice Over ISDN**, if the program in case of alarm should automatically send a voice message via telephone to a receiver. At the receiver a voice message will be automatically transmitted (WAV-file). The program scans a list of maximal 10 phone numbers consecutively until a number is being reached or until all numbers are being dialed to a maximum number of dial-repeat. The program assumes a successful alarming if the voice message is being transmitted.

Configure...

Activates the dialog-box for the configuration of the Voice Over ISDN – Parameters. In this box you may enter the parameters for the alarm via Voice Over ISDN.

Voice Over ISDN Configuration

With this plugin you may send an alarm message as a voice via a computer installed ISDN-Card. Enter up to 10 phone numbers to be dialed successively until the Message is transmitted. could be redisplayed.

Choose a wavefile to be transmitted to the receiver.

Enter/Edit Number:

Numbers:

Dial Timeout:

Dial Repetition:

Repeat Message:

Wavefile:

Run at Private Branch Exchange

Exchange line:

ISDN Plugin active.

The fields of the Voice over ISDN – Plug-in mean:

Enter/Edit number: Enter here the phone numbers of the receivers
Numbers: List of phone numbers to be dialed consecutively. A Maximum of 10 numbers is possible.
Exchange line: Enter here the number of your Exchange line access



Inserts the number in the enter field of the list



Inserts the number to be changed in the entry field and overwrite this in the list



Deletes the number



Moves the number in the dial position upwards



Moves the number in the dial position downwards

Dial Timeout Time of rings until the connection is identified as unreachable.

You may set the value between 15 s and 1 min 30 s

Dial Repetition Number of dial trials before transmitting voice message. You may set the value between 1 and 3


Repeat Message Number of repetitions of the voice message by dial success


Wave file Selection of File for the voice message.

The Voice files always have the ending *.wav. The file must have the following format:

Sample frequency 8000 MHz

16 Bit Mono with digit signs

Via the button  right of the enter field, you may select a dialog-box to open the voice file.

Press the button  to load the voice file through the sound card in your computer.

Checkmark the option **Activate Voice over ISDN Plug-in**, to use this function for the external alarming.

With the button **Test**, you may test the functionality and the correctness of your entered data.

Note: The Plug-in Voice over ISDN assumes a functioning access to the telephone net via ISDN-protocol. An ISDN-card and the corresponding CAPI-driver must be installed. In case you cannot establish a connection, please contact your network administrator.

The Evaluation of the Measurement

Entering / Editing Formula

Select in the main menu **Evaluate** the command **Formula Enter / Edit**, to create the formula you need for the evaluation of your measurement values. This dialog box appears.

The dialog box 'Formula Enter/Select' contains the following elements:

- Enter Formula:** A section with a 'No.' field (value 1), a 'Formula:' text box, and 'Load' and 'Save' buttons.
- Name:** A text box.
- Description:** A text box.
- Unit:** A dropdown menu.
- Pre-defined Functions:** A list containing symbols: (,), ;, ^, 7, 8, 9, /, 4, 5, 6, *, 1, 2, 3, -, 0, ., Pi, +.
- Available Variables:** A list containing entries: OP1468M01 mV, OP1468M02 mV, OP1490M01 Pa, Dr, OP1490M02 °C, Te, OP1491M01 Pa, Dr, OP1491M02 °C, Te.
- Buttons:** 'Close', 'Help' (with a question mark), and '-ab Variables'.

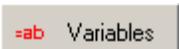
You may select an existing formula from the **formula data bank** and enter this as formula channel in the channel table.

The Fields of the Formula Enter / Select Dialog Box

- No.:** Formula channel number to be entered in the channel table analog to measurement channel number (starting with F..)
- Formula:** Mathematical term consisting of variables (Measurement and Formula Channel) combined with mathematical functions
- Name** Short description of the formula for the channel table and formula data bank
- Description:** Text box for user specific comments about the formula
- Unit:** Physical unit selectable from the units list
- Predefined Functions:** Mathematical functions for combining variables

Available Variables

Measurement or formula channels consisting of device number and measurement channel number or device number and formula channel number.



=ab Variables

Opens an additional dialog box with **user specific defined variable**, which you may additionally use as part of the formula for the formula definition.

Note: A formula channel for combining measurement data will be entered in the channel table of the measurement setup like a measurement channel. A **maximum of 99 formula channels** is possible. A formula can only be saved, if the mathematical term is valid and if the formula name is defined. The **Limits** of a formula are to be entered in the channel table.

Creating a New Formula

To create a new formula, proceed as follows:

1. First choose a **free formula channel number**.
2. Enter your **mathematical term in the formula box**. Signs from the keyboard block may be applied by clicking the left mouse button. Mathematical functions and variables such as measurement channel and other predefined formula channel may also be applied in your mathematical term by double clicking the left mouse button.
3. Always add at the end of your mathematical term a **semicolon „;“**. Only then is your formula complete.
4. Assign your formula a **name**, which will be used as a short description for the channel table and for the formula data bank.
5. Select a physical **unit** for your formula.
6. Describe briefly the **function of the formula** in the respective text box.

Note: If you want to repeat the calculation with different parameters just change the desired formula channel. Calculations from combination of formula channels will be considered and automatically be computed.

List of Implemented Mathematical Functions

+ - * / () < > =	basic mathematical operations
DIV, MOD	integral division and module (the remainder from division)
GGT, KGV	largest common divisor, and smallest common multiple.
^	raise to a higher mathematical power
SQR, SQRT	square and square root
EXP	exponential function
LN, LG, LD	natural logarithm, base 10 logarithm and base 2 logarithm
PI	pi
E	exponential function (inverse logarithm)
NEG	negation
SIN, COS, TAN, COT, ARCSIN, ARCCOS, ARCTAN, ARCCOT, SINH, COSH, TANH, COTH, ARCSINH, ARCCOSH, ARCTANH, ARCCOTH	trigonometric functions angle functions
ABS	absolute value
REZ	reciprocal
FAK	faculty
INT	integer (whole number form floating point number)
DEG	conversion from radial to degrees
RAD	conversion from degrees to radian
RND	rounding
SGN	determines sign (-X = 1, 0 = 0, +X = 1)

Special Function

The following are **special functions**, where you can get a direct access to the channel and to the contained data. The variable name must have a prefix „I“ (for Index) to enable the program to determine the correct value.

<u>Example:</u>	normal variable name:	OP53M01
	special function variable name:	IOP53M01
I	Index Designation	
INDEX	value of the channel at index x	<u>Example:</u> (IOP53M01 INDEX 10)
MEAN	mean value of the channel data	<u>Example:</u> MEAN(IOP53M01)
MIN	smallest value of the channel data	<u>Example:</u> MIN(IOP53M01)
MAX	largest value of the channel data	<u>Example:</u> MAX(IOP53M01)
LAST	last recorded value of the channel data	<u>Example:</u> LAST(IOP53M01)
FIRST	first recorded value of the channel data	<u>Example:</u> FIRST(IOP53M01)
SUM	summation of all values of the channel data	<u>Example:</u> SUM(IOP53M01)

Applying / Saving a New Formula



Adds your formula as formula channel to your **channel table** in the measurement setup.

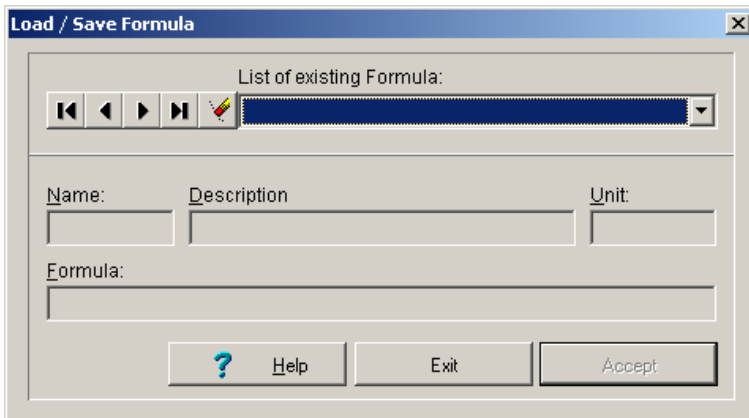
 Save

Saves the valid and complete formula in the **formula data bank**. If your desired formula name already exists in the data bank, you can either overwrite the existing formula name or change your formula name.

Loading an Existing Formula

 Load

In the dialog box of **Formula Enter/Edit** click the **load** button to open this dialog box where existing formulas are listed. Select your desired formula from the list of existing formula and enter this in the Formula Enter / Select box. Formula characteristics will be displayed in the respective fields. Use buttons to go from one data record to the other or to delete unnecessary formula.



Go to first data record



Go to previous data record



Go to next data record

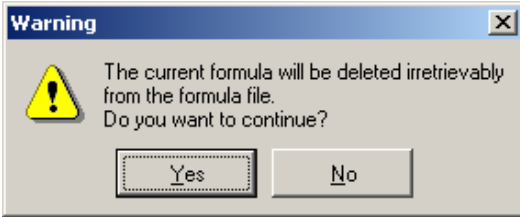


Go to end of data record



Delete current formula

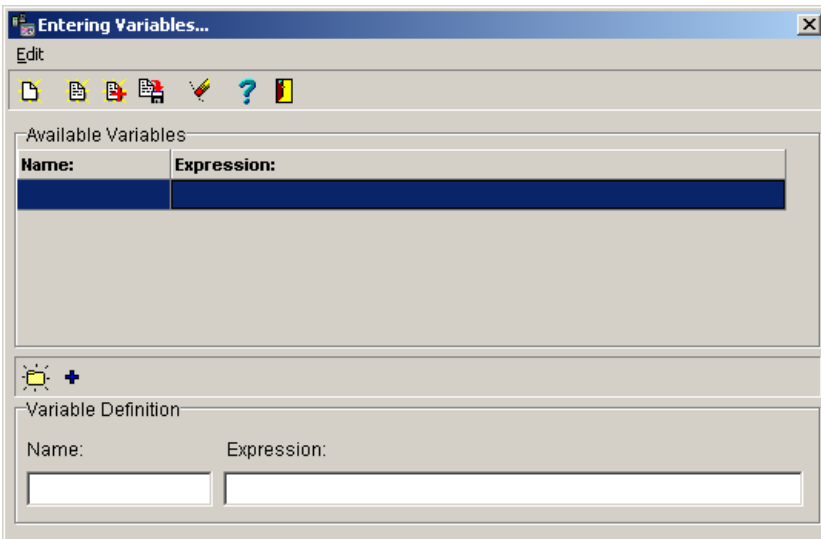
This security check will be displayed before a formula from the formula data bank will be finally **deleted**.



Using Variables

Enter / Edit Variables

Use variables to save often recurring formula part. Hereby you may reduce effort in entering your formula. Select in the main menu **Evaluate** the menu item **entering/editing variables** to define the variables for the processing of your measurement data. This dialog box will appear.

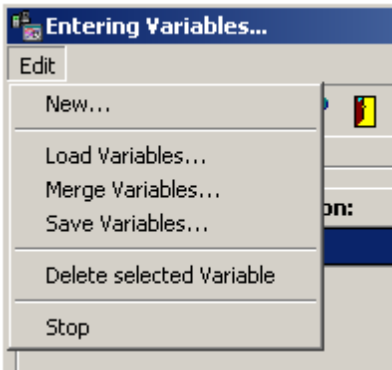


You may save a variable in a **variable data bank**, or you may save in a file and use in any formula.

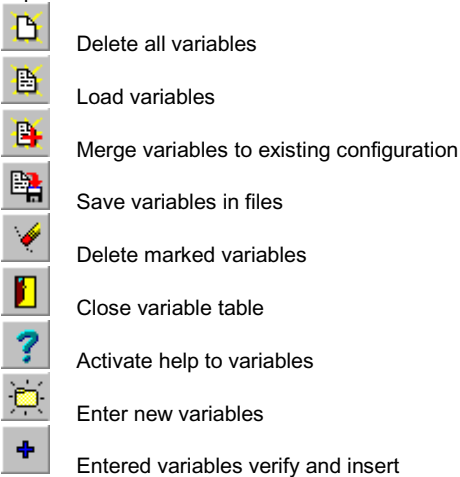
Editing Variables

Select in the submenu of the **variables** the item **Edit** the shown menu will appear with the following functions:

- Add new variable
- Load variable
- Merge variable
- Save variable
- Delete marked variable
- Stop (close table)



The functions are also via the **tool bar of the variable table** comfortable to handle. The buttons in particular means:



The Fields of the Variable Entry / Selection

At the upper part of the dialog box the **available variables** are listed. At the lower part you may enter and insert in the **definition of variables** new variable and modify existing variables. The entry fields means:

Name: Short description of the variable for the variable data bank (file).
Expression: Calculation equation for variables to be use in the measuring and formula channels.

Formulate a New Variable

To formulate a new variable, please proceed as follows:

1. Enter your Calculation equation in the field terms.
2. End-up your calculation equation with a Semicolon „;“. Only then is your equation complete.
3. Give your variable a Name as short description for the variable data bank.

Note: If you want to repeat the calculation with a different parameter, you only have to modify the desired term. Calculations from interdependent formulas will automatically be recalculated.

Accept / Save a New Variable



Verifies the entered variable and insert a valid and complete variable in the **variable data bank**.



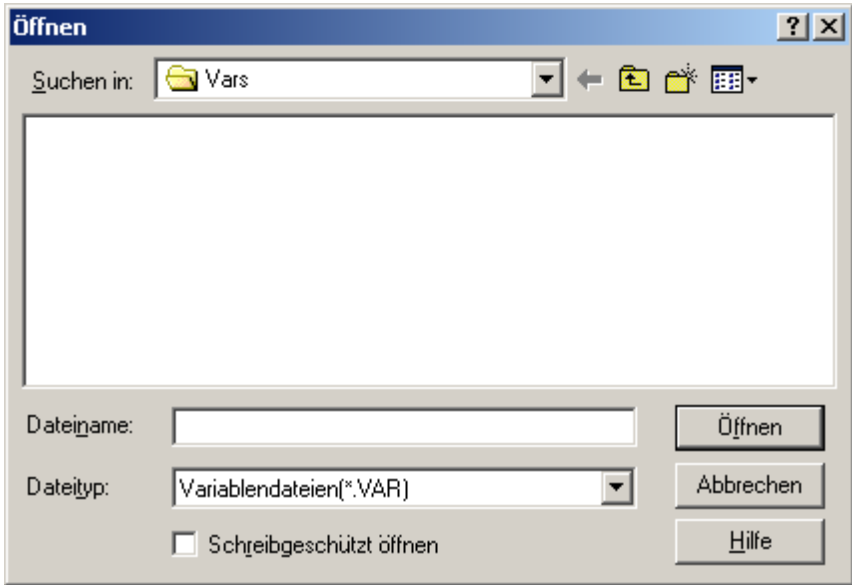
Saves the existing variables in a file.

If the definition of the variable is incorrect this message will appear.



Load Variable / Merge Variable / Save

Select in the submenu **variables** the item **load/ merge/ save variable** or the corresponding button in the tool bar. This dialog box appears. Files for variable have the ending *.var.



Adding Pre-Defined Functions

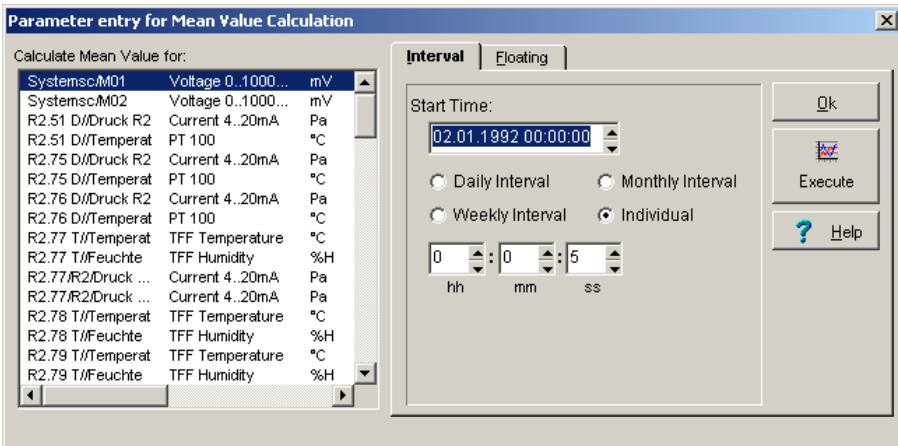
Several pre-defined functions may be delivered optionally with this program. These functions are not included in the standard version of SMART Control 1.24. The following describes the functionality and the integration in the measurement setup.

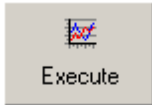
Mean Value Calculation (Option OP-MWSUM)

Select in the main menu **Evaluate** the item **Mean value**. This function is only active in Offline-Mode and if your file contains measuring data. Mean values may be calculated for measuring channels as well as for formula channels. Mean value calculations will be entered in the channel table of the measurement setup with **Channel Definition A...** and **Sensor Type MW...** The program automatically adds comments about the source of the data in the field description. For mean value calculations you may choose between **interval** and **floating** calculation.

Mean Value Calculation in Interval

Select a channel for **mean value calculation in interval**. Enter in the mask **start and stop** the **evaluation** range and the **evaluation -interval**. At the evaluation interval you may choose between daily, weekly, and monthly interval or you may determine the interval individually.



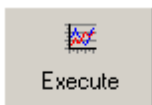
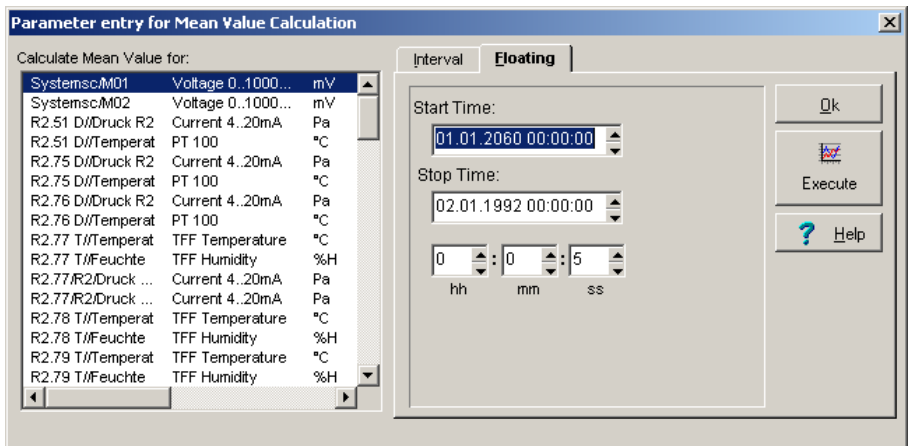


Execute

Click **Execute** with the left mouse button. The program adds an evaluation channel in the measurement setup and calculates mean values of the predefined interval within the evaluation range. The values will be arranged with respect to time in the middle of the interval and may be transferred in a diagram.

Mean value floating:

Select a channel for **floating mean value calculation** to smoothen your measuring results. Enter **start and stop time** for the evaluation range and enter the **Interval**.



Execute

Click **Execute** with the left mouse button. The program adds an evaluation channel in the measurement setup and calculates mean values of the predefined interval within the evaluation range. After each calculation the interval will be moved one step to the next measuring value. In this manner the measuring data will be smoothened. The values will then be arranged with respect to time, in the middle of the interval and will be transferred in the diagram.



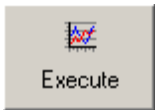
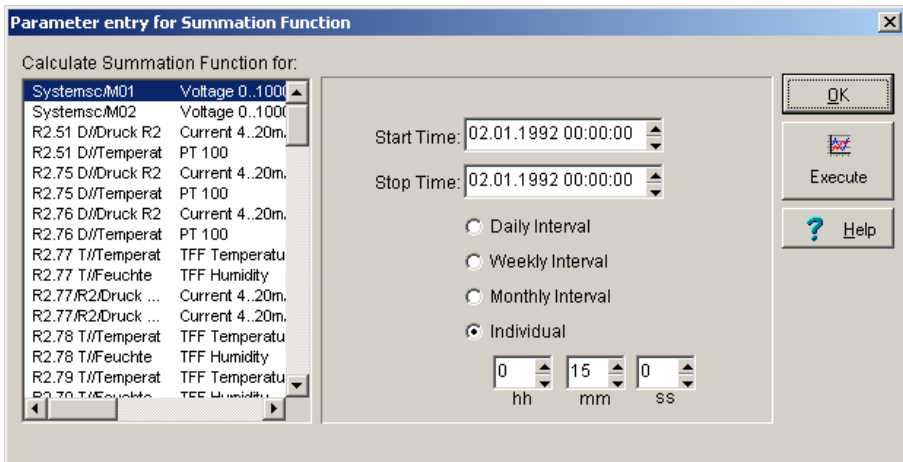
Opens the mean value calculation via the tool bar.

Summation (Option OP-MWSUM)

Select in the main menu **Evaluate** the item **Summation**. This function is only active in the Offline-Mode and if your file contains measuring data.

Sums may be calculated for measuring channels as well as for formula channels. The summations will be entered in the channel table of the measurement setup with **Channel Definition S...** and **Sensor Type Sum**. The program automatically adds comments about the source of the data in the field description.

Select a channel for Summation. Enter **start and stop time** for the evaluation range and enter the **Interval**. To define the interval you may choose between daily, weekly, or monthly interval or you may determine the interval individually.



Click **Execute** with the left mouse button. The program adds an evaluation channel in the measurement setup and calculates the sum of the predefined interval within the evaluation range. For each interval the calculation starts at zero. Finally the summation will be transferred in a diagram.

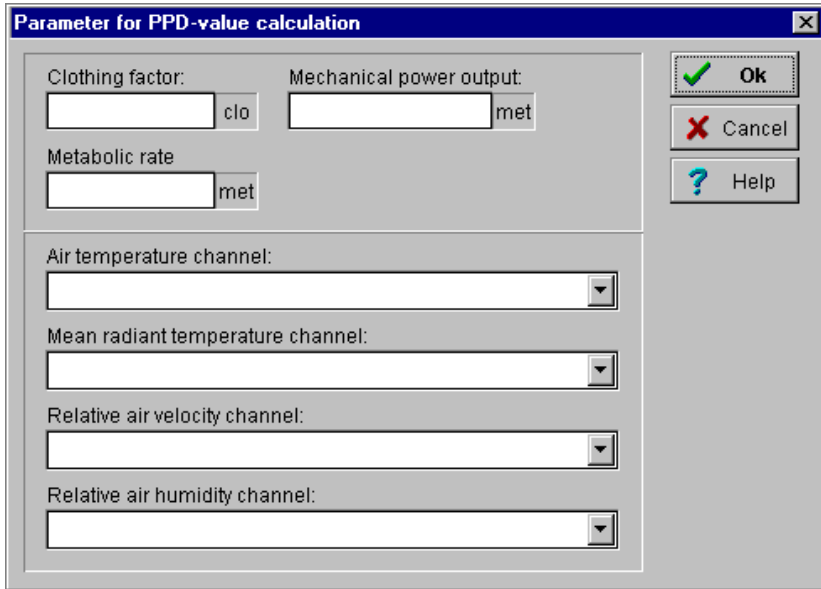


Opens the function summation via the tool bar.

PPD-Value Calculation (Option OP-PPD)

This function enables you to calculate the PPD (predicted percentage of dissatisfied) according to DIN EN ISO 7730. The PPD-Index represents a quantitative prediction about the number of dissatisfied persons in a particular surrounding climate.

Select in the main menu **Evaluate** the item **PPD-Value**. This function is only active during configuration without measurement data. The function is not available if your file contains measuring data.



The dialog box titled "Parameter for PPD-value calculation" contains the following fields and controls:

- Clothing factor:** Input field with unit "clo".
- Mechanical power output:** Input field with unit "met".
- Metabolic rate:** Input field with unit "met".
- Air temperature channel:** Dropdown menu.
- Mean radiant temperature channel:** Dropdown menu.
- Relative air velocity channel:** Dropdown menu.
- Relative air humidity channel:** Dropdown menu.
- Buttons:** "Ok" (green checkmark), "Cancel" (red X), and "Help" (question mark).

Enter the **Parameters** for the calculation of the PPD-value and select the channels with the corresponding **Measuring values**. The program adds an evaluation channel for the **PPD-Value** in the measurement setup with a **Channel Definition PD...** and with a **Sensor Type PD-Value** and also adds an evaluation channel for **Turbulent Rate** with a **Channel Definition T...** and with a **Sensor Type Turbulent**. For the PPD-Value Calculation the following **Parameters and Measuring values** are necessary:

PARAMETERS

1. Clothing factor in [CLO]
(Thermal isolation value for clothing combinations)
2. Energy Yield in [met]
(degree of physical activity)
3. Mechanical Output in [met]
(the effective mechanical output – for most works = 0)

MEASURING VALUES

1. Air Temperature in [°C]
(surrounding temperature at measuring point)
2. Mean Radiant Temperature in [°C]
(Globe Thermometer)
3. Relative Air Velocity in [m/s]
(air velocity at measuring point)
4. Relative Air Humidity in [%]
(relative surrounding humidity at measuring point)

Depending on the number of sensors, several PPD-Indices may be determined simultaneously during measurement.

The first PPD-Index and Turbulent Rate will be calculated after the first 200 measuring values and will be continuously displayed from there on.



Activates the calculation of the PPD-Indices via the tool bar.

Application Fields of the PPD-Index

The aim of this standard is,

1. to describe a procedure for predicting the warmth feeling and the degree of discomfort of persons who are exposed to a moderate surrounding climate.
2. to lay down conditions for the surrounding climate which bring about a feeling of comfort.

The international standard is valid for healthy men and women. It is originally based on the study of the North American and European citizens. It also corresponds to current studies on Japanese, which are exposed to moderate climate. It is expected that the norm is applicable with good approximation to almost all part of the world. However ethical and national-geographical deviation may occur which makes a further study necessary.

The standard is applicable to persons exposed in an inside room climate, where a feeling of thermal comfort is to be attained. It is also applicable to inner room climate where a moderate deviation of the comfort condition may exist. In an extreme surrounding climate, other international norms are applicable. Deviation may occur for sick and handicap persons. This standard is applicable for the creation of a new surrounding climate or for the evaluation of an existing surrounding climate. This standard is drawn for the working surrounding climate, but may also be applied for any other kind of surrounding.

Predicted Percentage of Dissatisfied (PPD)

PPD-Index represents a quantitative prediction about the number of dissatisfied persons in a particular surrounding climate. With the PPD-Index, it is possible to predict the percentage of a large group of persons who feel warm or cold. This means that these persons could be categorized according to the 7 levels of climate rating scale, which is very warm, warm, cold or very cold.

With the PPD-Index, it is possible to predict the number of a large group of persons who are dissatisfied with the surrounding climate. The rest of the group may have a climatic neutral, a little bit warm or cold feeling.

Acceptable Surrounding Climate for Comfort

Thermal comfort is defined as a feeling, which expresses the satisfaction with the surrounding climate. Dissatisfaction arises from discomfort of the body as a whole due to the effect of warmth and coldness. This is expressed through PMV and PPD. Thermal discomfort may also be due to unintended cooling (or warming) of certain part of the body, example through draft, which could be expressed through a model for predicting the degree of impairment through draft. Local discomfort may also be due to an abnormal high vertical temperature difference between the head and the ankle, caused by very warm or cold flooring or very high asymmetry of the radiant temperature. Discomfort may also be caused by very high energy yield or heavy clothing.

Due to individual difference, it is impossible to define a surrounding climate, which satisfies everybody. There will always be a percentage of dissatisfied persons. But it is possible to define a surrounding climate, which could be predicted that a certain percentage of surrounding exposed persons feels the climate to be acceptable. In appendix D of DIN EN ISO 7730 are suggestions for the comfort requirements drafted, which could be predicted that 90% of the surrounding exposed persons accept and 85% feel not annoyed by draft.

In some cases, a higher quality of the surrounding climate as mentioned above (less dissatisfied) is desired. In some other cases, a lower quality of the surrounding climate (more dissatisfied) could be sufficient. In both cases, the PMV-and the PPD-index and the model for prediction of the degree of impairment through draft could be applied to determine other fields of surrounding climate parameters as suggested in appendix D of DIN EN ISO 7730.

Turbulent Rate Calculation

The Turbulent Rate is calculated as follows:

$$T = sv / vm * 100$$

$$vm = 1/n * \text{Sum} (n, i = 1) * vi$$

$$sv = \text{SQRA} (1/(n-1)) * \text{Sum} (i = 1 \text{ to } n) * (vi -vm)^2$$

Where:

T	Turbulent Rate in %
sv	Standard deviation of the current values of the air velocity
vm	mean air velocity (time related mean value of the air velocity, see also VDI 2080)
n	number of measurements
vi	current value of the air velocity

Energy Yields of Different Physical Activities

Type of Physical Activities	Energy Yield	
	W/m ²	met
Leaned	46	0,8
Seated, relaxed	58	1,0
Sitting activity (office, apartment, school, laboratory)	70	1,2
Light standing activity (shopping, laboratory works, light industrial works)	93	1,6
Mid-heavy standing activity (Selling, house keeping, operation machines)	116	2,0
Walking on plane surface:		
2 km/h	110	1,9
3 km/h	140	2,4
4 km/h	165	2,8
5 km/h	200	3,4

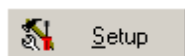
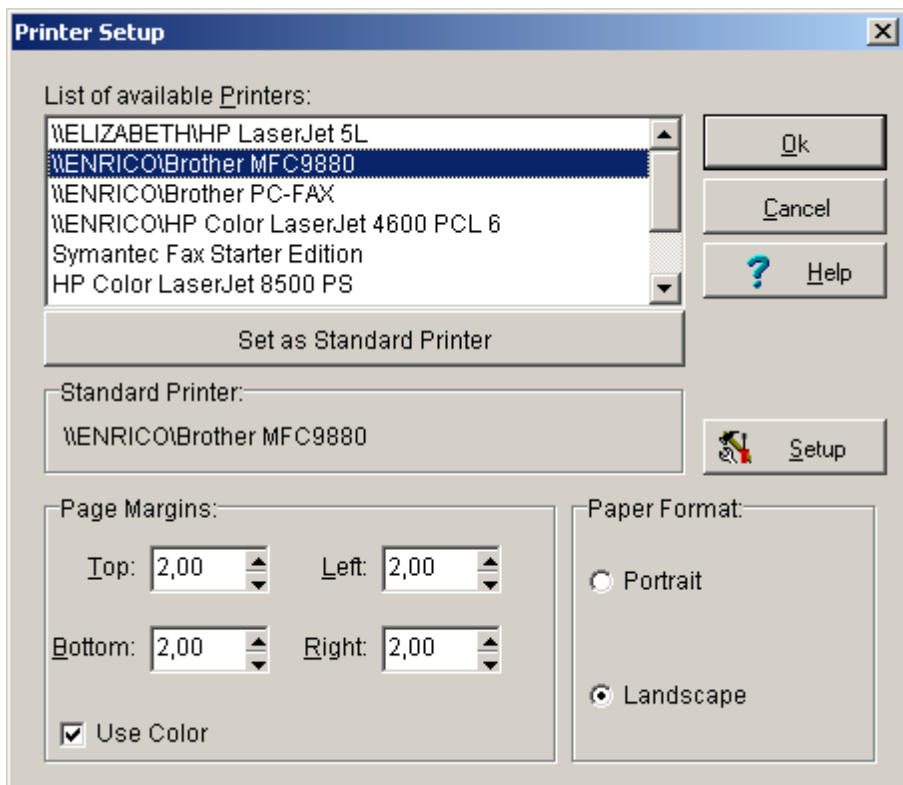
Insulation Value for Clothing

Clothing	Insulation Value	
	m ² /W/kW	clo
Naked	0	0
Light clothing (shorts, shirts)	80	0,5
Clothing with shirts, pants, socks, shoes	100	0,65
Normal working clothes	125...160	0,8...1
Light sport dress with jacket	160	1
Heavy working clothes with underwear, socks, shoes, vest, jacket	200	1,3
Clothes for cold weather with coat	250...300	1,6...2
Clothes for very cold weather	450...600	3...4

Printing-out of Measurements

Configure Printer

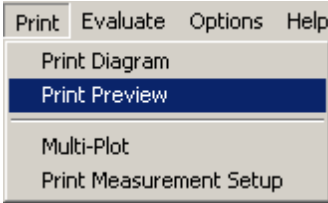
Select in main menu **File** the command **Printer Setup**, to configure your printer. The dialog box on the left will appear.



Opens the printer setup according to Windows-Standard. You may set here further options of your printer.

Diagram Preview

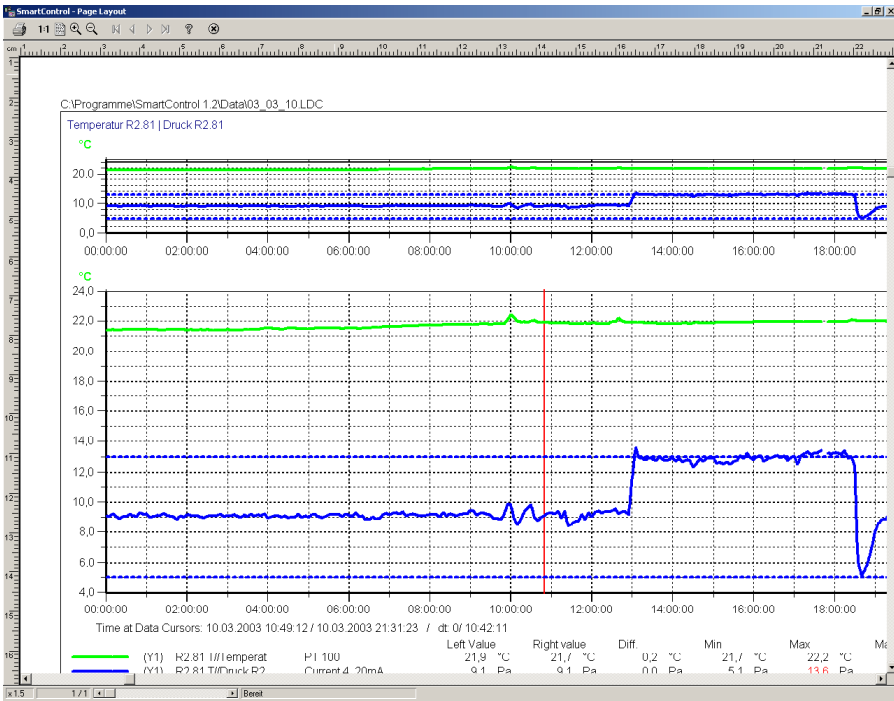
Select in the main menu **Print** the command **Page Preview**. The page preview shows the page, which will be printed later. This view mode is only available for the Y/t-diagram and for the X/Y-diagram. The digital and column monitoring diagrams and function indicating panel do not have page previews.



Hint: By activating the page preview via Menu Print, the printer selection box will first appear..



go to diagram preview.





Go to printer setup



Shows view in scale 1:1



Shows all pages at the same time



Enlarges view



Reduces view size



Apply grid



Go to page one of view



Go to previous page



Go to next page



Go to last page of view



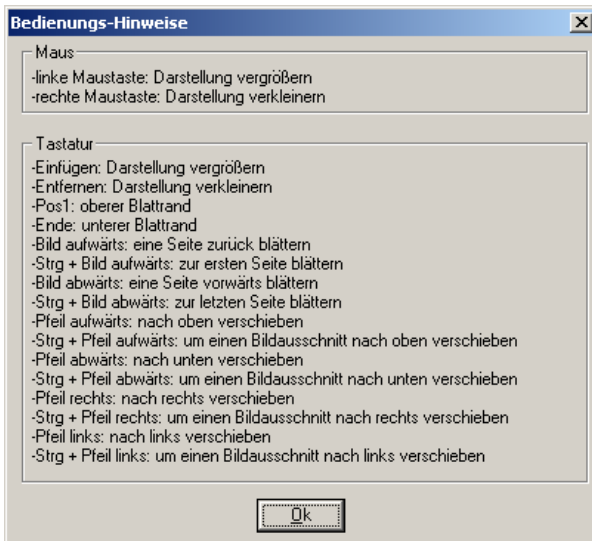
Displays help for mouse button and key functions



Exits page preview



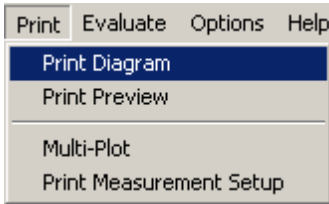
Press the button , to activate the help functions below.



Print Diagrams

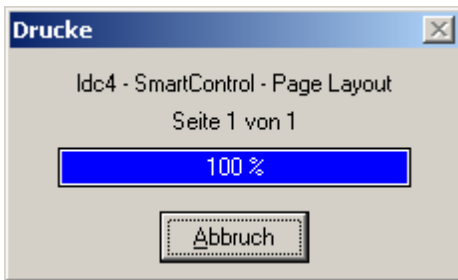
The function **Print Diagram** is available only for active Y/t-diagrams or X/Y-diagrams. Digital and column monitoring diagrams cannot be printed.

Select in main menu **Print** the command **Print Diagram**, to directly print your diagrams. The page preview will not be shown anymore.



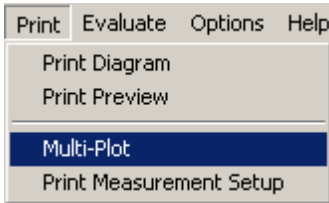
Print your Y/t- or X/Y-diagrams directly without printer setup and page preview.

During printing, the box on the left appears. You may cancel printing here.

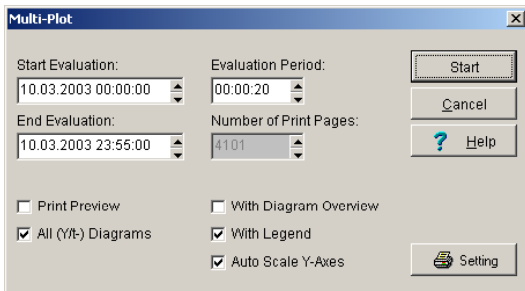


Multi-Plot (Option MULTI-DOK)

The function **Multi-Plot** is available only for active Y/t-diagram. It allows to print your measurement data in several consecutive pages. Select in main menu **Print** the command **Multi-Plot**, to print your measurement data in several consecutive pages.



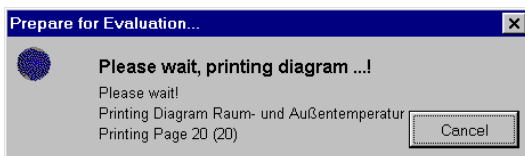
Activates the function Multi-Plot from the toolbar.



Enter the **Start and End Time** of the measuring data to be printed. With the **Evaluation Time** you may determine the interval between two consecutive measurement values. The number of pages to be printed will be automatically calculated by the program. Set your printer if necessary and select from the following options for your printouts

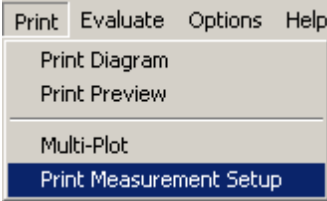
- Page preview
- Print all Y/t-diagrams
- Print with overview diagram
- Print with legend
- Automatic scaling of the Y-axes

After confirming your entries this notice appears during printing. You may cancel here your printing job.

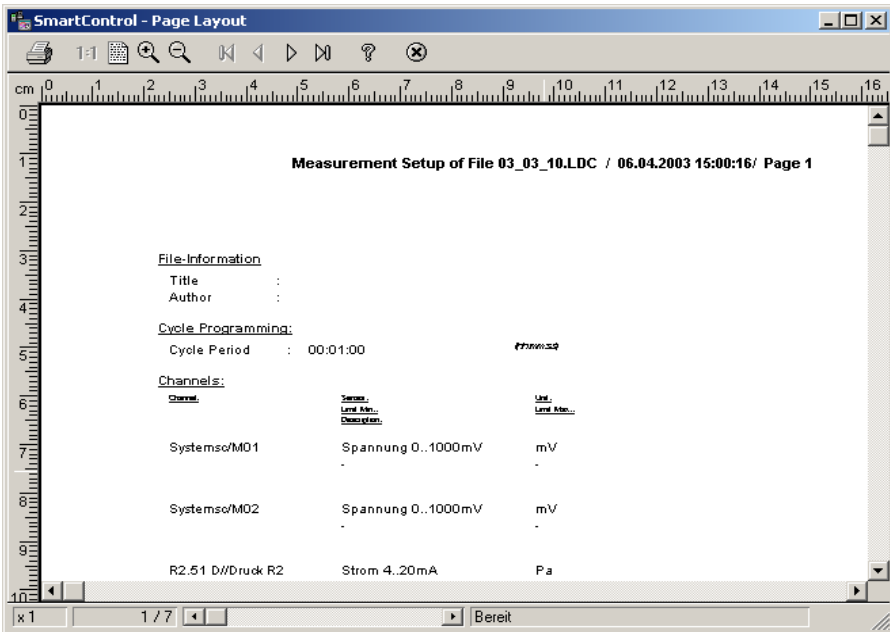


Print Measurement Setup

Select in main menu **Print** the command **Print Measurement Setup**, to print your measurement setup.



Before finally printing, the program goes to page preview and shows the measurement setup there.



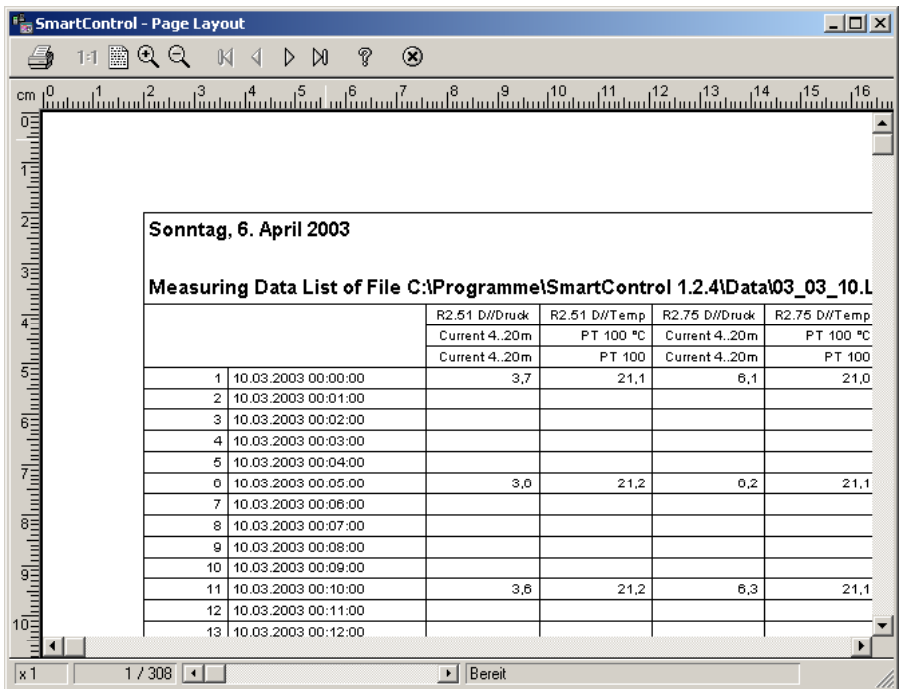
Print Measuring Data List

Select in the main menu **Diagrams** the menu item **Global Measuring Value List** and press here the button **Print Table**. The preview of the measuring data list appears on the screen. You may print from here your measuring data list.

To print a **local measuring data list**, proceed as follows:

- Create a **Diagram** and assign your desired measurement channels.
- Activate the **Local Menu** by clicking the right mouse button.
- Select here the command **Measuring Data List**
- Press the button **Print Table**

The program goes to the page preview. From here you may print your measuring data list.



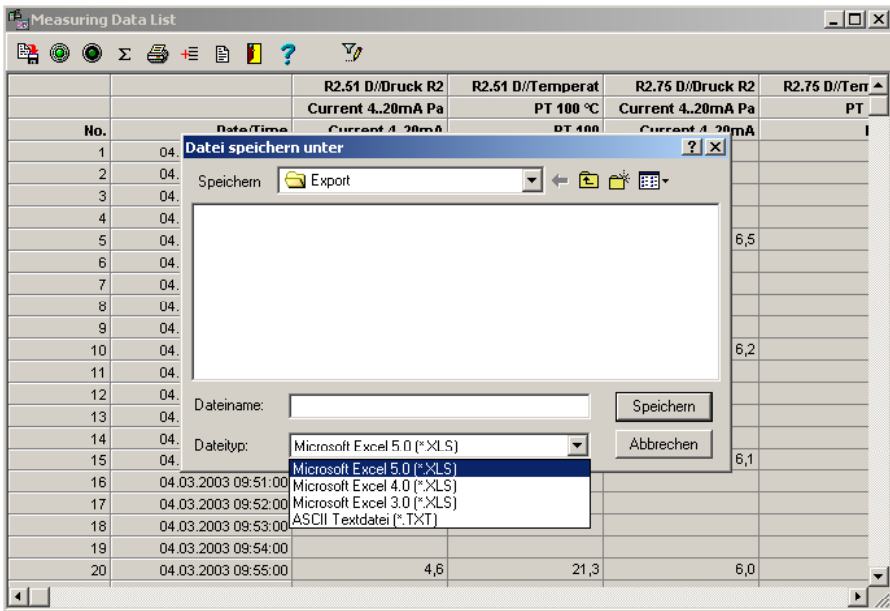
Hint: You may print your data from a Y/t-diagram independent of the exact measuring time. In case the option **relative time axis** is activated, the diagram shows the chosen values starting from 00:00:00 hours. The date is no longer active.

Exporting Measuring Data

Select in the main menu **Diagrams** the menu item **Global Measuring Value List** and press the button **Export Data**. A dialog box with formula selection will be open. From here you may then export your measuring data list

To export a **local measuring data list** in EXCEL- or ASCII-Format proceed as follows:

- Create a **Diagram** and assign your desired measurement channels
- Activate the **Local Menu** by clicking the right mouse button
- Select here the command **Measuring Data List**
- Press the button **Export Data**
- Choose a **File Name**
- Choose a **Data Format**



The Files

File Types

All document processing are carried out in main menu **File**. The SMART Control 1.24 files follow the file name conventions **<name>.ldc**". The file extension **„ldc"** is permanent and is added automatically.

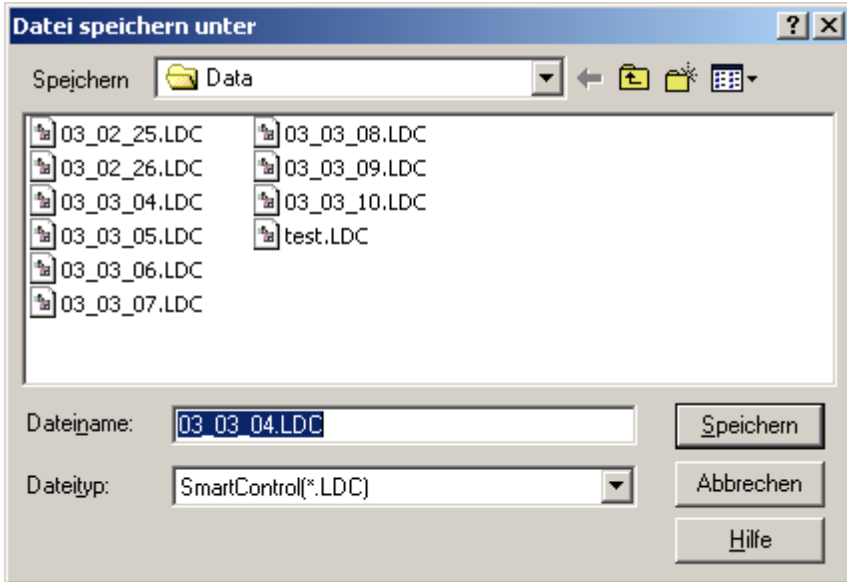
A SMART Control 1.24 file with the file name convention **„*.ldc"** always contains **Configuration Data** of the measurement setup and may also contain **Measurement Data**. Independent of this are the **Export Data** in EXCEL or ASCII format. For a better file management, SMART Control creates during installation under SMART Control main directory, several subdirectories. You may however choose other directories anytime.

...\ CONFIG *.ldc	Configurations (*.ldc without measurement data)
...\ DATA *.ldc	Measurement Data (*.ldc with pre-chosen configuration data)
...\ EXPCONFIG *.exp	Export Definition for free data export
...\ EXPORT *.*	Export Data in EXCEL- or ASCII-Format (*.xls or *.txt)
...\ OPUS *.ops	device specific OPUS-configuration data
...\ PICTURES *.bmp	Pictures in BMP-Format
...\ PLUGIN *.dll	System files for external alarm
...\ RULES *.rul	Rules (for future extensions)
...\ TEMP *.ldc	Temporary files
...\ VARS *.var	Variables for creating formulas

Note: Details about entering and saving variables are described in the corresponding chapters of this manual.

Save Measurement Files

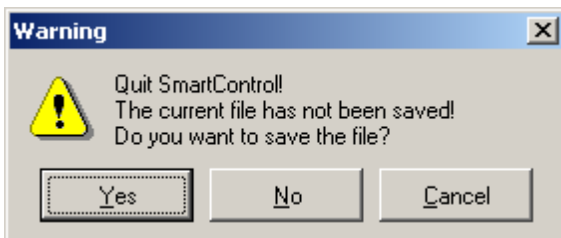
Select from the main menu **File** the command **Save** or **Save as** to save your measurement data and its corresponding configuration data.



Enter in the text box, drive, path and name of the file to be saved.

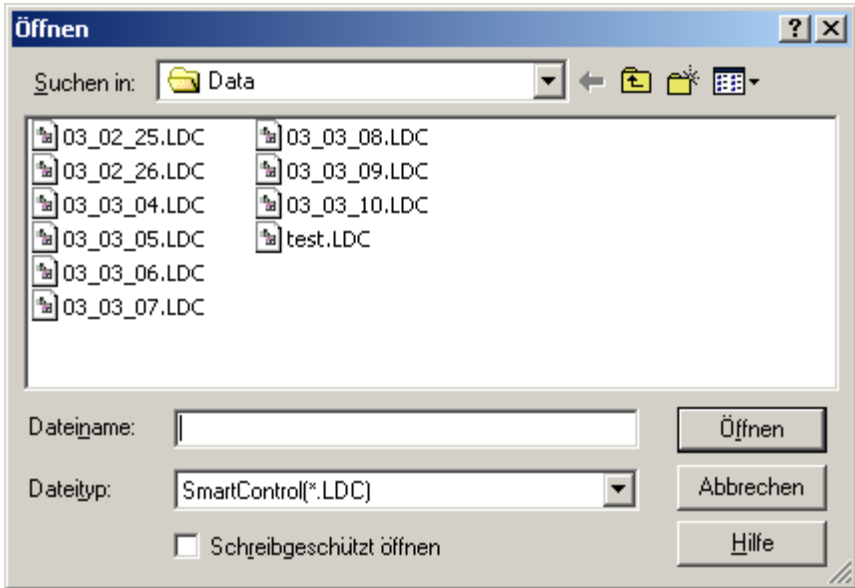
Choose the **directory ...\\DATA for measurement data**. This is to distinguish the measurement data from your pre-defined measurement setup configurations. The file name extension „**ldc**“ is permanent and is added automatically.

Note: If you want to exit program and your data are not yet saved, this warning appears.



Open Measurement Files

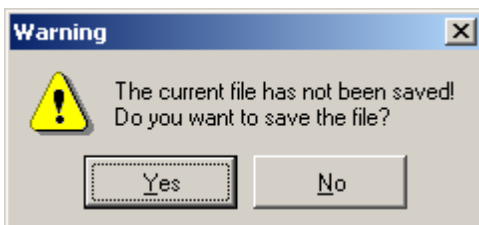
Select in the main menu **File** the command **Open**, to open your measurement data and its corresponding configurations.



Enter in the text box, drive, path and name of the file to be opened. .

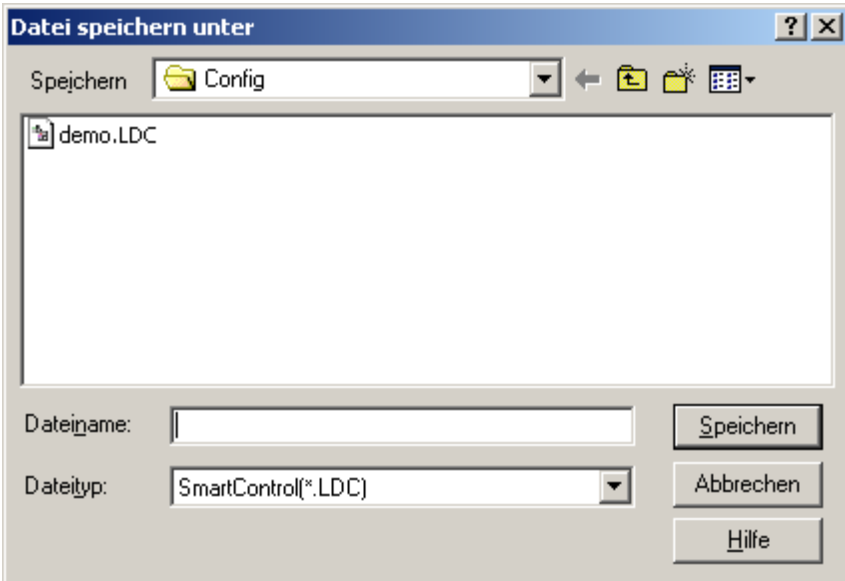
Choose the **Directory...\\DATA for Measurement Data**. Your measurement data are normally saved in this directory. In the DEMO-Version the directory also contains the file „**DEMO.LDC**“. The file name extension „.ldc“ is permanent and is added automatically.

Note: If you want to open a new file and your current data are not yet saved, this warning appears.



Save Configuration Files

Select in the main menu **File** the command **Save Configuration**, to save the configuration of your measurement setup for future measurements. This does not contain any measurement data.

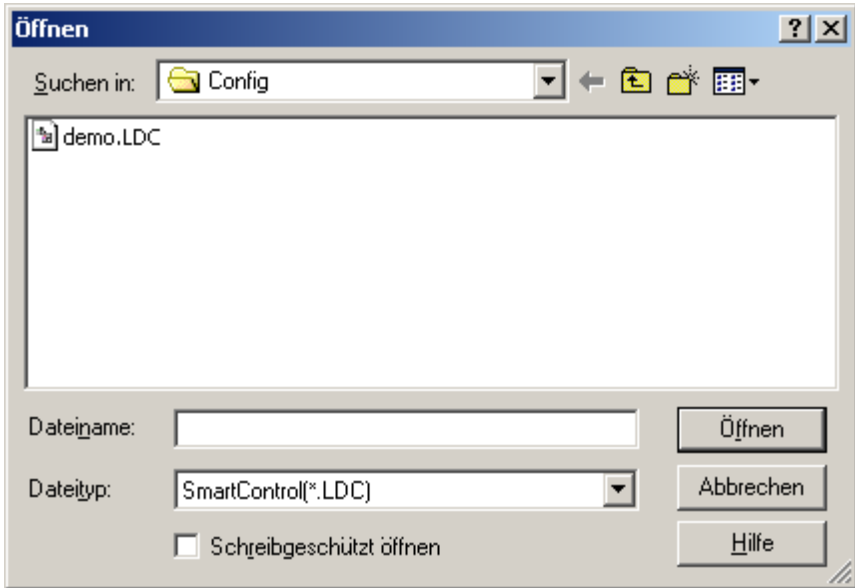


Enter in the text box, drive, path and name of the file to be saved.

Choose the **directory ...\\CONFIG for configuration data**. This is to distinguish your pre-defined measurement setup configurations from the measurement data. The file name extension „.ldc“ is permanent and is added automatically.

Open Configuration Files

Select in the main menu **File** the command **Load Configuration**, to open your configuration file. This does not contain any measurement data.

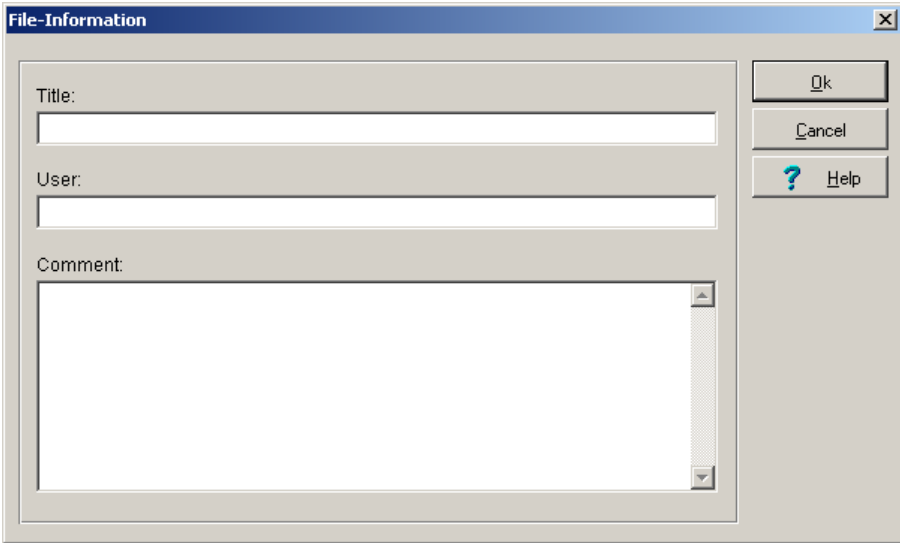


Enter in the text box, drive, path and name of the file to be opened.

Choose the **Directory...\ CONFIG for Configuration Data**. Your configuration data are normally saved in this directory. You may use this for future measurements. The file name extension „ldc“ is permanent and is added automatically. This function loads devices and channels, file information and diagrams from the selected file. Measurement data will not be loaded.

Enter File Information

Select in the main menu **File** the command **File-Info**. A dialog box **File Info** will appear.



The image shows a dialog box titled "File-Information" with a standard Windows-style title bar (blue with a close button). The dialog has a light gray background and contains three input fields on the left and three buttons on the right. The first field is labeled "Title:" and is empty. The second field is labeled "User:" and is empty. The third field is labeled "Comment:" and is a large text area with a vertical scrollbar, currently empty. The buttons on the right are "Ok", "Cancel", and "Help" (with a question mark icon).

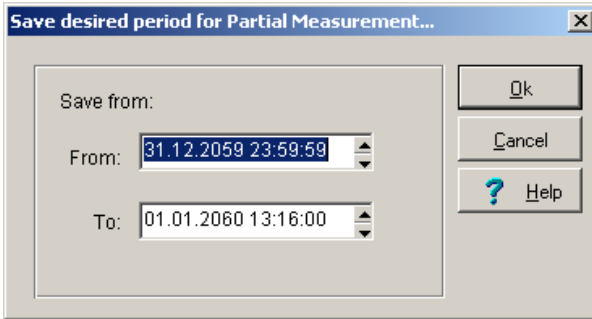
Here, you may enter into your currently opened file, user defined information such as title, user and comments.

As comments you should enter here all measurement relevant information such as measurement location, used devices and its eventual irregularities, which may occur during measurement and which should be considered in the evaluation. Please enter as many information as you can!

Note: This information will be printed together with the measurement setup.

Save Partial Measurement

Select in the main menu **File** the command **Save Partial Measurement**. The dialog-Box **Save desired period for partial Measurement** will appear.



Enter the desired period manually or scroll up or down, holding the left mouse button pressed until your desired range appears. Holding the scroll button pressed increases the scroll speed.

Note: The function **Save Partial Measurement** is available only for activated Y/t-diagrams.

Join Several Measurement Data Files

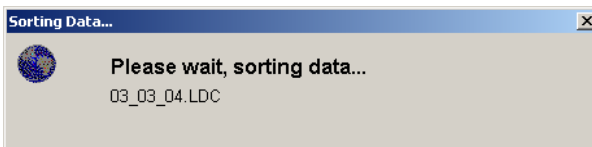
With this function you may join together several measurement data files to one file. For example, files from two consecutive days with the same measurement setup. You may however also join any other files together; configuration data from the files to be added will not be applied to the current file.

How to join files:

1. First open the file, where the new data are to be added..
2. Select in the main menu **File** the command **Join File**.
3. Mark out and open the file(s) to be added and confirm to join files.

If channels correspond to files, the new measurement data will be added in the current measurement file according to time. Data of new channels in the joined file will be shown in a new diagram on screen.

Note: Transferring of data may take some time depending on data size. Please wait



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A

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