

*Manual*

**MÄTMAN** 

*Software version 4*



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## Getting started - step by step

We congratulate you on your purchase of Mätman and hope you will get great value from the use of it.

We know you want to start measuring immediately, but first we ask that you read these instructions carefully. *The step-by-step instructions are only 3 pages!*

Read the instructions carefully as you work through the program on the computer. You will learn how to use Mätman in less than 30 minutes.

### Installation of software

The software is delivered on CDROM only. If you need to install by USB stick copy all files on the CDROM to USB stick and run AutoRun.exe.

Installation from the CDROM:

1. Start Windows.
2. Place the Mätman XL disk in the CDROM unit (probably D:).
3. A window with menu choices appears. Click on "Install Mätman XL".
4. Select language and follow the instructions.
5. The installation program suggests that the Mätman Control Program will be installed in the directory " C:\Program Files\Eltex\Mätman XL ". If you wish to install it in an alternative directory you can change the name. To complete click "Install".
6. Now you can see which parts of the program that will be installed. Continue with "Next".
7. Click "Next" to complete the installation.

There is now a new program icon called "Mätman XL" on your desktop.

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**Your first measurement - step by step**

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1. Check that the computer clock shows the correct time. If not, you can set the time in the “Control Panel - Date/Time”, or double-click on the time to the right on the Activity Bar.
2. Start “Mätman XL ” from the program icon. If an error message about the COM port shows, ignore it and continue with the next step.
3. Connect logger to USB or COM port. IR unit to COM port.
4. Logger type
  - Mätman G2/Combi-USB logger: Select plugin Mätman, first time the logger is connected driver will be loaded. Wait until the unit is ready to use. Go to 6.
  - Mätman G2/Combi logger: Select plugin Mätman and click on “Setup...”
  - Mätman 3: Select plugin Mätman 3 and click on “Setup...”
5. Choose the COM port number to which you have connected Mätman. Then click “OK”.
6. Check that you have contact with Mätman by clicking “Show”. Current measurement value is displayed for 10 seconds in a separate window.
7. Click the “Start...” button.
8. Enter a “Title” for your measurement, for instance “My first measurement”. “Templates” are earlier measurements used as templates.
9. Select when the measurement shall start: now/at start time/with button.
10. Select how Mätman shall proceed when the memory is full: stop the measurement/replace oldest value. Check the box “Activate stop button”, if you want the possibility to stop the measurement with the button on Mätman.
11. If you have chosen not to start the measurement now, enter start time. Select Measuring Interval, Total Measuring Time or Stop Time – the other two parameters will be calculated automatically.
12. If you want to save this setting as a template for other similar measurements, click the button “Save as template”. Click the “OK” button.
13. After a few seconds a message appears which confirms that the measurement has commenced. Click “OK”. Mätman is now activated.
14. Disconnect Mätman from the cable. Try to vary the measurement values with a few minutes interval. If your Mätman measures temperature, you can hold the device in your hand and then place it in a lower temperature. You should note the time for the temperature change, to compare with the time shown on the graph.
15. You do not have to wait until Mätman is ready, but we recommend that you let it measure for a minimum of 5 minutes in order to have enough measurement samples.)
16. Connect Mätman to the computer again.
17. Click the “Dump” button. A separate window will indicate how the measured values are copied from Mätman to the computer and are saved there.
18. When the transfer is completed the measurements are displayed in a graph.
19. With the mouse you can draw a frame around an area in the graph you wish to study in detail. Hold down the mouse button and move the mouse pointer. A frame is now displayed in the graph. When you release the mouse button the frame is determined.

20. The mouse pointer will change into a magnifying glass. Move the mouse pointer inside the frame and click. The graph is now magnified to the area you made a frame around. You have performed a zoom.

Outside the zoom-frame the magnifying glass is crossed-out, you can then inhibit the zoom-frame.

21. To return to the original, automatic diagram setting, click the “Zoom out” button.

22. Click the “Print...” button.

23. If the selected printer is not correct, you can change printer and change “Properties”.

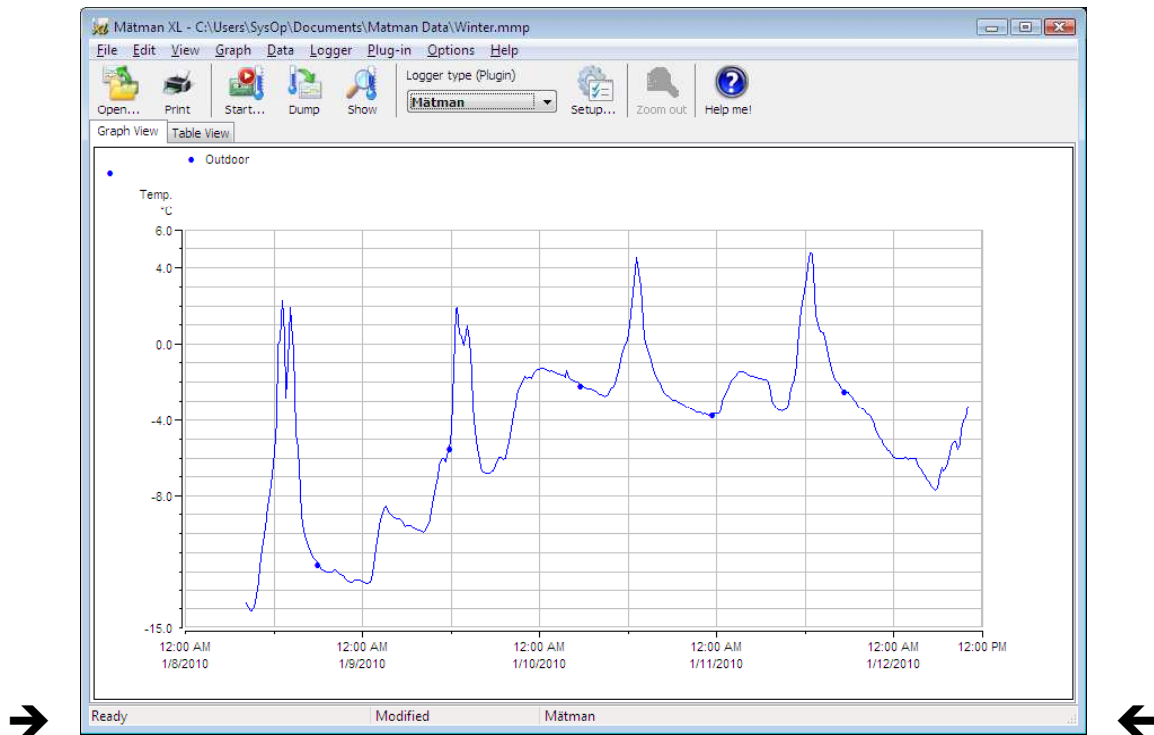
24. Click the “OK” button and the graph will be printed.

You have now performed your first measurement, studied it in the graph and printed the result on the printer. We have looked at the most basic functions of Mätman. There are more refinements in the program, you can read about them in this manual, or click the “Help” button in the program.

***Good luck with your measurements!***

## Status bar

At the bottom of the program window is the Status Bar with three information fields.



To the left you will see when the program is working with a task, e.g. opening a measurement. Default is “Ready”.

In the middle you will see “Modified” as soon as you have opened a measurement or made a change in the presentation and not saved it.

To the right you can see which Plugin that is in use.

## File | Open measurement



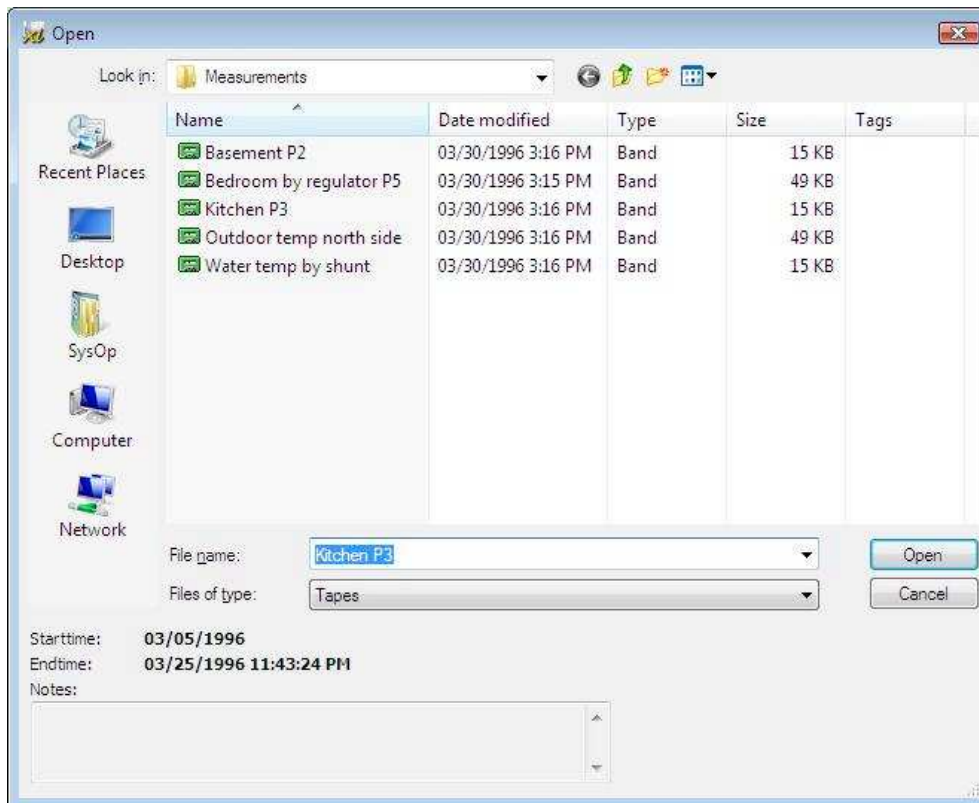
File/Open...



Open...

Use this command when you want to study a saved measurement.

Available measurements are presented in a list, each one symbolised by a tape.



Select a measurement by clicking on it. The start and end time of the measurement is also displayed. Click the "Open" button, or double click on the file name in the list. The selected measurement is immediately displayed in a chart. If you already had a measurement open, you will now see both of them.

**NOTE!** If the measurements are made at different times, it is possible that they do not show in the diagram, because the time scale will be too extensive. Double click on the time scale and the dialog box "Change time scale" appears. Select the tab "Relative" and click OK. Both measurements will now start from the left axis.

## File | New presentation



File/New presentation      Ctrl+N

Start a new presentation. If you had a measurement or a presentation on the screen, you will be prompted to save it.

## File | Open presentation...

Opens a Mätman XL presentation.

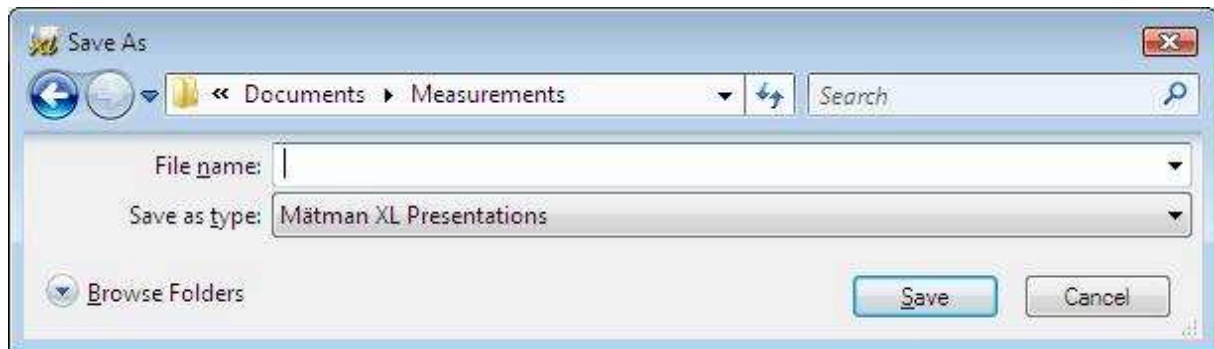
## File | Save presentation



File/Save presentation      Ctrl+S

Save Presentation As...

Use this command when you want to save a presentation to the disk so you can load it and study it at a later time. The presentation will be saved exactly as you see it on the screen.



If the presentation is already saved, but you want to save it under another name, choose “Save Presentation As...”.

**NOTE!** The presentation is only the **settings** for the diagram, table and curves. If you want to save the presentation in another computer, you have to copy **both** the presentation and the measurement tapes used in the presentation.

## File | Import

To import and show measurement data from an Excel file. This file must contain a date/time column and a value column. If the first line contains the name of the measurement, this will be used to name the diagram.



## File | Export

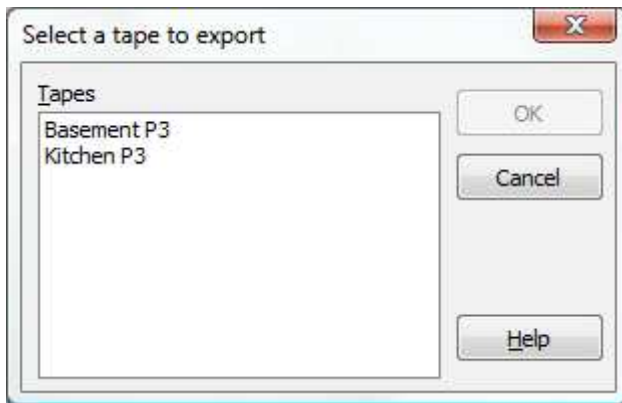


File/Export...

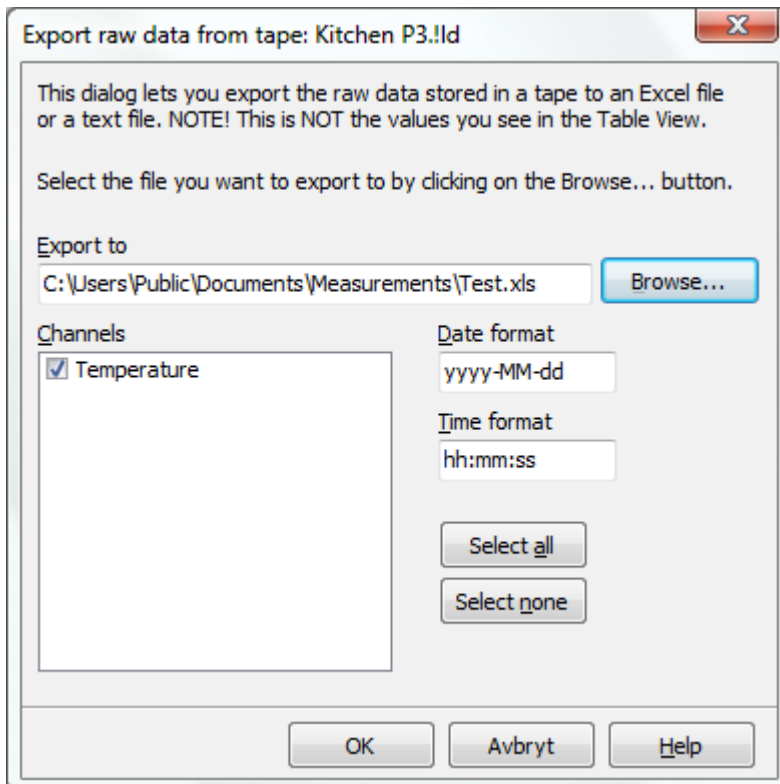
You can export measured data to other programs in three ways:

- Raw data from tape...
- Values in Table View...
- Graph as Image ...

### Raw data from tape...



If more than one tape is active in the graph, you must select which tape to export values from. Only one tape can be exported at a time.



Exports measured values from the tape to a file in text format (TXT) or Excel format (XLS).

## Export to file

Enter name and path of the file to export values to. Use Browse for easy selection of a folder. If the specified file exists it will be overwritten.

## Browse

Enter the export file by using an ordinary "Save" dialog. In this dialog you select text- or Excel format. When you closes the dialog with Save, the resulting file name will be shown at Export to file.

## Channels

If there is more than one channel available in the tape, you can select which channels to export. Only checked channels will be exported.

## Date format

Specifies the date format for time stamps in the export file. The short date format in Windows is specified as default.

These formats are valid:

<b>Format</b>	<b>Displays</b>	<b>Example</b>
d	The day as a number without a leading zero (1-31).	9
dd	The day as a number with a leading zero (01-31).	09
ddd	The day as an abbreviation (Sun-Sat).	Thu
dddd	The day as a full name (Sunday-Saturday).	Thursday
m	The month as a number without a leading zero (1-12).	3
mm	The month as a number with a leading zero (01-12).	03
mmm	The month as an abbreviation (Jan-Dec).	Mar
mmmm	The month as a full name (January-December).	Mars
yy	The year as a two-digit number (00-99).	00
yyyy	The year as a four-digit number (0000-9999).	2000

## Time format

Specifies the time format for time stamps in the export file. The long time format in Windows is specified as default.

These formats are valid:

<b>Format</b>	<b>Displays</b>	<b>Example</b>
h	The hour without a leading zero (0-23).	8
hh	The hour with a leading zero (00-23).	08
m	The minute without a leading zero (0-59).	2
mm	The minute with a leading zero (00-59)	02
s	The second without a leading zero (0-59).	25
ss	The second with a leading zero (00-59).	25
z	The millisecond without a leading zero (0-999).	77
zzz	The millisecond with a leading zero (000-999).	077

## Values in Table View...

Export of the average values showed in the table view with average display on. The values are exported in tab separated text format (TXT) or Excel format (XLS).

These values are presented in the specified data interval.

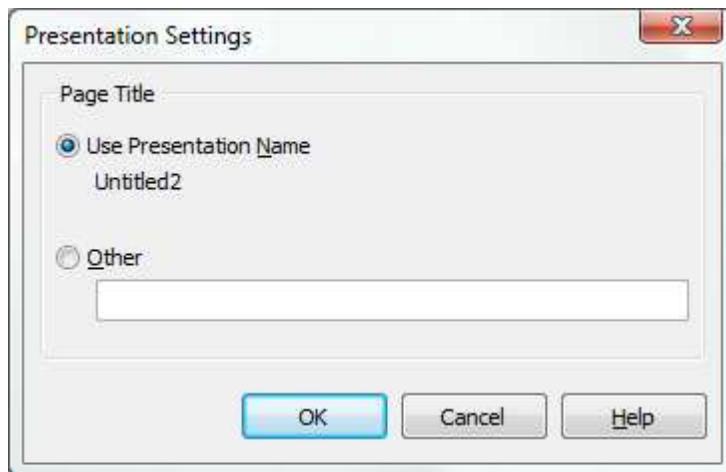
## Graph as Image ...

Exports the graph as an image. Supported file formats are Windows Metafile (vector) and Windows Bitmap (pixel). A vector image can be resized without any loss of details.

## File | Presentation Settings...



File/Presentation Settings...

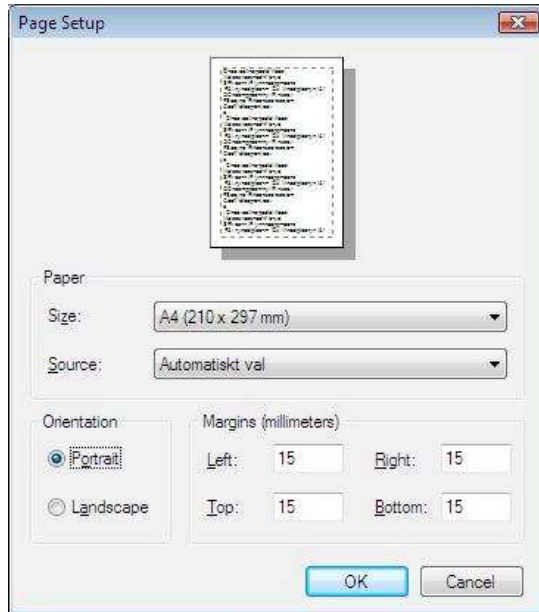


The file name of the presentation will be used as title of the page when printing. This name is the name you specify when saving the presentation. The current presentation name is shown below this choice.

You can also enter another name for the presentation.

## File | Page Setup...

Select printer, paper format, margins, etc.



## File | Preview

Will show the printout on the screen.

## File | Print



File/Print

Ctrl+P



Print

To print the presentation on the selected printer. You can change printer and select properties for the printer.

## Edit | Copy Graph



Edit/Copy Graph

Ctrl+C

This command copies the graph to Windows Clipboard.

This copy of the graph picture can be inserted in a document.

## Edit | Copy Table



Edit/Copy Table

Ctrl+T

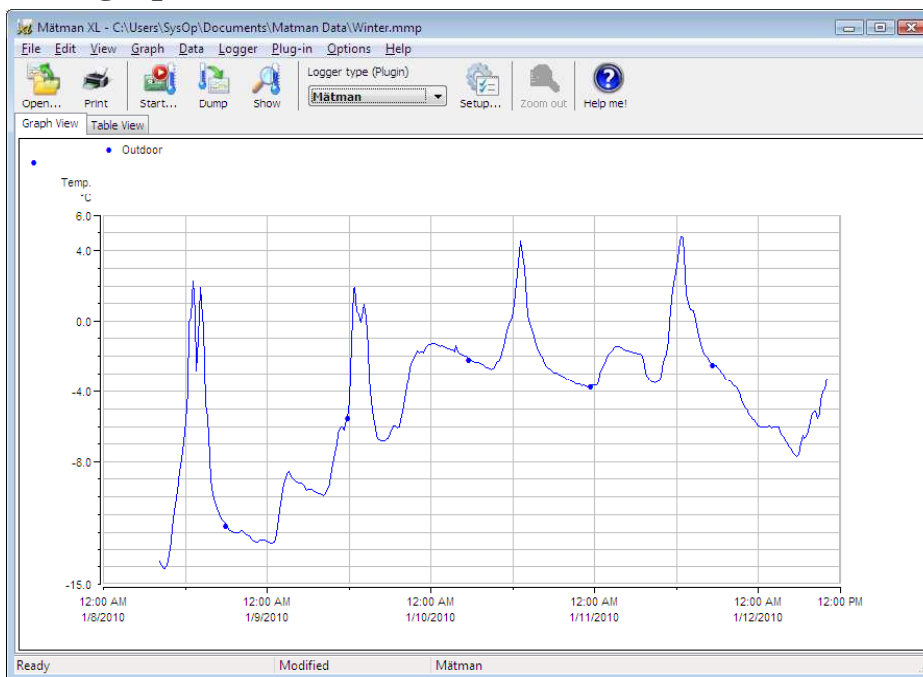
This command copies time stamps and values from the table view (average values) as text to the clipboard. If the diagram is zoomed, only data from the zoomed area will be copied.

## View | Graph/Table

●	<b>Graph</b>	<b>F8</b>
	<b>Table</b>	<b>F9</b>

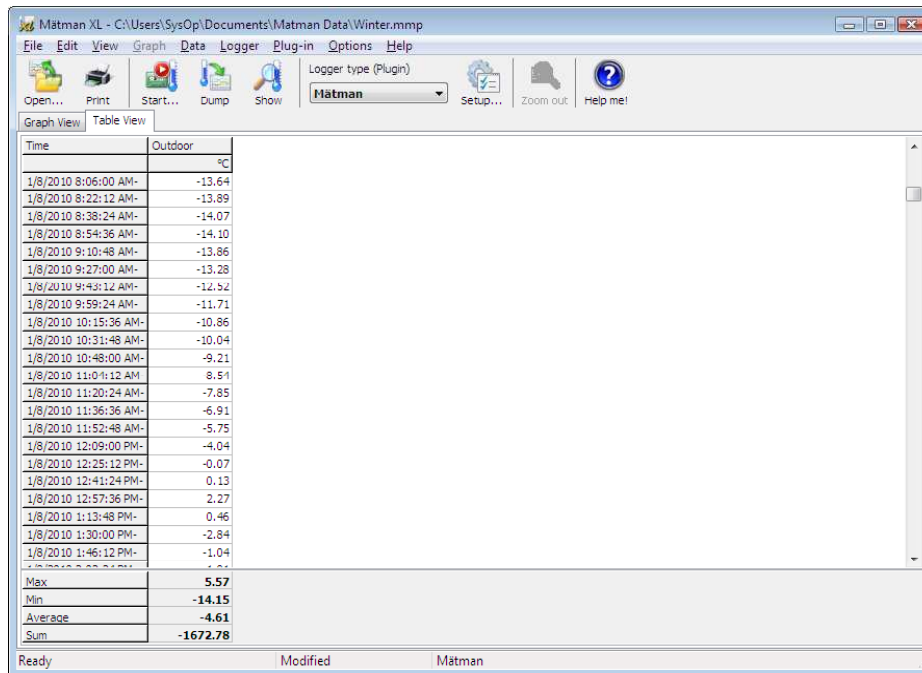
Change view by clicking on the respective tab or by the keys F8/F9.

### View graph



## View table

The values will display as a table with one graph in each column.



Every row in the table corresponds to a time interval and the value is the average value for that interval.

The rows (time intervals) are evenly spread over the total time range. The time range can be changed only through the time scale of the graph.

If a value is missing for a time interval, it will show by an empty row in that column. This is usual at zooming or displaying of short measurements, when the time interval is shorter than the original log interval.

## View | Graph symbols

Show/hide the graph symbols, that is the coloured symbols in front of the name of the respective graph.

## View | Started loggers



View/Started loggers...

This command displays a list of all the data loggers you have started from this computer.

Title	Type	Serial #	Started	Log start	Log done	Interval
Refridgerator	Mätman Combi 18510	3045034	1/27/2010 3:0...	1/27/2010 3:04:0...	1/31/2010 6:10:0...	00:01...

Buttons: Help, Remove, Close

When a Mätman is started, all information about it will be saved in this register. When the Mätman samples are dumped after the measurement, it will be deleted from this register.

The button “Remove” deletes the marked measurement from the list. Useful if the data logger has been dumped on another computer.

## Graph | Average – Min/max

- Average                      F5
- Min/max                    F6
- Average min/max        F7

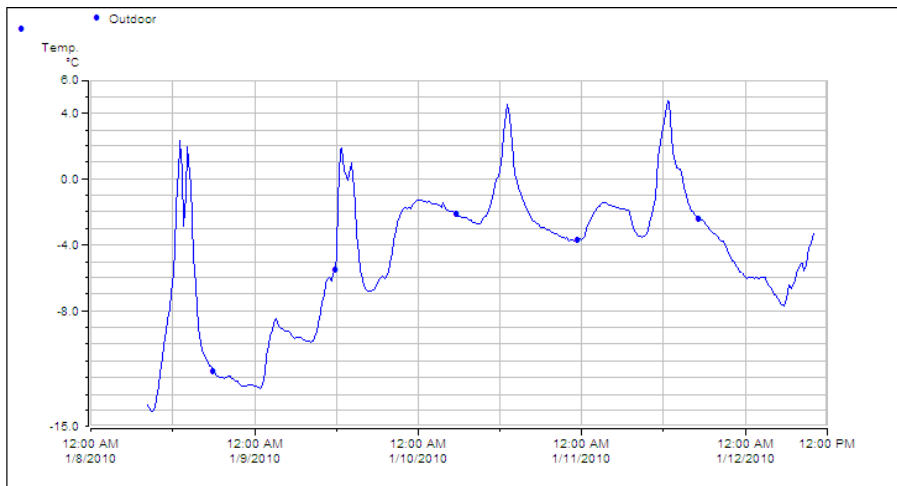
The values are plotted in a time graph, with separate curves for each channel.

The time resolution is dependent of the selected time interval. As default the time interval is adjusted automatically when the time range of the graph is changed, to keep the number of data points in the graph constant.

The graph can plot the values in 3 different modes:

### Average (standard)

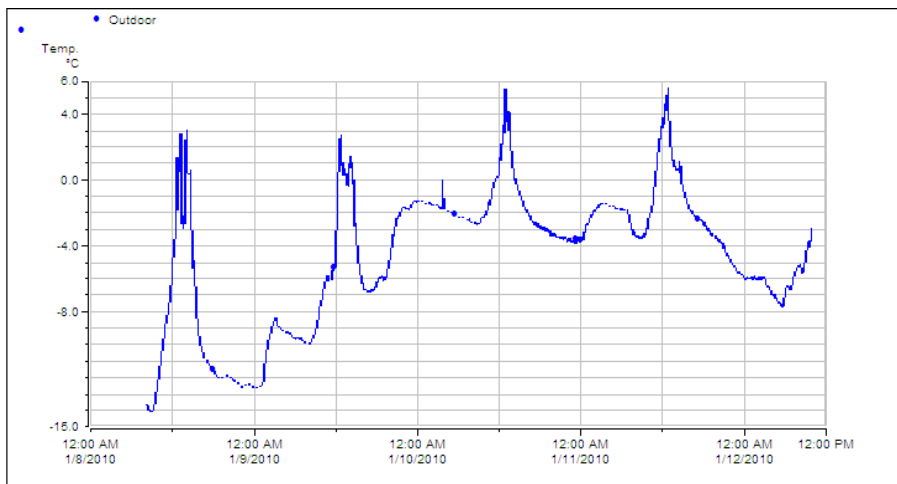
The average values for each time interval are plotted and connected to a line graph.



A shorter time interval increases the details in the curve, while a longer time interval decreases the details. If the time interval is set automatically (default), you can see more details when you zoom in the graph, since the time interval becomes shorter.

### Min/max

The minimum- and maximum value for each time interval is plotted as bars.

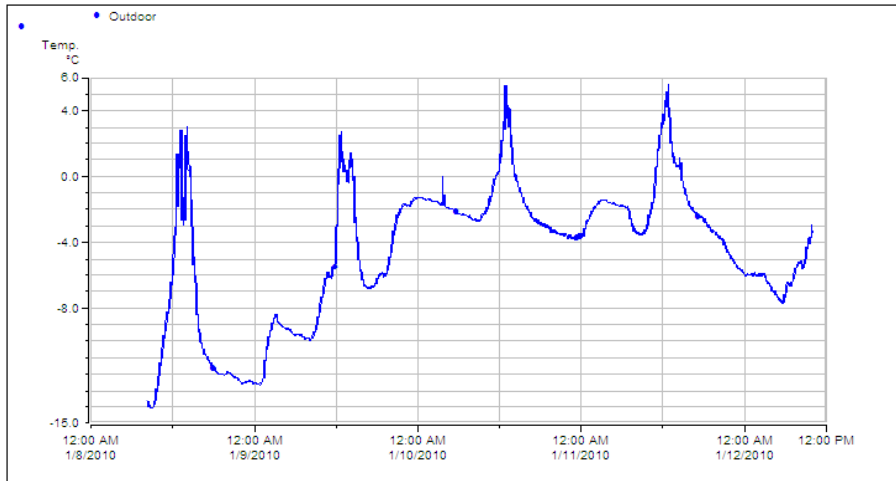


A shorter time interval increases the number of bars, while a longer time interval results in fewer and wider bars. If you set the time interval to 1 hour, you see a graph that displays the minimum/maximum values for each hour.

### Average and min/max

This mode combines **Average** and **Min/max** plotting in the same graph.





## Zoom in

When you wish to study a detail of the measurement, you can zoom this area by:

1. Draw the mouse pointer diagonally over the area you wish to study (with the mouse button pressed). A frame appears which indicates where the new edges of the graph will appear.
2. When you are satisfied with the size of the area, release the mouse button. The mouse pointer is now a magnifying glass. Outside the zoom-frame the magnifying glass is crossed-out, you can then inhibit the zoom-frame.
3. Move the mouse pointer within the zoom frame and click.
4. The graph is now redrawn over the area you have selected.

To return to the original graph setup, click the “Zoom out” button.

**NOTE!** There must be at least two values in the graph, otherwise it will not show.

## Graph | Zoom out



Graph/Zoom out



Zoom out/Esc

Use this command to display all the information in the graph.

The diagram automatically sets both time and value scale, so that no part of the graph will be outside the diagram.

## Graph | Left axis.../Right axis...

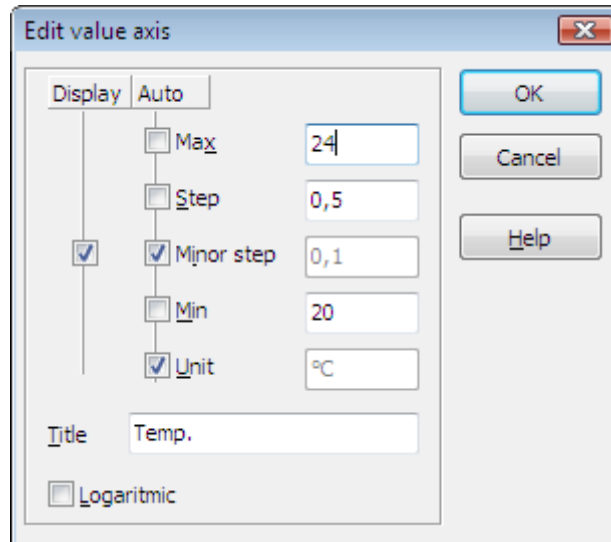


Graph/Left axis...

Right axis...

The program automatically adjusts the value scale range, so all measured values are displayed on the graph. You can, however, change the scales setup manually, if you are not satisfied with the automatic setup.

Double click with the mouse on *the value axis area* on the graph, that is to the left/right of the graph, or use the menu command “Graph/Left axis.../Right axis...”. A dialog box appears where the following information can be entered.



## Max.

The maximum value on the axis. The check box "Auto" must be cleared before a new entry can be made. When "Auto" is checked, this value automatically adjusts to the highest value in the current view.

## Step

The distance between two axis marks with labels. The check box "Auto" must be cleared before a new entry can be made. When "Auto" is checked, the program will calculate a suitable step value depending on the values in Min and Max.

## Minor step

The distance between the minor axis marks. No labels are displayed at the minor steps. The check box "Auto" must be cleared before a new entry can be made. When "Auto" is checked, the program will calculate a suitable minor step based on the current step value. If the "Display" box is cleared, no minor steps will be displayed.

## Min

The lowest value on the graph. The check box “Auto” must be cleared before a new entry can be made. When “Auto” is checked this value automatically adjusts to the lowest value in the current view.

## Title

The title of the scale is visible on top of the scale in the graph.

## Unit

The measuring unit on the scale is shown under the title of the scale.

## Logarithmic

The scale will be displayed in logarithmic mode when this box is checked.

**NOTE! The values of Max and Min must be greater than zero when logarithmic mode is used!**

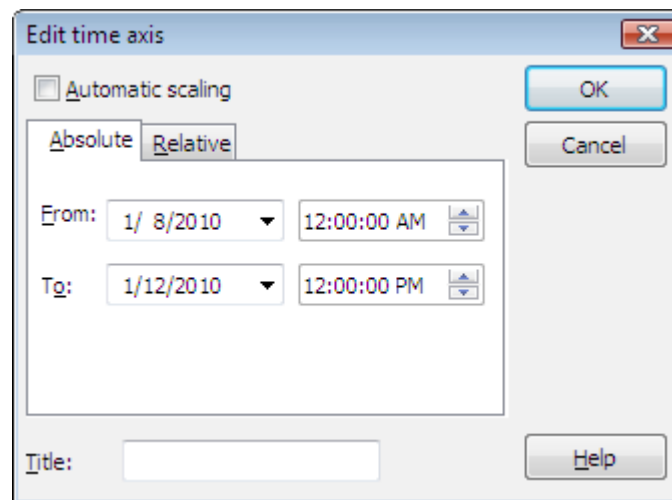
## Graph | Time axis...



### Graph/Time axis...

The program automatically adjusts the time scale range, so the whole measurement is displayed on the graph. You can, however, change the scale setup manually, if you are not satisfied with the automatic setup.

Double click with the mouse on **the time axis area**, this is below the graph, or use the menu command.



### Automatic scaling

Check this box to adjust the time span automatically to the selected tapes.

### Title

The title of the scale is visible to the right of the scale in the graph.

## Absolute

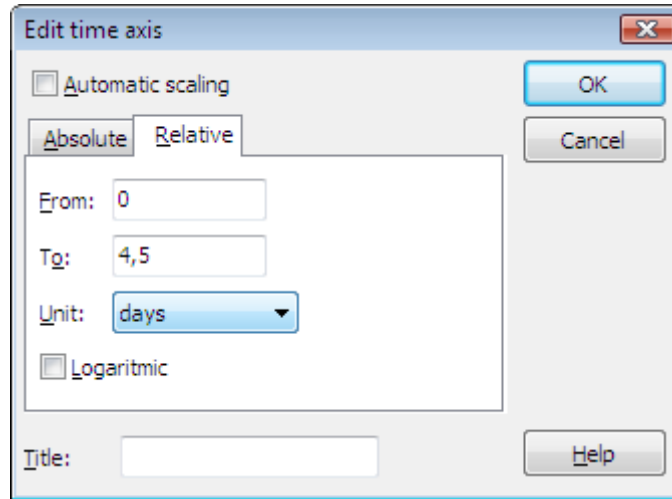
In this tab you select the time span of the graph. Display as absolute time.

**From**

The start time for the axis is entered as date and time.

**To**

The end time for the axis is entered as date and time.

**Relative**

In this tab you select the time span of the graph. Display as relative time.

**From**

The start time for the axis, entered as amount of selected unit.

**To**

The end time for the axis, entered as amount of selected unit.

**Unit**

Unit of axis values. Select from days, hours, minutes or seconds.

**Logarithmic**

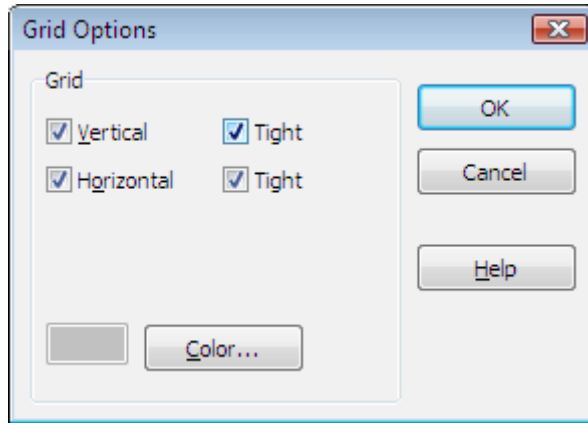
The scale will be displayed in logarithmic mode when this box is checked.

**NOTE!** The values of “From” and “To” must be greater than zero when logarithmic mode is used!

**Graph | Grid...**

Graph/Grid...

This command lets you change the grid in the graph. Use the menu command or double click on the grid. You will get this dialog box:



## Vertical

When the checkbox “Vertical” is marked, the vertical grid lines are visible.

## Horizontal

When the checkbox “Horizontal” is marked, the vertical grid lines are visible.

## Tight

If the checkbox “Tight” is marked, the grid lines will follow the minor steps of the scale axes.

If the checkbox “Tight” is not marked, you will only get grid lines for the steps with printed value/time.

## Colour

For changing the colour of the grid.

## Data | Curves...

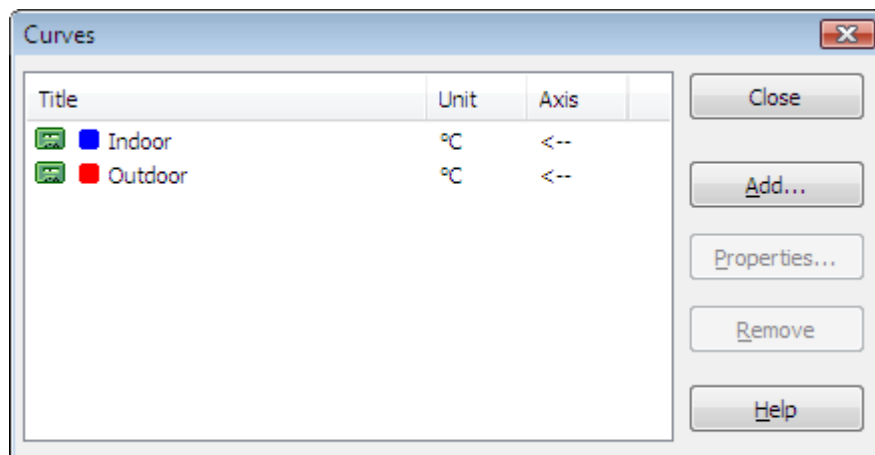


Data/Curves...

F4

Displays a list of properties for the active curves.

**NOTE!** The measurements must be within the same time interval, otherwise the curves will not show in the graph.



## Add

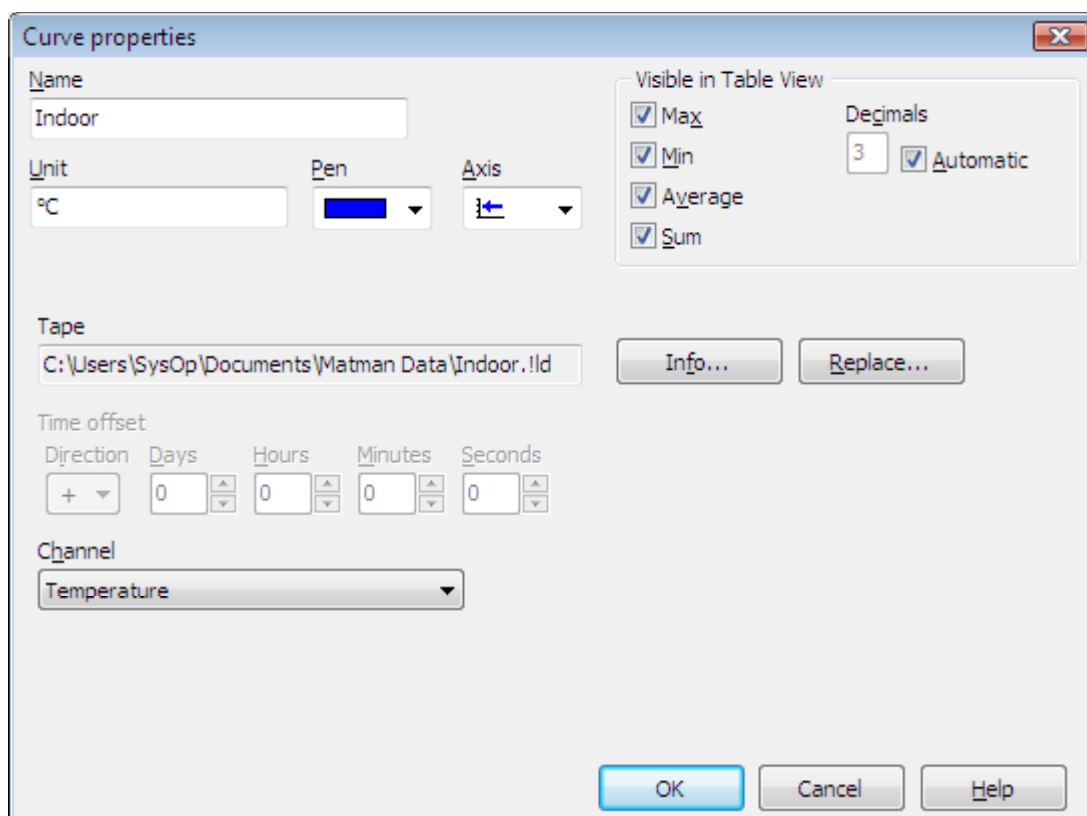
Adds values from a measurement.

## Remove

Removes the selected curve from the list.

## Properties...

Edit properties for selected curve.



## Name

The display name for the values in the graph/table (not the file name).

The title entered at start or dump of the logger will be used as default.

## Unit

Measuring unit for the values. The default unit was taken from the logger when it was dumped.

## Pen

Select one of 8 pen colours for plotting the curve in the graph.

If you select no colour (X), the values will still be active in the table, but will not be plotted in the graph. May be useful if you want to use the values in a calculation and only display the result in the graph.

More than one curve can use the same pen colour, so you can group the curves according to type, e.g. temperature and humidity, or according to measuring site, e.g. indoor and outdoor.

## Axis

Select the axis to use for plotting this curve in the graph.

## Visible in Table View

### *Max*

Check to display the maximum value in this curve when viewing or printing the table view.

### *Min*

Check to display the minimum value in this curve when viewing or printing the table view.

### *Average*

Check to display the average value in this curve when viewing or printing the table view.

### *Sum*

Check to display the total sum of all intervals in this curve when viewing or printing the table view.

### *Decimals*

Enter how many decimals to display when viewing or printing the table view. Can only be changed when Automatic is unchecked.

### *Automatic*

Check to set the number of decimals automatically.

## Tape

Displays the name and path of the tape.

## Time offset

When viewing the graph with relative time scaling, you can adjust the time offset between curves from different tapes. This makes it easier to analyse similar measurements that occurred at different occasions.

## Direction

Select if the offset will be adjusted forward (+) or backwards (-)

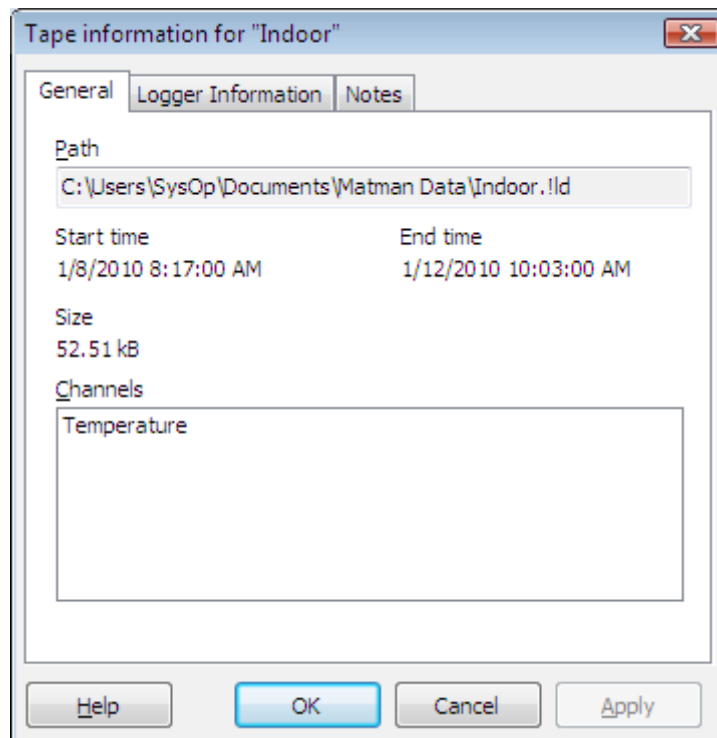
## Days, hours, minutes, seconds

Enter the number of days, hours, minutes and seconds for the time offset.

## Channel

Select which channel to use, if the tape contains more than one channel with values. (Only possible if you have dumped a logger with more than one channel).

## Info...



## General

### *Start time*

The start time for the measurement.

### *End time*

The end time for the measurement.

### *Size*

Data size for the tape.

### *Channels*

A list of all value channels in the tape.

## Logger Information

Displays information about the logger, that was available when the values was dumped from the logger.



## Notes

Space for your own notes, which will be stored in the tape. Store changes by clicking Apply or OK.

### Replace...

Opens a dialog to select another tape.

**NOTE!** The new tape should have the same time range as the other tapes in the presentation, if relative time display is not selected.

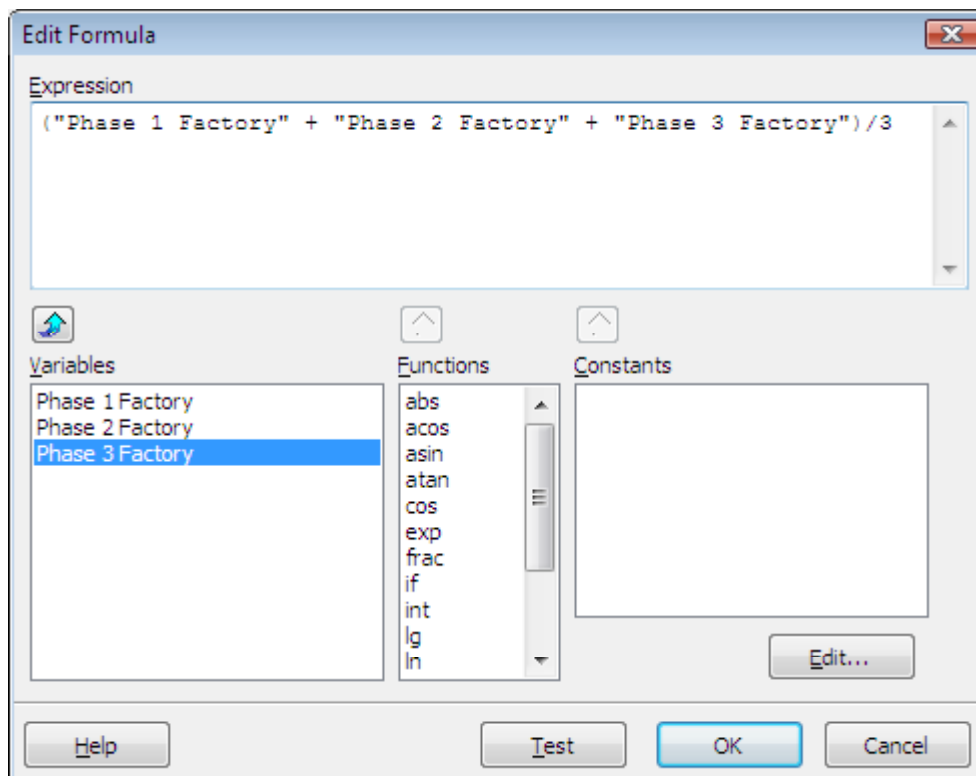
## Data | Insert calculation



Data/Insert calculation...

Shift+Ctrl+C

With this function you can define a calculation, that can be presented in the graph and table in the same way as other values. The calculation can use values from measurements and other calculations as variables.



## Expression

Enter a mathematical expression here. Name of variables must be written inside quotes ( " ), because it can contain special characters that can be misinterpreted by the formula interpreter.

This example calculates the average of 2 temperatures:

$$(\text{"Temperature1"} + \text{"Temperature2"})/2$$

## Variables

This is the list of available variables. These can be measurement values or other calculations. When you have selected a variable in the list, you can click on the arrow button above the list or double click on the selected variable, to insert it at the cursor in the expression. You can also “drag and drop” the selected variable from the list to its position in the expression.

## Functions

This is a list of available mathematical functions.

When you have selected a function in the list, you can click on the arrow button above the list or double click on the selected function, to insert it at the cursor in the expression. You can also “drag and drop” the selected function from the list to its position in the expression.

## Constants

Enter your own constants.

When you have selected a constant in the list, you can click on the arrow button above the list or double click on the selected constant, to insert it at the cursor in the expression. You can also “drag and drop” the selected constant from the list to its position in the expression.

## Edit

Opens the dialog “Edit constants”, to edit the constant list.

## Test

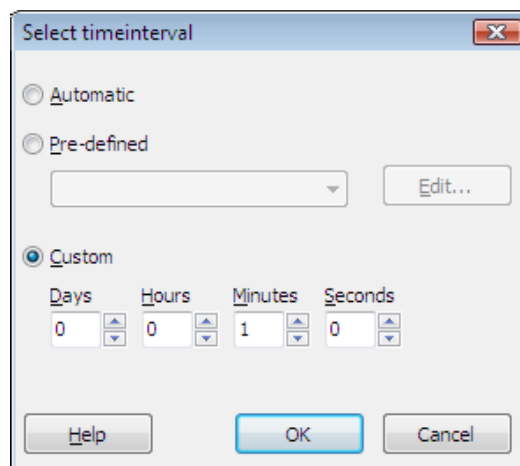
Use this button to test if the expression is entered correctly and if it can be interpreted. If no error message is displayed the expression is correct, otherwise an error message is displayed.

## Data | Time Interval...

Changes the time resolution for the values.

A smaller interval displays more details, and will result in more points in the curve and table.

By specifying a proper interval, you can study average values or min/max values per hour, minute etc.



**Automatic**

In this case the program will split the current time span for the graph in 400 time periods. This gives a reasonable resolution independent of the time span.

**Predefined**

Select one of the time intervals you have defined.

Click on Edit to edit the list of predefined intervals. Defined intervals will be stored automatically, so they can be reused.

**Custom**

Enter a time interval as days, hours, minutes and seconds. This interval is temporarily and will be cleared when you exit the application.

## Logger | Start...



Logger/Start...



Start...

This command starts a measurement in a data logger.

**A data logger must be connected to your computer in order to operate this command!**

The measurement can be started in two ways:

- **In the classical way with a dialog box. This is the fastest way.**
- **Through a Wizard that guides you through all the steps. You can't miss anything.**

Select the start dialog type with the button "Setup...", see chapter "Plugins/Setup...".

### Start measurement – via dialog box

A dialog box appears, where you select how the measurement will be carried out. When the set-up is correct, you click the "OK" button to start Mätman.

### Title of measurement

Enter a title or a short description of the measurement. This information is stored in Mätman and will be displayed when the values are transferred from Mätman. With this information it is easy to monitor the measuring objects when more than one Mätman is used. (We

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recommend that you write the same information on labels, which you stick on all your Mätman in use).

### Start options

Enter when Mätman shall commence measuring.

- **now**            The measurement commences immediately you click the “OK” button.
- **at time**        The measurement commences at a time you enter.
- **button**         The measurement commences when you push the button on Mätman  
(only Combi and G2).

### At full memory

Enter how Mätman shall act when its memory is full:

- **stop measurement**    Registration ends when the memory is full, which happens at the calculated “Stop time”.
- **replace oldest value**    The last measured value replaces the oldest. The measurement includes the time which is displayed at “Total measuring time”, but start and stop time will move forward for each new measurement.

### enable stop button

Will enable an immediate stop of the measurement by the button on Mätman  
(only Combi and G2).

### Start time

This information is only visible if you have selected “At full memory / stop measurement”.

Start time can also be changed if you have selected “Start / at time”.

Enter required start date and start time. The entered start time must be at least 5 seconds after present time, when you click the “OK” button.

### Interval

The time between two samples.

The interval can be set between 1 second and 12 hours (for Mätman 3 minimum 5 sec).

When you change the interval, the total measuring time and the stop time will be calculated automatically.

## Total measuring time

The total measuring time is entered as number of days (24 hours), plus number of hours, minutes and seconds on the last day. The time can be changed by entering the figures from the keyboard or by selecting the figures with the buttons to the right of the time field.

When you have changed “Total measuring time”, click the button “Calculate interval”, to see the interval and the stop time. The Total measuring time will then be slightly adjusted, because the interval must be split into whole seconds.

## Stop time

This information is only visible if you have selected “At full memory”, “stop measurement”.

Enter required stop date and stop time. The entered stop time is limited by the capacity of the connected logger.

When you have changed the stop time, click the button “Calculate interval ” to see the interval and the total measuring time. The stop time will then be slightly adjusted, because the interval must be split into whole seconds.

The final stop time is calculated as:

$$(\text{Start time} + (\text{Interval} \times \text{number of samples}))$$

## Calculate interval

Calculates Total measuring time and Stop time. The calculation proceeds from current interval time and start time, and the maximum number of samples which are contained in the connected Mätman.

## Lock start/stop

(Only Mätman 3 ver. 1.04 or higher)

Lock menu 4 “stop log” on Mätman 3 and menu 3 “start log” when logging is done. To prevent breaking or overwrite measurement by using the buttons on Mätman 3. Use PC program Mätman XL/LT to stop a locked logging .

## Templates

**Save** Save the present start settings under the template name you choose. Later you can choose a template with a complete start setting from the list.

**Remove** Deletes saved templates.

## Logger | Dump



Logger/Dump

F11

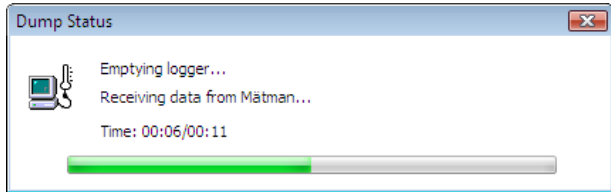


Dump

***A logger must be connected to your computer to operate this command!***

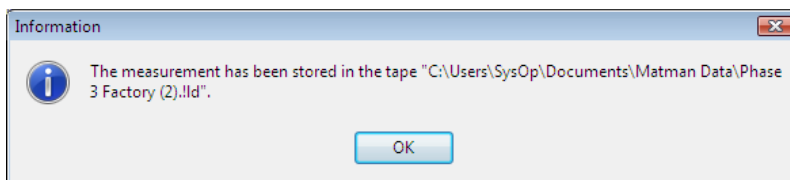
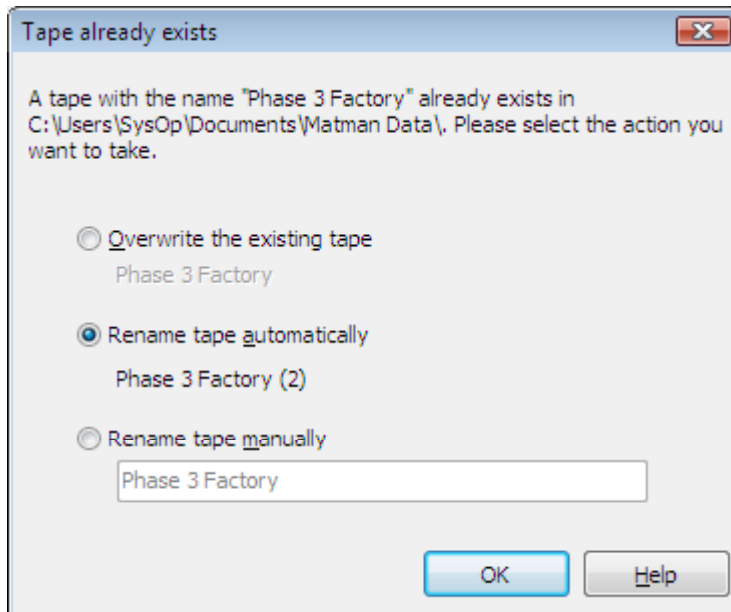
Dumps connected logger and stores the logged values on a measurement tape on the hard disk.

Usually a progress dialog will be displayed during the dump.



Different logger types may take more or less time to dump, depending on memory size and design. The dump time may vary from a few seconds to several minutes.

When all values have been transferred from the logger, they will be stored in a file (=measurement tape). If the application can't give the file a unique name, then it will ask you how to act by displaying the "Tape already exists" dialog.



When the values have been stored, a notification is displayed.

When the transfer is completed, the samples are displayed in a graph, where you can study details of the measurement, and print the result.

## Logger | Show



Logger/Show

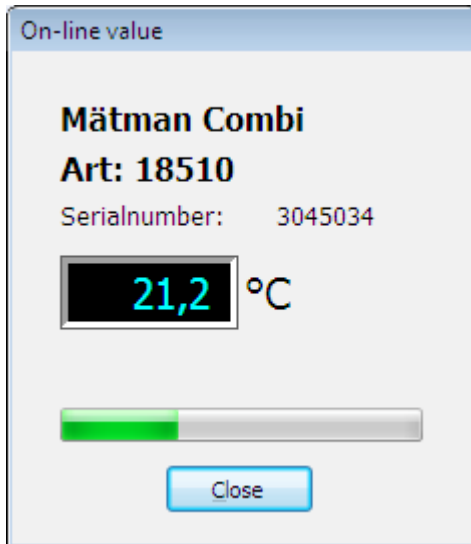
F12



Show

This command displays the current value in Mätman.

***Mätman must be connected to your computer to operate this command!***



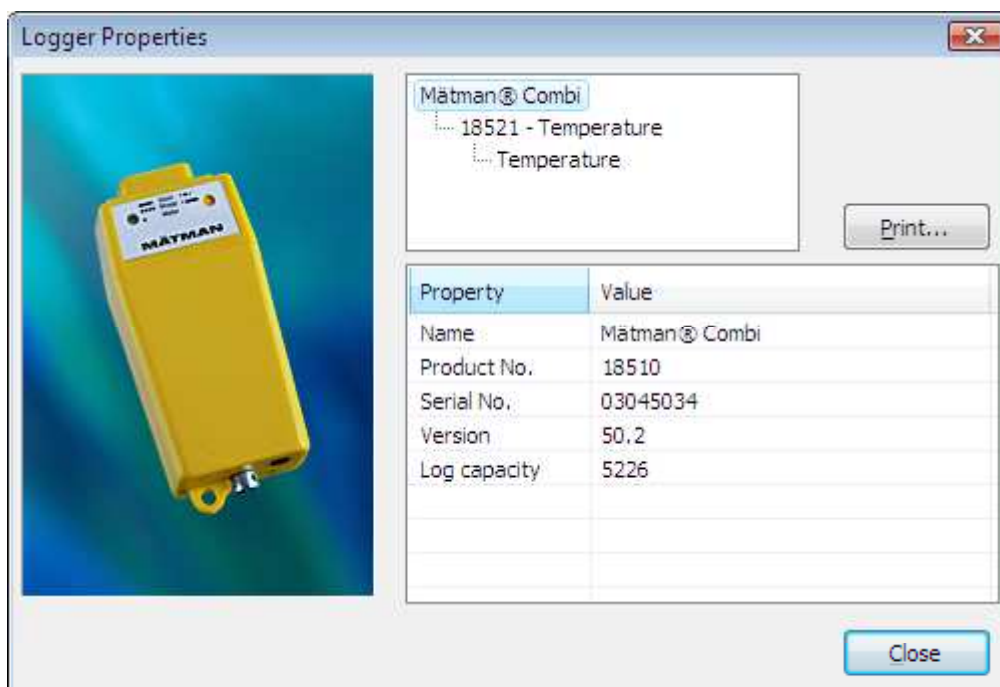
The current value is displayed in a separate window for about 10 seconds.

## Logger | Show Properties...



Logger/Show Properties...

This command displays technical data of the connected Mätman.





## Logger | Calibration



File/Setup... - Calibrate...

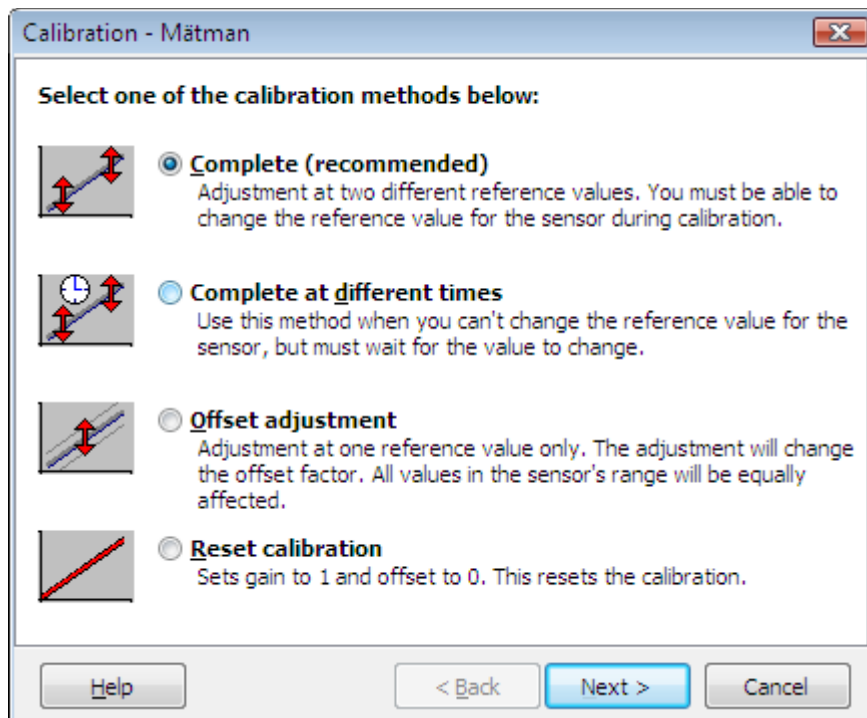


Setup... - Calibrate...

### Warning!

*The calibration changes the main setting of Mätman. If the calibration is not carried out correctly, Mätman will perform incorrect readings. If you are not absolutely sure, do not calibrate!*

You can select one of four methods:



### Complete

This is the recommended method.

The complete calibration calls for a reference measurement at two different levels. The two points (levels) should be as far from each other as possible in order to perform an exact calibration. At both calibration points you must enter the correct reference value, so the computer can calculate the proper correction factors for Mätman.

**NOTE!** The “Measured value” does not have to be the same as the “Reference value”. The important thing is, that it is absolutely stable for at least 30 seconds.

Finally save the adjustment of the logger according to the new calibration. Cancel will abort this new calibration without any changes.

## Complete at different times

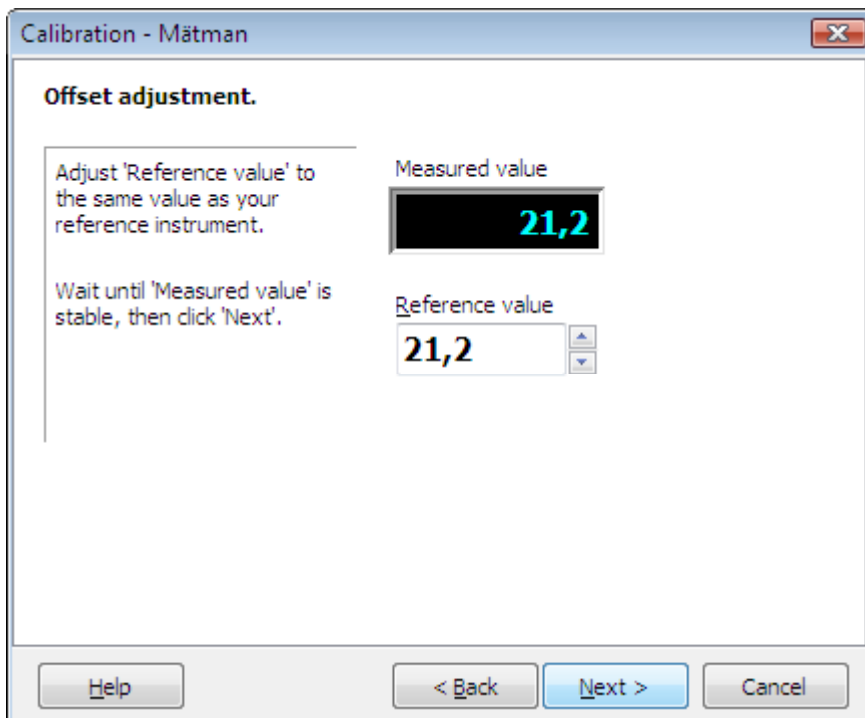
Use this method if it is impossible to change the reference level, and you have to wait for the reference level to change.

This method allows for calibration at the two levels at different times. After measuring of the first reference level, the calibration data are saved in a temporary file.

Next time the calibration function is started with the same Mätman connected, you will go directly to the second reference level. Complete the calibration as above.

## Offset adjustment

This method only needs reference measuring at one level. Then the value is equally adjusted over the whole measuring range, so called offset adjustment.



Use this method when you are normally measuring values within a narrow range, and have no possibility to reference measure at two levels.

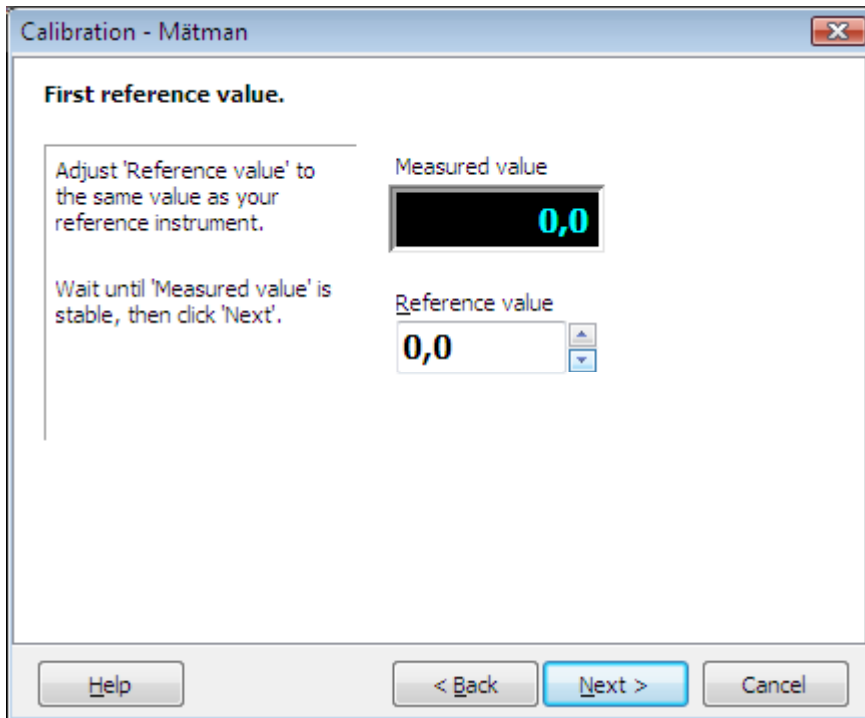
## Reset calibration

Resets the adjustment factors to normal values. The gain is set to 1 and the offset to 0.

This means that the values from Mätman Combi are translated according to the present linearisation table, and other Mätman use a normalised linearisation table.

**Example**

1. Start “Calibrate...”. At temperature calibration, choose two reference temperatures, e.g. 0°C and 35°C.
2. Click “Next” for the “First reference value” to be shown.



Calibration - Mätman

**First reference value.**

Adjust 'Reference value' to the same value as your reference instrument.

Measured value

0,0

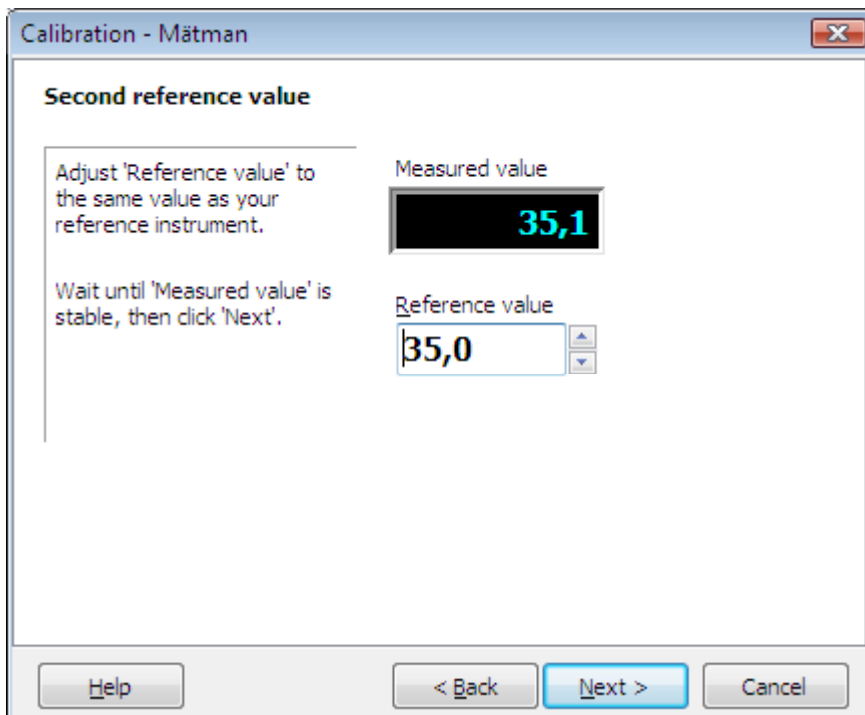
Wait until 'Measured value' is stable, then click 'Next'.

Reference value

0,0

Help < Back Next > Cancel

3. Place Mätman in 0°C, the first reference level.
4. Enter “0” as “Reference value” and wait for the “Mätman value” to be stable. Note that the Mätman value need not necessarily be 0°C, the important thing is, that it is absolutely stable for at least 30 seconds.
5. Click “Next” for the “Second calibration point” to be shown.



Calibration - Mätman

**Second reference value**

Adjust 'Reference value' to the same value as your reference instrument.

Measured value

35,1

Wait until 'Measured value' is stable, then click 'Next'.

Reference value

35,0

Help < Back Next > Cancel

6. Place Mätman in 35°C, the second reference level.
7. Enter “35” as “Reference value” and wait for the “Mätman value” to be absolutely stable.
8. Click “Next” for the last page of the calibration routine.

**Calibration - Mätman**

**Finish calibration.**

Calibrated by:

Remind for next calibration after

Select 'Save' if you want to save this new calibration and overwrite the current one.

Select 'Cancel' if you want to abort this new calibration without any changes.

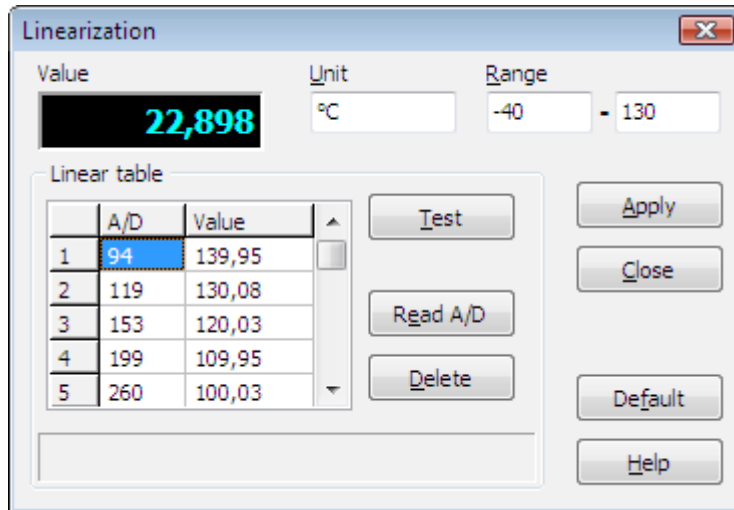
Select 'Back' if you want to go back and change this new calibration.

9. Enter Name and if it's desired activate reminder on next calibration and select calibration interval.
10. If you have performed the calibration with proper accuracy, click “Save” and the new correction factors will be saved in the connected Mätman.

## Logger | Linearize connected sensor

### Not supported on all models

All sensor heads for Mätman Combi contain a table telling Mätman how to translate the measured signal to the correct value. The table is called linearisation table, since it can contain up to 30 breakpoints and thereby linearise a non-linear sensor.



### Value

Displays the present measuring value in Mätman.

### Unit

Displays the current unit of measure, for instance “ °C ”, “m<sup>3</sup>/h” or “Mpa”. The unit of measure will be shown when the measured value is displayed. It will also be used as an axis unit when displaying a graph of the measured values.

### Range

Enter the lowest and the highest value to be measured. This prevents values outside the sensor limits. If a measured value should be outside the limits, it will be adjusted to the respective minimum or maximum value.

### Linear table

The translation table between Mätman’s A/D value and the requested value. The table must continue at least two rows.

Example: (table for measuring current 0–20 mA with probe 18540)

A/D	Value
0	0
4094	20

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According to the table, an A/D value of 0 corresponds to 0 mA, and an A/D value of 4094 corresponds to 20 mA. All values in between will be interpolated, so that an A/D value of 2047 corresponds to 10 mA.

Mätman always supplies A/D values between 0 and 4095, which is 12-bit resolution.

(Default in 18540: Value column 0-100, Unit %)

### **Test**

When you click this button, the program uses the edited table. You can see the resulting value in the “Value” display.

**NOTE! Possible correction factors, saved with the calibration routine, will be reset when you click the “Test” button. This makes it easier to test your own tables, where you want correct measuring without extra correction factors.**

### **Read A/D**

This button reads the present A/D value in Mätman and enters this value as a new line in the table. You must enter the actual engineering value corresponding to this A/D value.

To measure known values, click “Read A/D” and enter the corresponding real value is the easiest way to build up a new table.

### **Delete**

This button deletes the marked row in the table.

### **Default**

Recalls the manufacturer’s original table for this sensor head. Use this button if you make table changes by mistake, or for any other reason you would like to recall the original setting.

### **OK**

When you click “OK”, the changes will be saved in the connected Mätman sensor. We recommend that you perform a complete calibration, when you have changed the linearisation table. This is a reliable check, to ensure the values are correct.

### Example of linearisation

Example of tables for different sensors connected to probe 18540 (0–10V / 0–20 mA).

Flow sensor supplying 0–20 mA at measured flow 0–50 m<sup>3</sup>/h:

*Unit:* m<sup>3</sup>/h

*Range:* 0 – 50

A/D	Value
0	0
4094	50

Temperature sensor supplying 0–5 V at measured temperature 0–200°C.

*Unit:* °C

*Range:* 0 – 200

A/D	Value
0	0
2047	200

Balance supplying 4–20 mA at measured weight 0–100 kg.

*Unit:* kg

*Range:* 0 – 100

A/D	Value
819	0
4094	100

## Plug-in | Setup...



Plug-in/Setup...



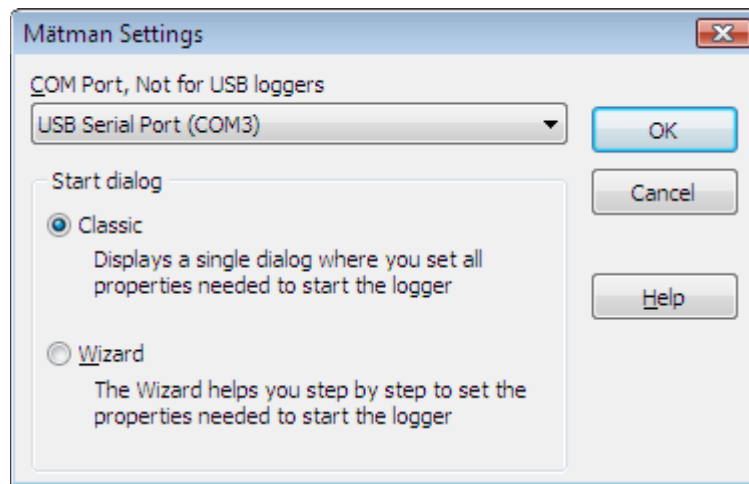
Setup...

## COM Port

USB loggers are auto detected.

If no USB Mätman is connected, XL program tries to connect a serial logger on selected COM port.

If your computer doesn't have an available COM port, use an USB to serial adapter.



When you have selected a free serial port, check if you can make contact with Mätman. The easiest way to do this is to click the “Show” button, displaying the current measurement value in Mätman.

If you are unable to make contact with Mätman, check the connection to the serial port and check if the battery is fitted correctly in Mätman.

## Start dialog

Select the start dialog you wish to use.

## Plug-in | About...



Plug-in/About...

Shows the program version of the selected Plugin module.



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## Options | Preferences...



### Options/Preferences...

Used for setting program options.

#### **Show startscreen**

Checking this causes a startscreen to be shown a few seconds at program startup.

#### **Export data on logger dump**

Checking this causes the function “Export raw data from tape” to be run each time a logger is emptied.

#### **Folder to store Mätman XL files in**

Specifies the folder where all tapes, presentations and other files used by Mätman XL are stored. Use Browse to select another folder.

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## Help | Contents



### Help/Contents

Here is detailed help information for the program.

Each Plug-in module has its own help documentation.

## Help | About...



### Help/About...

Information about:

- the program version number
- web site and E-mail, Eltex of Sweden AB