testo Comfort Software Professional 4

Instruction manual

1 Contents

2 About this document

Use

> Please read this documentation through carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the products.

> Keep this document to hand so that you can refer to it when necessary.

> Hand this documentation on to any subsequent users of the product.

Knowledge of Windows® operating systems is required when working with the software.

Symbols and writing standards

Representation	Explanation
	Note: Basic or further information.
1. ... 2. ...	Action: more steps, the sequence must be followed.
> ...	Action: a step or an optional step.
- ...	Result of an action.
Menu	Elements of the program interface.
[OK]	Buttons of the program interface.
... | ...	Functions/paths within a menu.
“...”	Example entries

3 Specifications

3.1. Use

The testo Comfort Software Professional 4 serves the purpose of saving, reading out and analysing individual readings and measurement series. The graphical presentation of readings is the main task of this program.

Readings are measured with Testo measuring instruments and transmitted to the PC via a interface.

Reading out data is accomplished with the testo Comfort Software Professional 4, which activates the interfaces and provides all functions.

For each Testo instrument / system there is a matching device driver that is especially adapted to the capabilities of the instrument hardware and its control.

Measured readings are recorded with date and time. In case of ONLINE measurements the values are permanently updated.

3.2. System requirements

Operating system

The software can be run on the following operating systems:

- Windows® XP ServicePack 2 (SP2)
- Windows Vista
- Windows 7
- Windows® 8, Windows® 8 Pro, Windows® 8 Enterprise
- Others: on request

Computer

The computer must meet the requirements of the corresponding operating system. The following requirements must additionally be fulfilled:

- Interface USB 1.1 or higher
- Internet Explorer 5.0 SP1 or higher

Date and time settings will be automatically accepted by the PC. The administrator must make sure that the system time is regularly compared with a reliable time source and adjusted, if necessary, to ensure authenticity of the measurement data.

4 First steps

4.1. Installing the software/driver

Administrator rights are required for installation.

1. Insert program CD in the CD-ROM drive of the computer.

If the installation program does not start automatically:

> Open My Computer, select the CD drive and start the **Setup.exe** file.

2. Follow the instructions of the installation wizard.

When installing under Vista, please note the following steps during the installation procedure:

- The **User Account Control** window opens.
  > Click on **[Continue]**.
- The **Windows Security** window opens.
  > Click on **Install this driver software anyway**.

3. To finish the software installation, click on **[Finish]**.

After completion of the software installation, the instrument must be connected to the PC to continue with the driver installation.

4. Connect the instrument to the PC using the USB cable.

- The connection is established.
- The driver installation is performed automatically.

In some cases, the instrument driver may not be automatically recognized. In this case, continue as follows:

Windows XP:

- The **Found New Hardware** window is opened.

1. Select **No, not this time** and click on **[Next]**.
2. Select **Install the software automatically** and click on **[Next]**.

If the driver is not automatically found:

> Enter the driver path in the CD directory: **USBDriver** folder:

3. Click on **[Finish]**.

Windows Vista:

- The **Found New Hardware** window is opened.

1. Click on **Locate and install driver software** and then on **[Continue]**.

If the driver is not automatically found:

> Click on **Browse my computer for driver software** and then click on **[Browse]**. Enter the driver path in the CD directory: **USBDriver** folder:

- The **Windows Security** window opens:

2. Click on **Install this driver software anyway**.
3. Click on **[Close]**.

4.2. Starting the software

Starting the Comfort software

	The user interface of the software is opened in the language of the operating system if this is supported. If the operating system language is not supported, the user interface is in English.

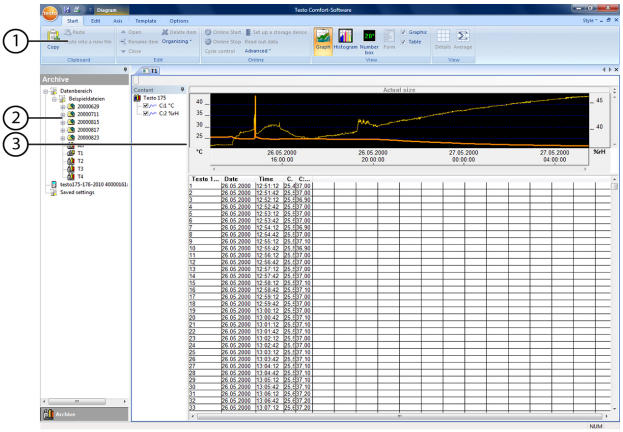
> Click on **[Start]** | **Programs** (Windows XP) or **All programs** (Windows Vista, Windows 7) | **Testo** | **Comfort Software**.

	Under Windows Vista the window **User account control** is opened when the software is started the first time. > Click on **Accept**.

5 Using the product

5.1. User interface

This chapter provides you with information about the design of the user interface of testo Comfort Software Professional 4 .



1 Multi-function bar

The multi-function bar assists you in executing editing/setting operations and in quickly finding the associated functions.

Menu	Explanation
testo	All functions that you require to open, close, save, delete and print. The recently used files are also available as a list for opening. Using this menu, the program can also be ended. **Send**: With the **Send** command you can send out measuring results by e-mail. PDF-Printouts can be created using the Create report binder function.
	Saves the current selection in a file.
	Prints the current view.
	Setting options for the menu bar.

Functions and commands are divided into various groups, which are summarized under the tabs **Start**, **Edit** and **Options**.

Start	Functions for editing the measurement data sets, the evaluation and display
Edit	Functions for evaluating the graphs or tables and possibilities for making settings for the curves in the graphics display.
Axes	Setting options for scaling the time and value axis.
Templates	Selection of the report heads and editing functions for the templates.
Options	Possibilities for setting typefaces in tables and graphs and display of service data.
	The software version number can be found among the service data.

2 **Data area**

The data area serves the purpose of managing measurement data.

3 **Display area**

The display area shows the readings in graphical and tabular form.

5.2. Menus

This chapter informs you about the available menus.

5.2.1. Start

Menu Start | Clipboard

Menu function	Description
Copy	Copies the marked element onto the clipboard.
Paste	Pastes the contents of the clipboard at the current position.
Paste into a new file	Paste the contents of the clipboard into a new file.

Menu Start | Create reports

Menu function	Description
Create report	Create a report in pdf format.
Graphic	Enable/disable graphic display of data.
Table	Enable/disable tabular display of data.
Alarms	Enable/disable display of alarms.
Portrait / Landscape	Sets the orientation of the PDF.

Menu Start | Edit

Menu function	Description
Open	Opens the marked element; e.g. the data from a group.
Rename	Renames the marked element.
Delete item	Deletes the marked element.
Close	Closes the marked element; e.g. the data of a group.
Organizing	Set up a new instrument, new folder/location.

Menu Start | Online

Menu function	Description
Set up a storage device	The configuration page associated with the selected instrument is displayed. This is adapted to the corresponding instruments and provides the settings options that are available.
Online start	Start Online measurement. The measurement data are automatically displayed in the display area.
Online stop	Stop a progressing online measurement.

Menu function	Description
Cycle control	Set the meas. rate for the Online measurement. The minimum adjustable meas. rate depends on the instrument and is checked accordingly.
Read out data	Saves a resultant report to hard disk and opens it in the display area.
Advanced	Synchronizing, importing, alarm settings, acknowledging alarms, saving settings

Menu Start | View

Menu function	Description
Graph	Representation of data in form of a line graph
Histogram	Representation of data in form of a histogram
Number box	Representation of data in form of a numerical field
Form	Representation of data in a form
Graphic	Activate/deactivate graphic representation of data.
Table	Activate/deactivate tabular representation of data
Alarms	Enable/disable display of alarms.
Details	Displays all measuring values.
Average	Displays mean values for a given time span.

5.2.2. Edit

Edit in the diagram view

The **Edit** menu (diagram) is only displayed if the diagram has been activated by clicking in the display area.

Menu Edit | Tools (diagram)

Menu function	Description
Adjustments	Set preferences for curves, background and grid.
Zoom	Drag to form a rectangle in the diagram window to zoom in on the highlighted area. By clicking on **[Original size]** the diagram is once again displayed in its overall size.
Crosshairs	Crosshairs with which the curve can be followed are shown by clicking on a point of the measurement curve. The date, time, reading number and reading are shown in the process.
Average	Clicking on a measured curve determines the calculation range, which is to be calculated or saved (selective statistics). By clicking with the left mouse button you can displace the area limits, by clicking with the right button you can move the complete window.
Regression	Regression curves are an aid for being better able to assess large, unclear amounts of data. In this process, "outliers" are suppressed and the actual course of the curve is reproduced using a theoretical, mathematical function. The regression curve is shown by clicking on a measurement curve. The regression coefficients are shown in the status bar.

Menu function	Description
Classify text to a view	Test can be inserted into a diagram. The text frame can be moved to any desired position within the diagram. The text can be edited by double-clicking.
Erase text from a view	Removes the selected text frame from the diagram.
Display limits	Displays the limit values in the graphic.

Menu Edit | Curves (diagram)

Menu function	Description
K:1 [°C] (Channel designation)	Legend for the diagram. Click on the entry of a curve and the dialogue for the characteristics of the curve is opened.

Edit in the table view

The menu **Edit** (table) is only displayed if the table has been activated by clicking into the window.

Menu Edit | Tools (table)

Menu function	Description
Mark an array as selected	Mark data over a definable time period or definable lines (index range).
Dropping the marking	Drops the marking.
Extra lines (minimum, maximum, mean value)	Inserts a row with the corresponding value for the overall table at the end of the table.
Attach formulae to table columns	Compresses the table to definable intervals. Only the first and the last value are shown for the individual intervals. The other readings are hidden.
Drop formulae	Drops the compression.

Menu Edit | Search (table)

Menu function	Description
Minimum	Shows the smallest reading of the selected channel within the table.
Maximum	Shows the largest reading of the selected channel within the table.

5.2.3. Axes

Edit in the diagram view

Menu Edit | Axes (diagram)

Menu function	Description
Upper limit	Maximum of the shown range of values.
Lower limit	Minimum of the shown range of values.
Division	Scaling of the value axis.

Menu Edit | Time axis (diagram)

Menu function	Description
Division	Scaling of the time axis.

5.2.4. Template

Template in diagram and table view

Menu Template | Template (diagram and table view)

Select a standard template in this menu into which the data that are to be saved or printed are integrated.

The templates differ in the protocol header, meaning in the company logo, the address field or the specification of statistical values.

Menu Template | Edit

Menu function	Description
Edit template	Enables the editing of an existing template.
New template	Enables the creation of a new template.

5.2.5. Options

Menu Options | Formulas

Menu function	Description
Create a new formula	Opens the dialogue for creating a new formula. In a formula several channels of a measurement report can be offset against each other. This results in a new value range, which can be displayed and edited.
Edit a formula	Enables the modification of a formula.
Eras	Deletes a formula.

Menu Options | Font

Menu function	Description
Font	Setting the font for the tables and diagrams.
Font size	Setting the font size for the tables and diagrams.

When selecting the font and font size, take into account the legibility of the diagrams and tables. Use sans-serif fonts such as Arial or Verdana.

Extras | Security menu

Menu function	Description
Hash code	Display the hash calculated from the measuring values.

Menu Options | Service

Menu function	Description
Display service data	Creates a text file with the required information, e.g. the software version number, for Customer Service if servicing is required.
	If the service data cannot be displayed under Windows® Vista, start the WordPad program and save, for example, an empty file of your choice in *.wri format. To do so, manually enter the file extension behind the file name. A link is thus formed between the file and the service data and WordPad.

5.2.6. Style template

Selection of the colour scheme for the program window.

5.3. Setting up a connection

5.3.1. Automatic connection

Instruments from the product ranges
- testo 175 and testo 176
- x35
- testo 184

establish a connection automatically.

✓ testo Comfort Software Professional 4 is installed, see **Installing the software/driver** page 7.

✓ Instrument is connected to the PC, see separate instruction manual for the instrument.

> Start testo Comfort Software Professional 4.

- Instruments from the product ranges testo 175 and testo 176, x35, testo 184 now connect automatically. A name for the connection is automatically created.

5.3.2. Setting up a connection manually

✓ testo Comfort Software Professional 4 has been installed, see **Installing the software/driver** page 7.

✓ Instrument is connected to the PC, see separate operating instructions for the instrument.

1. Start testo Comfort Software Professional 4.
2. Select **Start > Organise > New device**.

- The window **New instrument setup wizard** opens.

3. Select the desired instrument from the instrument selection list and click on **Next**.
4. Enter the name for the connection and click on **Finish**.

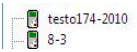
- The connection to the instrument has been set up. The name of the connection appears in the window **Archive**.

5. Press **OK** to confirm.

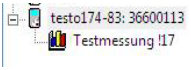
5.4. Configuring the data loggers testo 175 and testo 176

5.4.1. Opening a connection

> Double-click into the window **Archive** on the connection that is to be opened.



- If a measurement report is stored in the data logger, the saved data will be transferred and report icon together with the abridged name of the report log will appear under the opened connection.



Using a connection for several data loggers

You can connect different data loggers using an established connection. When changing the data logger the connection must be disconnected and subsequently set up again for the new data logger, as otherwise it may not be identified by the software (see Instrument configuration , page25)

5.4.2. Performing settings

> Choose **Start** | **Online** | **Instrument control**.

This function is only activated if the name of the connection is highlighted in colour. If this is not the case:

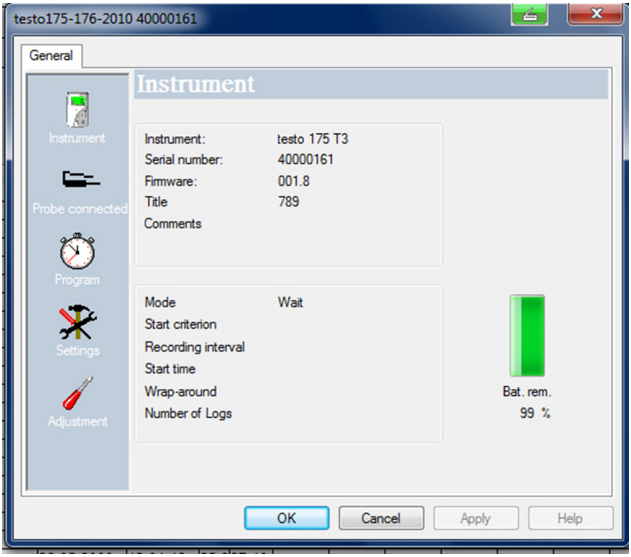
> First click on the name of the connection to highlight it in colour and subsequently choose **Start** | **Online** | **Instrument control**.

- The window for programming the instrument opens.

The following windows and the functions that can be adjusted therein depend on the connected instrument.

The following chapter describes the maximum scope of functions of all connectible instruments.

Please follow also then operating instructions of the connected testo device.



Instrument

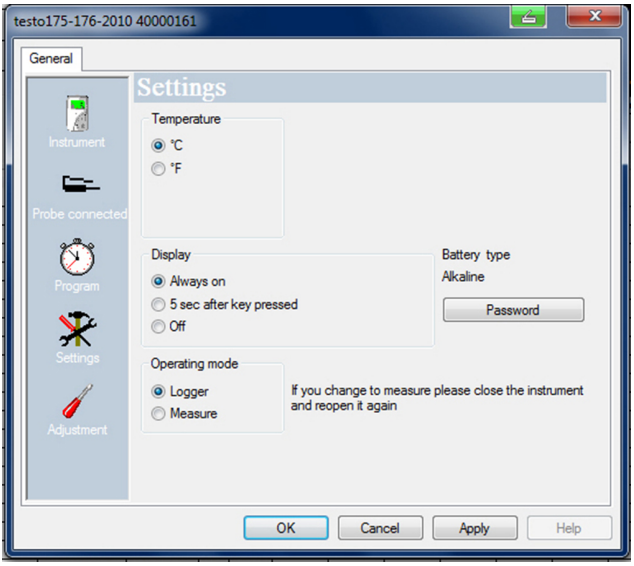
In the window **Instrument** you can view general information about the instrument.

This window serves as an information window. It cannot be used for programming.

It is recommended to do the programming first in the window **Settings** and then in the window **Measuring program**.

Settings

> Choose **Settings**.



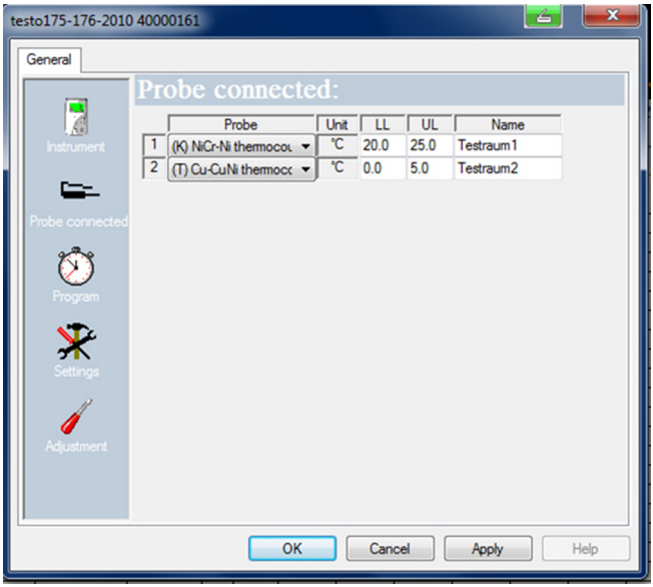
- Measurement parameters:
  > Choose the desired unit.
- Display options
  - Switch alarm display LED on/off
  - Switch operation indicator LED on/off
  - Make display settings
  - Activate the alarm switching output, configuration of the alarm switching output see operating instructions for instrument
- Operating mode
  - Logger: The instrument saves the measurement data (the instrument display shows: **Rec**).
  - Measuring: The instrument shows the measurement data in the display, but does not save these (the instrument display on shows the reading). The Online Measurement menu can be selected as soon as the Instrument Control window is closed.

For data loggers 176-T1, 176-T3 and 176-H2, no operating mode can be selected because there is no display. The Online Measurement menu can be enabled if the data logger is in End mode and is reconnected.

- Password:

> The data logger can be secured with the testo Comfort Software CFR with a password.

Probe connected



> For each connected sensor select the sensor type, enter upper limiting value (**UL**), lower limiting value (**LL**) and sensor name.

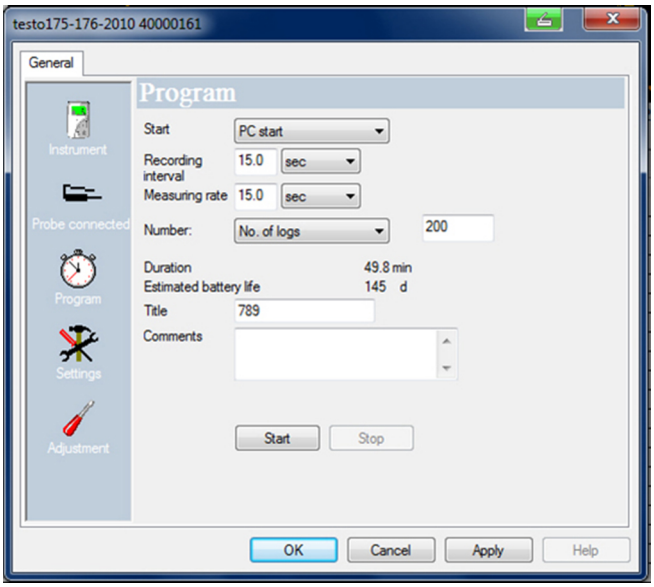
> With connections closed with blanking plugs: Choose **switched off**.

The sensor number refers to the connection number printed on the instrument housing.

Without assignment of the sensor type to the correct instrument port the instrument will not record any sensor readings.

Measurement program

> Choose **Program**.



- Start criterion:
  > Select the desired criterion to start the measuring program:
  - Date/time: The instrument starts at the pre-set time.
  - Button start: On the instrument: Hold **[Go]** depressed for longer than 3 seconds.
  - PC-start: Click on **[Start]**.
  - Formula start: With formula start explicit process events may become the start point of the measurement. For each measuring channel a formula can be assigned, which can then additionally be linked by operators. The instrument will only start measuring after the limiting value of the entered formula is exceeded. The measurement will therefore only stop when the software is terminated: Click on **[Stop]**.

- Measuring rate
  > Select the interval in which the measurements should be performed.
- Save rate:
  > Select the interval in which the measurements should be saved.

The save rate must be a multiple of the meas. rate.

- Stop criterion:
  > Select the desired criterion to stop the measuring program:
  - Memory full: The instrument stops the measurement as soon as the instrument memory is full.
  - Number of measurements: The instrument stops the measurement as soon as the defined number of readings has been obtained.
  - Circular buffer memory: If the memory is full, the instrument will first overwrite the "oldest" readings. The measurement will therefore only stop when the software is terminated: Click on **[Stop]**.
- Channel designation:
  > Enter the name for the measuring channels.
- LL:
  > Enter the lower limiting value.
- UL:
  > Enter the upper limiting value.
- Duration:

  Specifies the runtime of the measuring program, which has been calculated on the basis of the values start criterion, meas. rate and stop criterion. When selecting the stop criterion "circular buffer memory" the duration is calculated until the memory is full once.
- Battery life:

  Specifies the presumable battery life.

The expected battery life shown is calculated on the basis of the set measuring/memory cycle.

- Abridged title:
  > Enter the abridged title for the measuring program (maximum 15 characters).

  The abridged title of the measuring program is taken on by the software testo Comfort Software Professional 4 when the data logger is read out.

- Info:
  > Enter additional information to the measuring program (maximum 70 characters).
- Send to:
  > Enter the e-mail address.

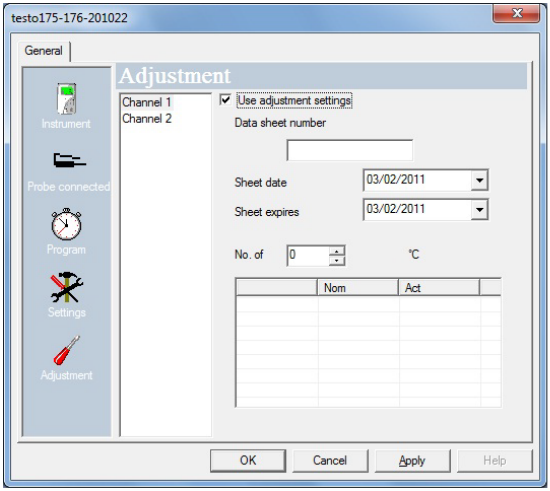
  The PC must have access to the Internet to be able to send the e-mail.
- Start and Stop:
  > Click on **Start** to start a measuring program.

This function is only available for selection if the start criterion PC-start has been selected and the measuring program has been transferred to the data logger (see following section: Finish programming).

> Click on **Stop** to quit a measuring program.

This function is only available for selection when a measurement is in progress (data logger in operating status **Rec**).

Adjustment

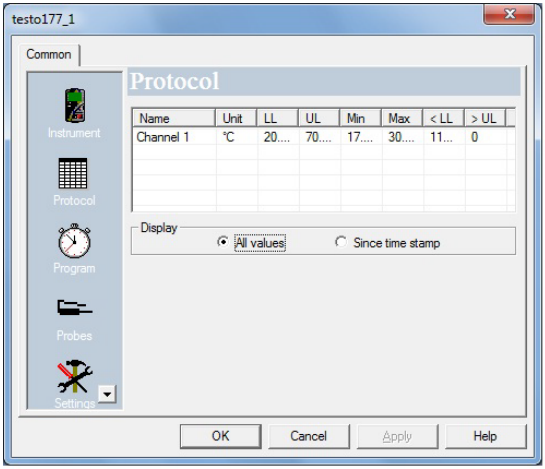


> Enter the adjustment data from the calibration certificate.

The adjustment influences the measuring accuracy and cannot be undone.

The adjustment function cannot be used with instruments from the 174 series.

Measurement protocol



The window **Protocol** only appears if a measuring program has been performed and has been saved in the instrument.

The window **Protocol** is a sole information window. It cannot be used for programming.

Finish programming

✓ The data logger is in operating status **Wait** or **End**.

1. Click on **Accept** to transfer the measuring program to the data logger.

If a measurement is in progress (status **Rec**):

> Quit the measurement: Click on **Stop**.

\- The window **Programming data** pops up to confirm the programming that has taken place.

2. Click on **OK**.

\- Programming has been completed.

5.4.3. Instrument configuration

Save

✓ The data logger is in operating status **Wait** or **End**.

✓ The configuration is complete and has been stored.

1. Click **Start** | **Online** | **Advanced** | **Save settings** to save the instrument configuration created.

2 Enter a name to save it under and press **[OK]**.

\- The instrument configuration is stored with the specified name under **Saved settings**.

Load

✓ The data logger is correctly connected to the PC and is displayed.

1. Click on the saved setting and drag onto the name of the data logger.
2 Confirm the information window that appears with **[OK]**.
3 In the subsequent input window enter the abridged title, info and starting time, check the box if the instrument is to be restarted and confirm with **[OK]**.

- The saved settings have been transferred to the data logger.

5.4.4. Disconnecting the connection

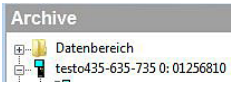
1. In the window **Archive** click on the connection that is to be disconnected.
2. Choose **Close**.

- The connection to the data logger is disconnected.

5.5. Configuring the instrument testo x35

5.5.1. Opening a connection

> Double-click into the window **Archive** on the connection that is to be opened.



- If a measurement report is stored in the instrument, the saved data will be transferred and the report icon, together with the abridged name of the report log, will appear under the opened connection.

Using a connection for several instruments

You can connect different instruments using an established connection. When changing the instrument, the connection must be disconnected and subsequently set up again for the new instrument, as otherwise it may not be identified by the software (see Instrument configuration , page25)

5.5.2. Instrument control

> Select **Start** | **Online** | **Set up a storage device**.

This function is only enabled if the name of the connection is highlighted in colour. If this is not the case:

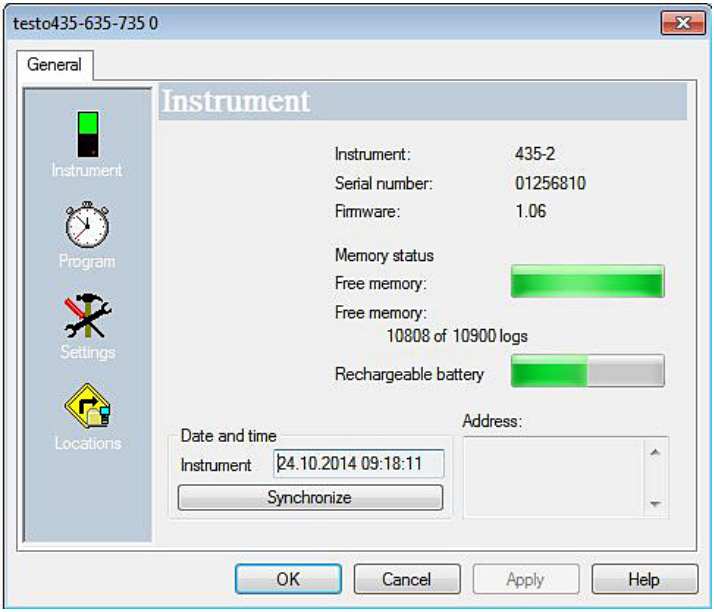
> First click on the name of the connection to highlight it in colour and then select **Start** | **Online** | **Set up a storage device**.

- The window for programming the instrument opens.

The following windows and the functions that can be adjusted therein depend on the connected instrument.

The following chapter describes the maximum scope of functions of all connectible instruments.

Instrument



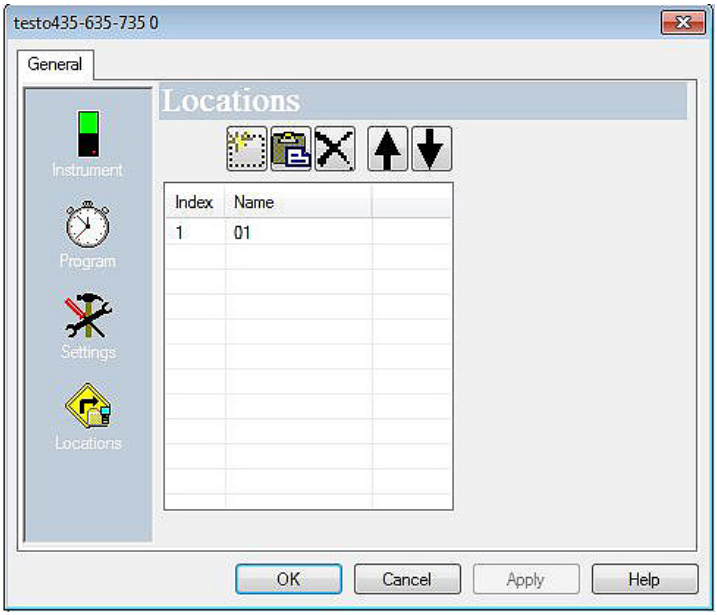
In the window **Instrument** you can view general information about the instrument.

This window serves as an information window. It cannot be used for programming.

We recommend first creating a measuring location in the window **Locations**, then carrying out the programming in the window **Settings** and subsequently setting the measurement program in the window **Program**.

Measuring locations

> Select **Locations**.



In the Locations window you can

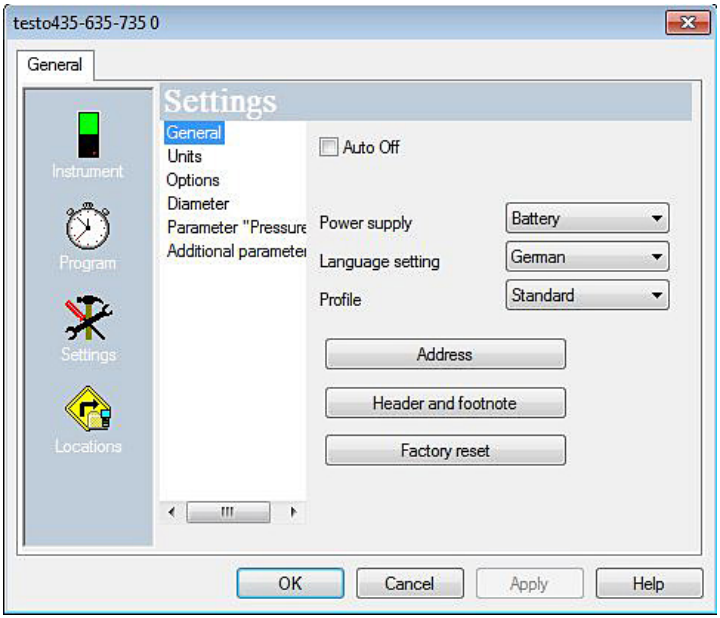
- Create new measuring locations
- Paste data from the clipboard
- Delete measuring locations
- Determine limit values (testo 735 only).

Icon	Explanation
	New measuring location > Each time you click on the icon, you create a new measuring location. Rename measuring location > Double-click on the selected measuring location.
	Clipboard > Paste contents from the clipboard.
	Delete > Remove marked location from the list.

Icon	Explanation
	Alarm settings (testo 735 only) Lower limit: > Enter lower limit value for the individual locations. Upper limit: > Enter alarm threshold for the individual channels.
	Cursor keys > Select the location with the cursor keys.

Settings

> Choose **Settings**.



General

- Auto Off
  > Enable automatic switch-off of the instrument.
- Power supply
  > Select battery or rechargeable battery operation.

- Language setting
  > Select language.
- Profile
  > Set standard, tour, long-term measurement.
- Address
  - Create customer address
  - Enter information on the measuring location.
- Header and footer
  > The header and footer for printout on the protocol printer can be adapted
- Factory reset
  The instrument is reset to the factory settings.

Units

> Select units for the individual measurement parameters.

Options

> Enable/disable volumetric flow measurement.

Cross-section (testo 435 only)

> Select cross-section.

“Pressure” parameter

> Carry out density calculation.

Other parameters (testo 635 only)

> Set heat transfer coefficient.

Material characteristic curves (testo 635 only)

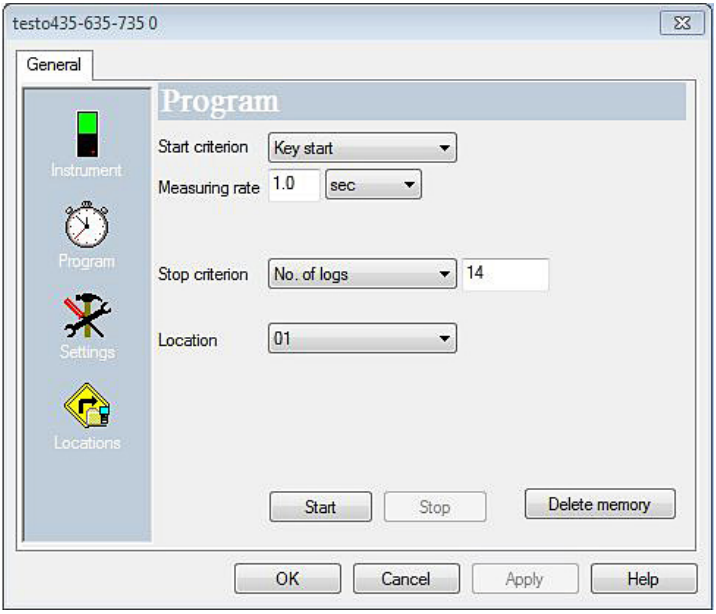
> Edit existing material characteristic curves.

Calibration data (testo 735 only)

> Display stored calibration data.

Measurement program

> Choose **Program**.



- Start criterion:
  > Select the desired criterion to start the measuring program: Button start or PC start
- Measuring cycle:
  > Select the interval in which the measurements should be performed.
- Stop criterion:
  > Select the desired criterion to stop the measuring program:
  - Memory full: The instrument stops the measurement as soon as the instrument memory is full.
  - Number of measurements: The instrument stops the measurement as soon as the defined number of readings has been obtained.

- Measuring location
  > Select measuring location for the measurement program.
- Start and Stop:
  > Click on **Start** to start a measurement program.

	This function can only be selected if PC start has been selected as the start criterion.

> Click on **Stop** to quit a measuring program.

	This function can only be selected if a measurement is being performed.

- Delete memory:
  > All data stored in the instrument is deleted.
  > Click on **Start** to start a measurement program.

Finish programming

✓ Instrument is in the operating status **Slave mode**.

> Click on **Apply** to transfer the measurement program to the instrument.

5.5.3. Disconnecting the connection

1. In the window **Archive** click on the connection that is to be disconnected.
2. Choose **Close**.

- The instrument is disconnected.

5.5.4. Online measurement

Online start

> Start online measurement: **Online-Start**

- The measurement data is automatically displayed in the work area.

Online stop

> Stop online measurement: **Online-Stop**

- The resulting log in the work area can now also be saved on the hard drive.

Control measurement

> Set the measuring cycle for the online measurement: **Cycle control**

	The minimum adjustable measuring cycle depends on the instrument and is checked accordingly.

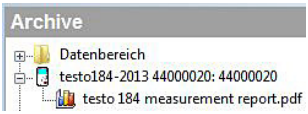
- The data is stored in a temporary file on the hard drive.

5.6. Configuring the testo 184 data logger

5.6.1. Opening a connection

> Double-click into the window **Archive** on the connection that is to be opened.

- If a measurement report is stored in the data logger, the saved data will be transferred and report icon together with the abridged name of the report log will appear under the opened connection.



Using a connection for several data loggers

You can connect different data loggers using an established connection. When changing the data logger, the connection must be disconnected and subsequently set up again for the new data logger, as otherwise it may not be identified by the software (see Instrument configuration, page 24)

5.6.2. Making settings

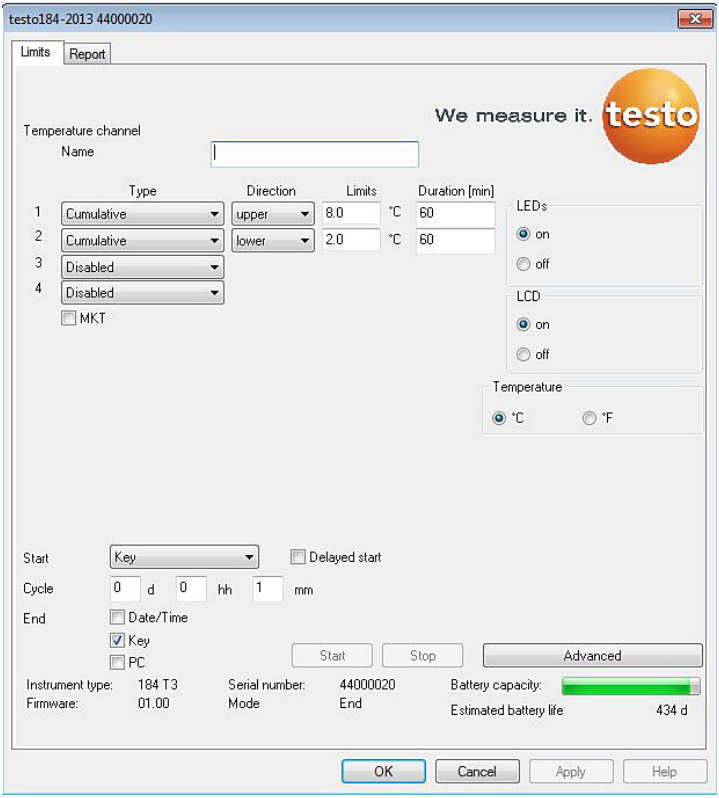
> Select **Start** | **Online** | **Set up a storage device**.

This function is only enabled if the name of the connection is highlighted in colour. If this is not the case:

> First click on the name of the connection to highlight it in colour and then select **Start** | **Online** | **Set up a storage device**.

- The window for programming the instrument opens.

The following windows and the functions that can be adjusted therein depend on the connected instrument.



Limit values and PDF report

The data logger can be configured on the **Limits and Report** tab.

The same functions are available as in the configuration via the PDF file saved on the data logger **testo 184 configuration pdf** in Expert mode.

Finish programming

✓ The data logger is in operating status **Wait** or **End**.

1. Click on **Apply** to transfer the measurement program to the data logger.

If a measurement is in progress (status **Rec**):

> Quit the measurement: Click on **[Stop]**.

2. Click on **OK**.

\- Programming has been completed.

5.6.3. Saving settings

Save

✓ The data logger is in operating status **Wait** or **End**.

✓ The configuration is complete and has been stored.

1. Click **Start** | **Online** | **Advanced** | **Save settings** to save the instrument configuration created.
2. Enter a name to save it under and press **[OK]**.

- The instrument configuration is stored with the specified name under **Save settings**.

5.6.4. Loading saved settings

Load

✓ The data logger is correctly connected to the PC and is displayed.

1. Click on **Save settings** and drag onto the name of the data logger.
2. Confirm the information window that appears with **[OK]**.
3. In the subsequent input window enter the abridged title, info and starting time, check the box if the instrument is to be restarted and confirm with **[OK]**.

- The saved settings have been transferred to the data logger.

5.6.5. Disconnecting the connection

1. >In the window **Archive** click on the connection that is to be disconnected.
2. Choose **Close**.

- The connection to the data logger is disconnected.

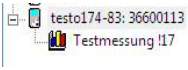
5.7. Reading out measurement data

Depending on the volume of data the representation of measurement data may take a few minutes. The status bar at the bottom of the display area informs about the progress of data transfer.

From the instrument

✓ Set up the connection to the instrument, see **Setting up a connection** page 17.

> In the data area double-click on the report to be opened.



- The saved data are imported from the data logger and appear in the display area under a new tab.

From SD card (testo 175 and testo 176 only)

✓ Measurement data were copied to the SD-card, see operating instructions of the instrument.

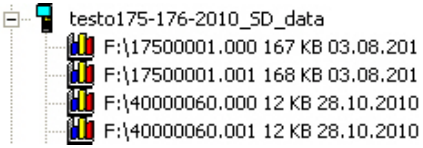
✓ SD-card connected to PC.

1. Start the software testo Comfort Software Professional 4.
2. Select **Start > Organise > New device**.

- The window **New instrument setup wizard** opens.

3. In the instrument selection choose **175-176-2010-SD_data** and click on **Next**.
4. Enter the name for the connection and click on **Finish**.

- The connection to the SD-card has been set up. The name of the connection appears in the window **Archive**.



5. Press **OK** to confirm.
6. Double-click on the report to be opened.

- The saved data are imported from the SD-card and appear in the display area under a new tab.

5.8. Analyzing series of measurements

You can represent series of measurements as a diagram or a table.

> In the **Start** | **View** menu, select the
  - Activate **Graphic** if the data is to be displayed graphically ~~or~~
  - Activate **Table** if the data is to be displayed in tabular form.

5.8.1. Graphic view

In this view, the readings are shown as line diagrams.

In the **Start** | **View** menu, the **Graphics** command is activated.

> If necessary, deactivate channels via the checkboxes for the display.

You can show or hide the gridlines for the corresponding axis by clicking on the time axis or the value axis.

5.8.1.1. Enlarging the view

Zoom in on a detail of the diagram to check the behavior of the readings within a specific time span, for example.

1. Click on **Edit** | **Tools** | **Zoom in**.
2. In the diagram, use the left mouse button, pressed and held, to highlight the area that should be shown enlarged.

Click on **[Original size]** and the entire diagram is shown again.

5.8.1.2. Information on a reading (crosshairs)

If you move your crosshairs along a curve, you will quickly receive detailed information on the individual readings.

1. Click on **Edit** | **Tools** | **Crosshairs**.
2. In the diagram, click on the point for which the details should be shown.

- A dialogue with the following information on the reading is shown:
  - date on which the reading was recorded,
  - time at which the reading was recorded,
  - number of the reading and
  - reading.

You can move along the curve with the left mouse button pressed and held and thereby see the individual information for the readings.

In doing this, it is not necessary to exactly follow the course of the curve; the crosshairs does this automatically if you move the mouse to the right or left.

5.8.1.3. Text field

Insert a text field to enter comments and additional information in the curve.

Insert text field

The text field may potentially cover parts of the curve. In this event, the text field must be positioned in such a way to ensure that the curve is not concealed.

1. Click on **Edit** | **Tools** | **Insert text**.

- A text field is displayed in the diagram.

2. Fill the text field with the required content.
3. Click on the border of the text field and move it so that the curve is not concealed.

Delete text field

1. Click on the text field and remove all the contents.

- The text field is deleted.

5.8.1.4. Characteristics of a curve

You can adapt the representation of a measurement series to your requirements. For example, you can change the line weight of a curve or the representation of the limit values in the diagram.

1. Change to the diagram view of the measurement series, the characteristics of which are to be displayed.
2. Click in the **Edit** | **Curves** menu on the entry of the curve, the characteristics of which are to be displayed.

- The **Characteristics of (name of curve)** dialogue is opened.

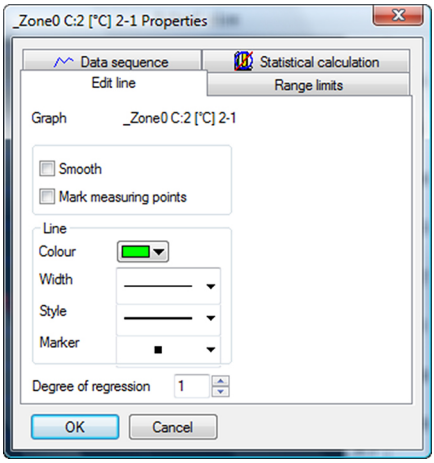
The following tabs are available in the dialogue:

- **Curve** tab
- **Range limits** tab
- **Statistical computation** tab.
- **Data sequence** tab

Buttons of the dialogue

Button	Explanation
[OK]	Applies the changed settings. The dialogue is closed.
[Cancel]	Closes the dialogue without applying the changes.

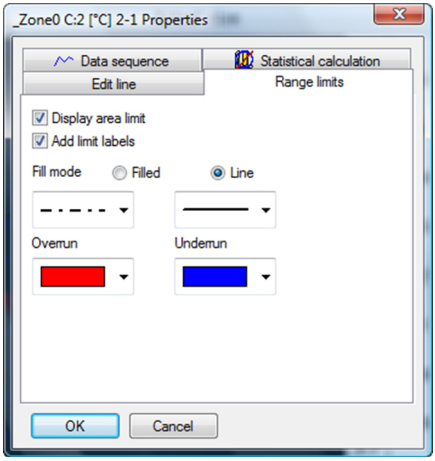
Curve tab



Designation	Explanation
Smooth	The measurement points are connected by an interpolated curve; the plot-points on the curve between two measurement points are estimated mathematically.
Mark measuring points	The individual measurement points are represented by a symbol. The value shown only corresponds to the exact measured value at these points. The measurement points are connected with straight lines during the measurement. When the measurement is paused the curve can be smoothed.
Colour	Line colour of curve.

Designation	Explanation
Width	Line weight of curve.
Style	Line pattern of curve.
Marker	Symbol for the measurement points.
Degree of regression	Possible values "0" to "7". The "0" degree represents a pure mean calculation, the "1" degree of regression the linear trend, a higher value helps in the event of curves with several extreme values.

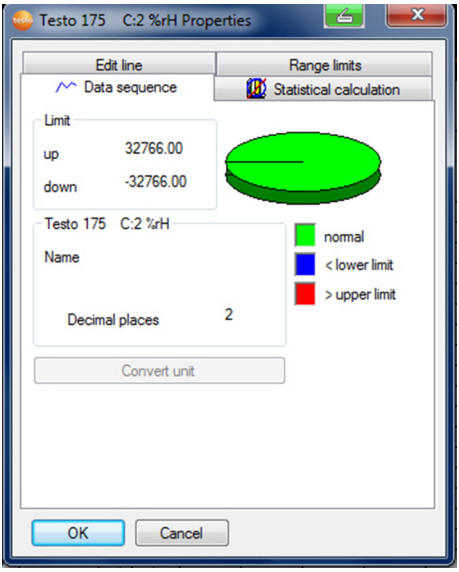
Range limits tab



Designation	Explanation
Display area limit	Specification as to whether the limit values should be shown in the diagram.
Add limit labels	Specification as to whether the limit values should be labelled (**Upper**/**Lower limit value: name of curve**).
Area fill	Specification as to whether the areas outside of the limit values should be marked by means of an area fill.
Selection list for area fill	Selection of the fill.
Line fill	Specification as to whether the limit values should by means of horizontal

Designation	Explanation
	lines.
Selection lists for line fill	Selection lists for line type and line thickness.
Overshoot	Colour selection for the fill of the area above the upper limit value.
Undershoot	Colour selection for the fill of the area below the lower limit value.

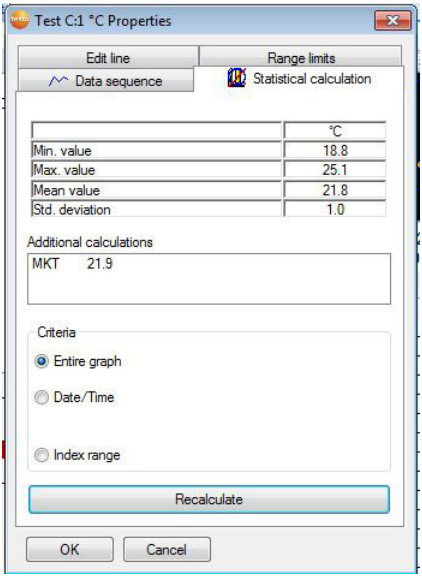
Data sequence tab



Designation	Explanation
Upper limit values	Specification of the upper limit value.
Lower limit values	Specification of the lower limit value.
Name	Designation of curve.
Decimal places number representation	Number of the decimal places; e.g. for the data table.
[Convert unit]	Opens a dialogue for converting the unit of the curve.

Designation	Explanation
Pie chart	Graphical representation for the distribution of the readings: • green: readings that are within the limit values. • blue: readings that are below the lower limit value. • red: readings that are above the upper limit value.

Statistical computation tab



Designation	Explanation
Min. value	Smallest reading of the curve.
Max. value	Largest reading of the curve.
Mean value	Arithmetically-determined average value.
Std. deviation	Measure of the scattering of the readings around the average.

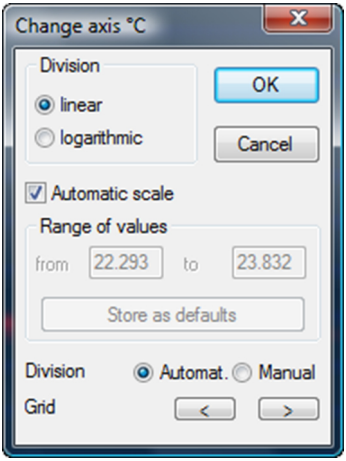
Designation	Explanation
Criteria	**Entire graph**: calculation of the entire data range **Date/time**: specification of which time period is to be calculated. **Index range**: select measuring points to be used for the calculation.
Recalculate	Curve is recalculated.

5.8.1.5. Settings for the axes in the diagram

Change the settings of the axes in the diagram to adapt the representation to your requirements.

Settings for the value axis

- >Click on the required value axis in the diagram by double-clicking or using the right mouse button.
- The **Change axis [unit of the readings]** dialogue is shown.



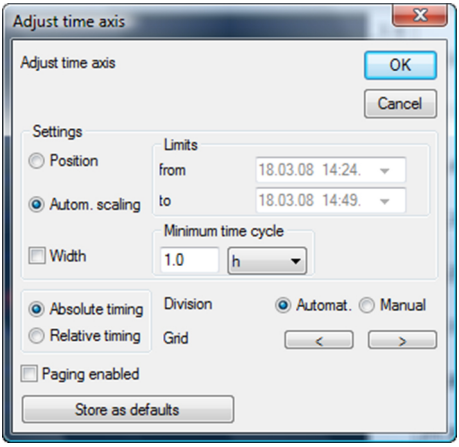
Designation	Explanation
Division linear	Specification that the axles are divided in a linear manner.
Division logarithmic	Specification that the axes are divided logarithmically, meaning the increments represent powers of ten.
[OK]	Applies the settings until other data are called up. The dialogue is closed.

Designation	Explanation
[Cancel]	Closes the dialogue without applying any changes.
Automatic scale	Specification as to whether the program should perform the scaling of the value axis.
Range of values from ... to	Manual entry of the range of values if the **Automatic scale** is deactivated.
[Store as defaults]	Saves the current settings as the default setting.
Division Automat.	Specification that the program should perform the division of the axis.
Division Manual	Specification that the division of the axis should be performed manually.
Grid [<], **[>]** (if automatic division is activated)	Decrease or increase the division of the axis by clicking on **[<]** or **[>]**.
Interval (if manual division is activated)	Manual entry of the grid.

Settings for the time axis

> With the right mouse button, click on the time axis in the diagram.

- The **Adjust time axis** dialogue is shown.



Designation	Explanation
[OK]	Applies the settings until other data are called up. The dialogue is closed.
[Cancel]	Closes the dialogue without applying any changes.
Position	Shows a freely-definable extract of the diagram.
Autom. scaling...	Shows the entire diagram in the window.
Extract	Shows a fixed, defined extract that can be moved over the time axis.
Limits from ... **to** (if **Position** view is activated)	Limits for the **Position** view.
Minimum time cycle (if **Extract** view is activated)	Specification of which time period should at least be shown.

Designation	Explanation
Selection list for the unit (if **Extract** view is activated)	Unit of the time axis in the minimum time cycle: • **sec** (second) • **min** (minute) • **h** (hour) • **d** (day).
Absolute	All times are the real times at which the readings were recorded.
Relative	Sets the starting time to 00:00; the time the runs relative to this starting point.
Paging enabled	The function associated with this is not available in the Small Business Edition.
Division Automat.	Specification that the program should perform the division of the axis.
Division Manual	Specification that the division of the axis should be performed manually.
Grid [<], **[>]** (if automatic division is activated)	Decrease or increase the division of the axis by clicking on **[<]** or **[>]**.
Interval (if manual division is activated)	Manual entry of the grid.
Selection list for the unit (if manual division is activated)	Unit of the time axis: • **sec** (second) • **min** (minute) • **h** (hour) • **d** (day).

5.8.2. Table view

The readings are listed in table form in this view.

In the **Start** | **View** menu, the **Table** command is activated. Now you have to select the data record that you wish to display.

- The table view of the selected data is shown.

> If necessary, deactivate channels via the checkboxes for the display.

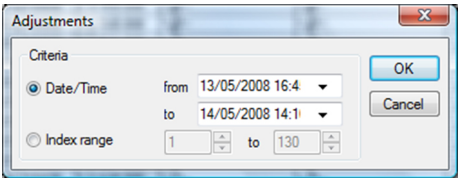
5.8.2.1. Marking readings

Mark specific readings to perform a statistical computation for part of the measurement series, for example.

The min, max and average values cannot be calculated via a period/index range defined in the table.

1. Click on **Edit** | **Tools** | **Mark**.

- A dialogue for determining the criteria is shown.



2. Select the
   - Select **Date/time** if the readings for a particular time period are to be marked.
   - The selection lists are enabled for the determination of the time period.
   - Select the **Index range** if the readings in particular rows in the table are to be marked.
   - The selection lists are enabled for the determination of the index range.
3. Determine time period or index range.
4. Click on **[OK]**.

- The dialogue is closed and the corresponding readings are marked in the table.

The selected readings can be copied and further edited using suitable software (e.g. with Microsoft® Excel®).

5.8.2.2. Dropping the marking

> Click on **Edit** | **Tools** | **Drop marking**.

- The marking of the readings is deleted.

5.8.2.3. Determining largest reading

> In the **Edit** | **Find** | **Maximum** menu click on the curve for which the largest reading should be determined.

- The largest reading is shown marked in the table.

5.8.2.4. Determining the smallest reading

> In the **Edit** | **Find** | **Minimum** menu click on the curve for which the smallest reading should be determined.

- The smallest reading is shown marked in the table.

5.8.2.5. Add rows

> In the **Edit** | **Tools** | **Add rows** menu, activate the selection that is to be displayed in extra rows.

\- The extra rows are displayed in the table.

5.8.2.6. Compress

Tabular values are displayed in compressed format. The limits for the compression range and the additional Min, Max and Mean values are displayed.

> Click in the **Edit** | **Tools** | **Compress** menu, a selection window appears.

> Set the calculation and extract and confirm with **OK**.

\- The table display is reduced to the selected Min, Max and Mean values, and the entered time period.

5.8.2.7. Drop compression

The table compression is removed.

> Click in the **Edit** | **Tools** | **Drop compression** menu.

\- The table is displayed with all the individual values once again.

5.9. Creating evaluations

You can print out series of measurements.

5.9.1. Printing measurement data

Measurement data can be printed in diagram or table form.

> In the **Start** | **View** menu, select the
  - Select **Graph** if the table view is activated but the graphic view should be printed.
  - Select **Table** if the graphic view is activated but the table view should be printed.

1. Select the type of report head in the **Template** | **Template** menu.

Open the preview of the report using the **File** (Testo logo) | **Print preview** command.

Use portrait format for printing a table and landscape format for printing a diagram.

You can determine the format under **File** | **Page Setup...**.

2. Select the **Print** command in the **File** menu.

\- The **Print** dialogue for selecting the printing options is shown.

3. Change printing options, if needed, and click on **[OK]**.

\- The report is printed.

6 Tips and assistance

6.1. Questions and answers

Question	Possible causes/solution
Instrument is not responding...	This message appears if the PC program cannot communicate with the connected measuring instrument or if the measuring instrument does not respond. • Make sure that the instrument is switched on. • Check the connecting cable. • Does the instrument have sufficient power? • Is the connecting cable connected to the correct COM port?
Instrument has signalled no functional probes. Measurement not possible.	• You try to obtain an online measurement using an instrument with no probes connected to it. • Connect the corresponding probes. • Not all input variables for the "..." function are contained in the measurement protocol. You have selected a predefined function that requires more or different parameters than those that are contained in the measuring protocol in order to perform the calculation, e.g. if you wish to calculate the dewpoint but provide only the temperature, the humidity parameter is missing.
Invalid name: The symbols: !,?,*,:,\ cannot be used in location and folder names.	Rename it and do not use these characters.
An instrument setting with this name already exists: Please select a new name.	Different names should be used when setting up new instruments. The same name should not be used for different instruments.

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