



measure • measuring software

User guide

Congratulations on the purchase of your new measuring software. With **measure** you now have an extensive and convenient measuring program, which is to a great extent intuitively operable. **measure** is available for a wide range of PHYWE measuring instruments, including all *PHYWE Hand-held measuring instruments* and *PHYWE Cobra3* with various modules and sensors.

The **measure** software offers you a uniform face for processing and visualizing your measurement data, and so enables you to work rapidly, reliably and simply with greatly differing measuring instruments. You will quickly learn how to work with and operate the software with one measuring instrument, and can then apply this knowledge directly to working with other measuring instruments.

Take the time to read this user guide. It explains how the software is to be installed, and the use of the basic program functions. You will get to know further, special functions during your work with **measure**. The comprehensive online help will answer detailed questions. Most new instruments in the PHYWE product line are supplied with literature on experiments which have been specially suited to your measuring instrument and subject, and which includes very detailed descriptions on how to use the software.

Should you have questions on working with **measure**, however, or possibly suggestions or ideas on further improvements, please contact PHYWE support, whereby it is best to send an email to:

measure@phywe.de

We wish you success and enjoyment in working with **measure**.

Installation

The software is equipped with its own installation program. To install it, place the original installation CD-ROM in the drive. Usually the installation program starts autonomously.

If it does not, open Windows™ Explorer, select the CD-drive, and double click on

- **start.exe**

Follow now the instructions on the monitor.

Working with **measure**

In the following, you will be introduced to the basic **measure** functions, and be familiarized with how you can record, display, evaluate and store a measurement. You will find that you can work quickly and easily with **measure**, and will very soon have become accustomed to the way it operates.

Your new measuring program **measure** offers you a variety of functions and possibilities. Give yourself a little time, therefore, and do not try to understand everything down to the last detail at the first go. These instructions give you a first overview of the program functions and how you can use them. Based on this knowledge, you can discover and use program functions not mentioned in this guide yourself.

The online help, and naturally the intuitive user prompting in the software, are always there to assist you. The online help gives you not only context-related, specific information on a certain program function, but also general comments on software function. You reach the online help when you

- select the menu prompt *Help /Manual* (also via *Shift+F1*).
- Within dialogs, press key *F1*, or a help key when available.

As these brief instructions are merely an introduction to working with **measure**, the online help is an indispensable tool for you, both to answer questions which arise, as well as to explain specific program functions and settings.

Recording of data

The first step is to learn how you can gather data with your measurement program. For this, you must naturally have the appropriate measuring instrument connected at the PC interface (RS232) which is set in the program (see the section on Installation) and switched on. Should you have several measuring instruments, or types of software modules, installed in the software, then you must select the one you want via the menu prompt *Gauge* before beginning data logging. This instrument is then given a hook in the menu and is from now on the actual measuring instrument (software module). This procedure is naturally not necessary when you only have one measuring instrument (software module) installed, as the single instrument is always selected. When you are using a *PHYWE Hand-held measuring instrument*, please select the measuring instrument type *PHYWE Hand-held measuring instrument* in the software, which then recognizes automatically which type of instrument (e.g. Temperature, Lux or IR Gas analysis) you are using.

After selecting the measuring instrument, select the menu prompt *File /New measurement* or press the red recording button on the button panel. You now come into a dialog in which you can set all parameters for the coming measurement. This dialog is designed differently for each measuring instrument (software module), according to which possibilities the measuring instrument offers and which functions the quantity to be measured requires. It is therefore clear, that this brief guide cannot cover all of the different settings for all of the available measuring instruments, but can only give an overview of possible functions and groups of functions, which may not be present in your special case and with the measuring instrument you have chosen. It is also possible that your measuring instrument offers you far more choices.

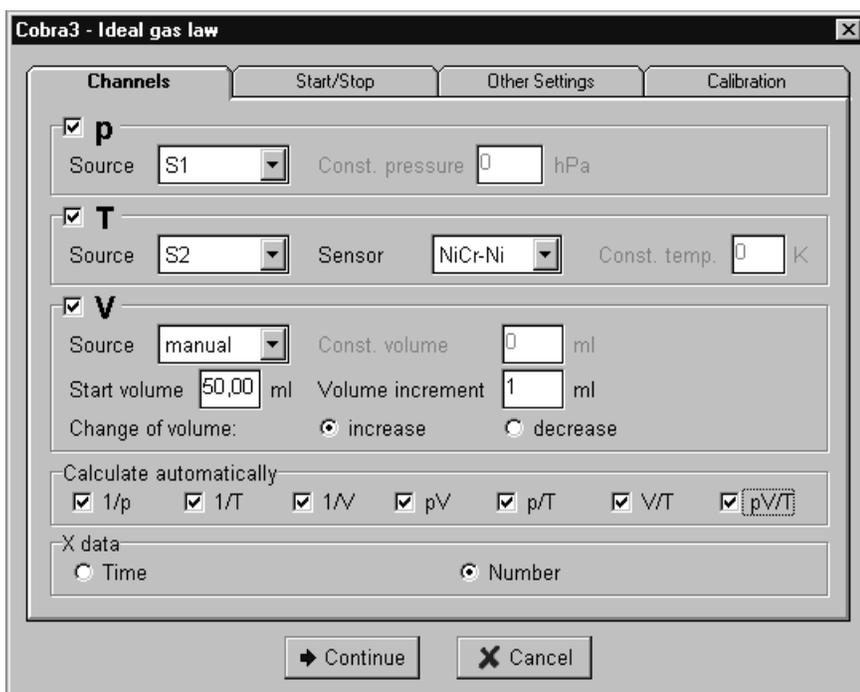


Fig. 3: The parameter dialog for a coming measurement

Exact information on your measuring instrument and on the possible settings and parameters for a measurement are supplied for you in the *PHYWE Experimental Handbooks*, which explain to you in detail the required settings for a specific experiment. In the following, we shall discuss some standard settings which are supported by most of the measuring instruments (software modules). We will use the measurement parameter directory of the *Cobra3 Temperature* as example (see Fig. 3).

With most measuring instruments, you can select which measured values you want to record. In *measure* these are called measurement channels. Later, in the main program, you can have measurement channels plotted against the X data record (e.g. time or number in this case). A measurement channel is a series of data for a definite, measured quantity. In our example, you can select diverse temperatures as well as temperature differences. The channels marked will then be recorded during the following measurement, so that the measured data is at your disposal for subsequent processing.

All measuring instruments (software modules) also have in common, that you can select the display instruments which are to be shown during the measurement, whereby, with most measuring instruments, you have digital and analog displays as well as simple diagrams at your disposal. Select the display instruments you want to use to follow the course of the measurement.

Please take into consideration, that the measurement channels displayed by the display instruments are not automatically recorded and available for later usage. As previously described, only those channels selected in the *Channels* selection list are recorded.

With many measuring instruments, you can determine whether measured data is to be recorded automatically at set time intervals or each time a key is pressed. To do this, select from the *Get value* selection panel. In most cases you will also be offered a so-called trigger for the start and end of the measurement. With this you determine under which conditions the data recording should begin and end, whereby you often have the choice of *on keypress* and of a certain *time*, as well as a condition for a channel ("if value bigger or smaller"). According to the experimental conditions, the use of a trigger can be extremely useful.

All measuring instruments have an *Allocate memory* selection panel, in which you can select the maximum number of measured values which **measure** should be prepared for in the coming measurement. You can routinely set this at a very high number, in order to always have sufficient storage space reserved for the coming measurement. As **measure** can process a maximum of 1 million measured values, it has sufficient storage space even for long-term measurements. In any case, when the measurement has finished, **measure** has only used as much storage as has actually been required by the measured data. The purpose of this choice is rather for you to be able to select a lower number with computer systems with little storage space (e.g. an old computer or some portable computers such as laptops etc.), with which data recording with **measure** could be impossible because of a lack of main storage (RAM). Should you receive such an error message from the program, therefore, select a lower number here.

In many cases, a button is offered for the calibration of your measuring instrument and of the sensors of your measuring instrument. This gives you the opportunity to considerably increase the accuracy of measurement and to minimize tolerances. If you do not accept calibration, the program will still carry out a standard internal calibration, but despite this you cannot be sure of getting the best possible results with your measuring instrument. We therefore recommend that you always take advantage of calibration when it is offered by the software. We would also like to point out, that a new calibration may be necessary when measuring instruments or measuring instrument modules are changed, as otherwise the calibration of the previous measuring instrument will be used.

As stated previously, this dialog can contain various other settings which have not been described here, but on which you will be informed by the *PHYWE Experimental Handbooks*.

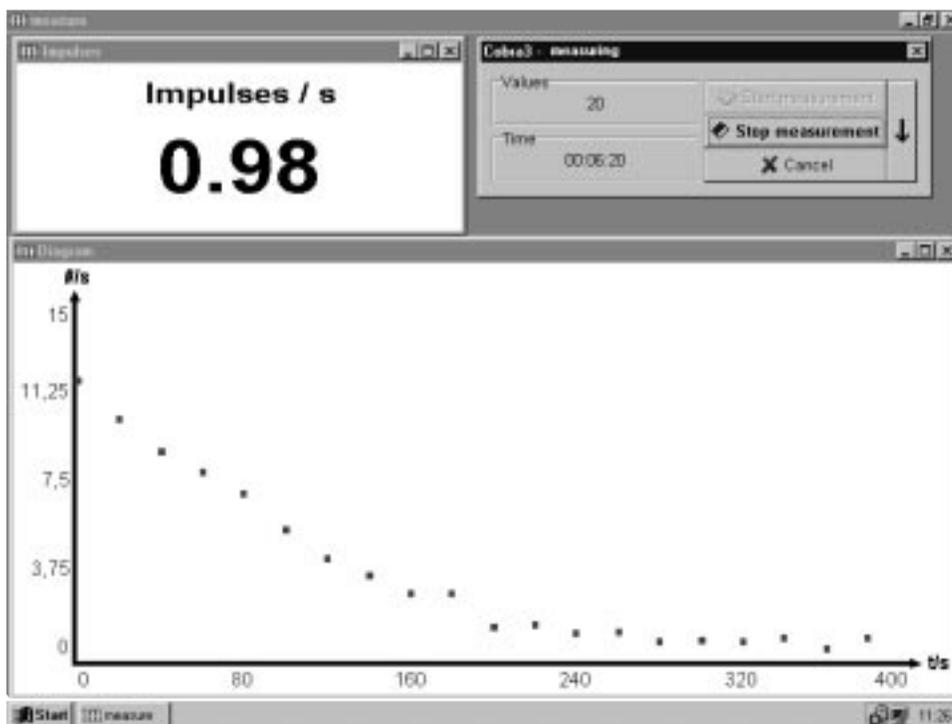


Fig. 4: The display instruments during a measurement

When all settings have been made, you can reach the data recording area by pressing the *Continue* button (see Fig. 4). Here you will again find the display instruments you have selected, as well as a window with the name *measuring*. You can shift the display instruments to anywhere on the screen, change their size and position them where you want. You should normally do this before data logging begins, as shifting them afterwards could result in a termination of the measurement, because the PC is possibly fully loaded by the data recording, according to its capacity.

Now you can start the recording of the measured data and the actual measurement by pressing the *Start measurement* button, provided you have previously installed an automatic, interval type data recording. It is naturally not necessary to press this button when you have selected a different trigger condition than *on keypress* for the start of

the measurement. In this case, the data logging starts automatically when the given conditions are met. If you previously selected the *Get value on keypress* setting, you can now record each individual value required by appropriately pressing the Save value button.

The button with the downward pointing arrow serves to temporarily hide the data recording dialog, to make more room for the display instruments. You can re-call the data recording dialog, which you may need to control the current measurement, at any time by pressing the right mouse key while holding the mouse pointer above one of the display instruments.

When you have entered a trigger condition for the end of data recording, then this is automatically stopped when the condition is reached; otherwise you can stop the measurement by pressing the *Stop measurement* button. You now come into the main program, in which you find the measurements you have just recorded visualized in a diagram. Note: Some measuring instruments (software modules) such as, for example, *Cobra3 Timer/Counter*, do not generate a diagram because no measurement data are permanently stored.

Displaying, processing and evaluating data

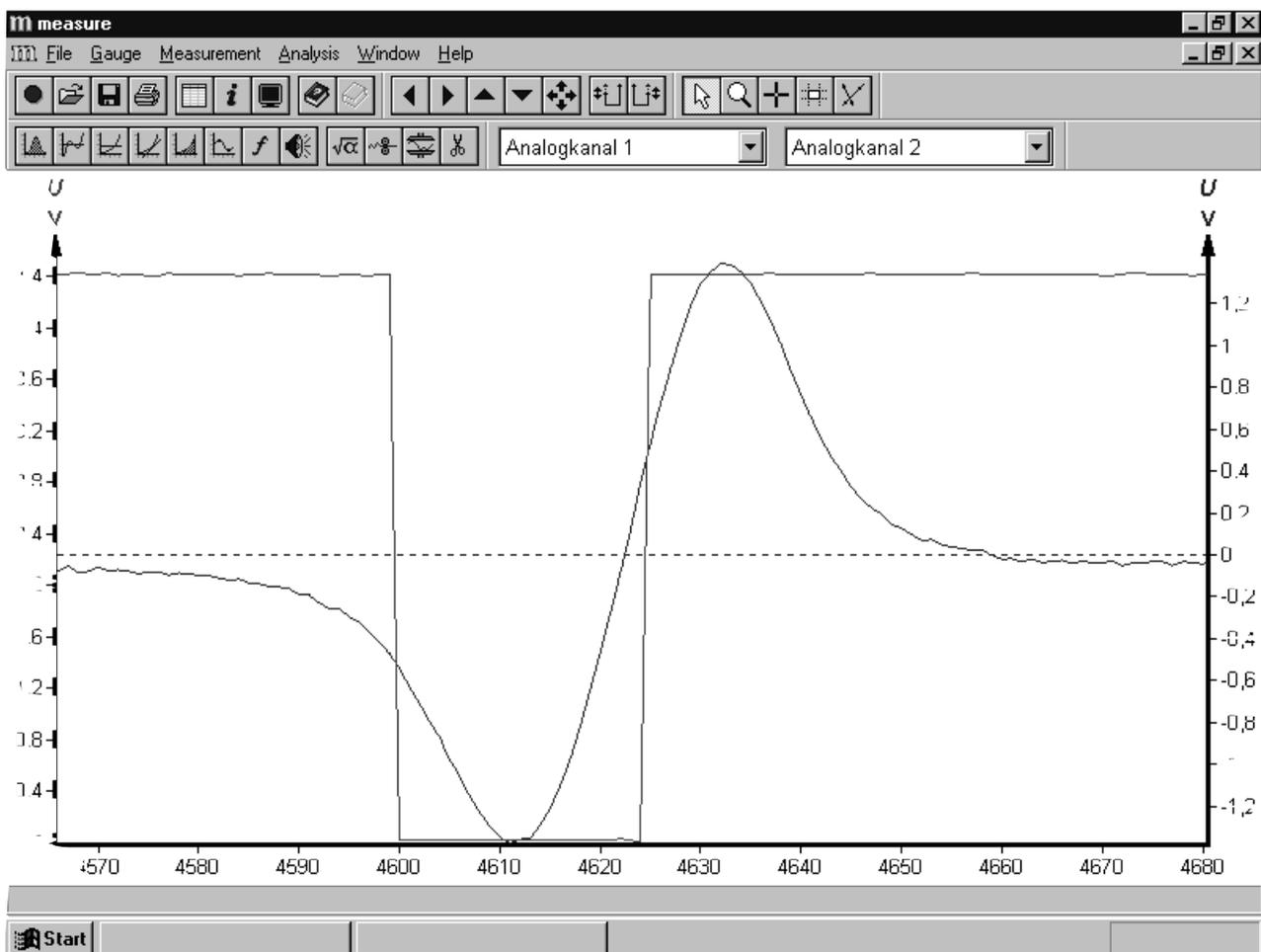


Fig. 5: Visualization of a completed experiment in the main program

After a measurement has been successfully brought to completion, the data which has just been recorded is visualized in a diagram. This diagram is presented in a sub-window. You can display as many diagrams simultaneously as you want, and change their size and position, for example, so that you can place them next to each other.

In this section, you should first learn how to store the data permanently on a floppy or hard disk. Simply select the menu prompt *File /Save measurement*, or *File /Save measurement* as should you want to change the file name before storing it. Alternatively, click the mouse on the button with the floppy icon in the top button panel.

As you can see, **measure** offers a whole series of menu prompts and buttons (see Fig. 5), and in the following we will use these buttons to comment further on some program functions. Take a closer look at the two short-cut button panels, situated near the top edge of the screen. Within these panels you will find various buttons, which are grouped according to their functions. We will use these buttons to outline some program functions.



On the top panel, far left, you will find the button for the recording of a new measurement, which you have already encountered. Next to this is a button for opening an existing *measure* file. The button for storage, already mentioned, and the button for printing out an existing measurement are also in this group. Each of these program functions is also available to you via the *File* menu.



The functions which are hidden behind the table icon, the information icon and the screen icon in the next group of buttons are also extremely important when working with *measure*. When you press the button with the table icon, or select the menu prompt *Measurement /Data table*, you obtain a table of the measured values from your actual measurement, in which each individual measured value is displayed and can even be changed -very helpful, when your measurement should at some time have a small outlier!



Hidden behind the button with the information icon, and the menu prompt *Measurement /Information* is a dialog window, in which you can make a series of settings for your actual measurement on four separate register pages. You can, for example, name your measurement under *General* and deposit any appropriate information in *Notes*. Under *x-Data* you can name the channel and enter the symbol and the unit (which you will find again in the labelling of the axes of your diagram).

In the edit box *Digits beyond point* you can enter the number of decimal places e.g. the table of measured values, should go to.

The register page *Channels* allows analogous settings to the *x-Data* record page, but the desired measurement channel (corresponding to a Y data record series) must first be selected. Here you can, for example, change the quantity or the unit of the measurement channel.



You reach the display options via the menu prompt *Measurement /Display* options or by pressing the button with the screen icon. Within this dialog, you can make various settings which determine the appearance of your diagrams. You can, e.g. have crosses displayed for the measured values, or switch the X-axis labelling on or off. In addition, you can enter the displayed measured value area and so zoom manually or trim the automatically generated scale in the diagram to acceptable values.

In this dialog, you can also decide which measurement channel you want to be displayed. You can select the left and the right Y-axis for the channel to be displayed, provided you have recorded more than one measurement channel.

You can further allocate a mathematical function to the axes, and so obtain, for example, a logarithmic representation in the Y-axis. The function allocated here relates only to the graphical display, and not to the measured data. A smoothed representation of measured value curves (spline interpolation) is also possible. By the way, you also enter the display options when the mouse arrow icon in the upper button panel is activated (pressed) and you then press the right mouse key in the region of the X-axis or one of the Y-axes.



Next to the button for the display options is a button with a book icon. With this you call up the table of contents of the online help, in which you can click through to further, more specific information. As already mentioned, you also reach the online help when you select the menu prompt *Help /Manual* or start the context-sensitive text with the *F1* key.

You can see a further book icon to the right of the help icon. After starting the program, it is coloured gray and is not active. When you open an experiment described by PHYWE with *File/Open experiment*, however, it is activated and a yellow book is visible. When you click on this icon, Acrobat Reader™ is opened and the loaded description of the experiment is shown as a PDF file.

Should faults occur during the loading or operating of Acrobat Reader™, the reason could be that you either have an outdated version of Acrobat Reader™, or no version of it at all, installed in your computer. There is a current version of Acrobat Reader™ on the *measure* CD. First delete any outdated version of Acrobat Reader™ from your hard disk, then place the *measure* CD in the appropriate drive. When the installation screen appears, click on *Acrobat Reader™*. Acrobat Reader™ will then be installed to your computer.



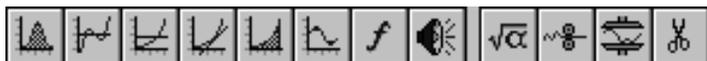
The next group of buttons serves both to shift a segment in the diagram on display, and to match and fit it in the diagram. With the quadruple arrows, you can adjust the axes so that the complete curve is shown in the diagram. Please note, when doing this, that the left and right axes can be given a completely different scaling when they display two channels simultaneously. If you wish to match the scaling of one Y-axis to that of the other Y-axis, then use the buttons for axis matching, the ones with the vertical double arrow. You can choose here whether the scaling of the left axis should be matched to the right axis or vice versa. These functions are not reachable via the menu, and can only be mouse operated.



We have not yet explained the functions of the last group of buttons in the upper button panel. There is a distinctive feature in this group. One of the buttons is always switched on and cannot be switched off. This button indicates namely the mouse mode in the diagram. When the mouse arrow is selected, then on every mouse click in the diagram, the current position in the diagram is displayed, i.e. the X value and the one or two (when two measurement channels are simultaneously displayed) Y values. This allows you to quickly get a rough estimation of the position of peaks, for example. When you activate the magnifying glass, you come into the zoom mode. You can then zoom into the diagram by moving onto the upper left corner with the mouse, pressing the left mouse key and holding it depressed while moving to the wanted lower right corner, and releasing it there. The axes of the diagram are then adjusted to this sector and the new diagram is correspondingly displayed. Zoom out with the right mouse key.

The reticle icon takes you into the marking mode. You can mark an X segment with the mouse by moving it from left to right while depressing the left mouse key. The marked segment can then be, e.g., cut out (menu prompt *Analysis /Cut*) or an analysis function be related only to this marked segment.

The button with the square icon shifts **measure** to the survey mode. The square which appears can be relocated and the coordinates are then displayed. The last button, with the lines icon, switches into the linear regression mode. Up to 3 straight lines are made available to you, whose data area, the basis for the regression, is given by the position of the relocatable marking points. You can add a further straight line with the right mouse key.



The lower button panel is comprised of functions for the analysis and modification of data. The first eight buttons are for various analysis functions which, however, do not change the original measurement data. The following functions are at your disposal: peak analysis, curve analysis, display of average values, slope, integral, the extremities of the curves, Fourier analysis and acoustic recording of the measurement data on the soundcard of your computer. These functions are always related to the section marked (see the previous section) or to the whole diagram, when no part of it is marked.

The remaining four buttons change the original measurement channel under some circumstances. The button with the square root calls up the channel modification. You can naturally also reach this via the menu prompt *Analysis /Channel modification*. Here you can apply mathematical functions to a displayed measurement channel, you can differentiate or integrate it, or form a progressive average value. The button with the steel press icon represents a simple smoothing function, which can smooth your measurement, e.g. when this is covered by noise. The roller icon, on the other hand, forms a local average value in a marked section and inserts this. The button with the scissors performs the cutting out, or deletion, of a marked section. With this you can eliminate an outlier from a diagram, for example. Only this value is cut out, the other values remain unchanged and the X-axis does not contract.

Next to these numerous buttons for the analysis and modification of data are two selection boxes, which show you which channel is presently displayed at the left axis and which at the right axis. When you open these boxes, you can change the display channel, just as you can do in *Measurement/Display options*.

Let 's go...

You have now become familiar with a number of **measure** functions and are well prepared to carry out your measurements with **measure**. During your work with the software, you will find many further functions in the menus which could not be introduced in this brief guide. You will certainly soon discover, and take advantage of, the *Function generator* or the interesting possibilities offered for your work by *Channel manager* (all in the Measurement menu), and the online help is always ready and waiting to give you detailed information.

Should you at some time experience a technical difficulty with your **measure** measurement software, please first try to solve it with this guide and the online help. Check also if the problem could be the result of a not quite fault-free installation of your operating system and PC.

Install **measure**, if available, on a different computer for example, and check if the problem occurs there also. The cause of the problem can then often be determined from the differences in the configurations of the two computers. Should a thorough investigation still not enable you to solve the problem, please do not hesitate to contact us, if possible by email at: **measure@phywe.de**