User Manual

PhysioPortWin

PC-Software for
Long-term blood pressure monitors

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CE 0482

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Update history

Update	Date	Remarks
A	2017-07-06	First edition
B	2020-04-20	Update of the user manual for product version 1.6 Introduction of new content according to DIN EN 82304-1 for healthcare software Revision of the product labelling (see section 1.3)
C	2022-03-28	Correction of the designation of the tabs in the Settings menu (see Section 4.4.4, 4.4.5 and 4.4.6); correction of Figure 53, as the setting of the measurement intervals for an SpO2 measurement was missing (see Section 5.4); Changing of the manufacturer address

1 General instructions

1.1 About this user manual

This manual has been prepared with the utmost care. However, if you find details that do not match the system, kindly let us know so that we can resolve any discrepancies as quickly as possible.

We reserve the right to make changes into information and illustrations in these operating instructions due to optical or technical developments.

All trademarks mentioned and depicted in the text are signs of the respective owners and are acknowledged as protected. Reprint, translation and reproduction in any form, even in extracts, require written permission of the manufacturer.

These operating instructions are not subject to any alteration service. For the latest edition, please contact the manufacturer.

The safety instructions in these operating instructions are marked as follows:

Safety advice

Draws attention to hazard or dangerous situation. Failure to do so may result in injury to the patient, the environment and third parties and may cause the PhysioPortWin-Software to fail.

Safety advice

Read the instructions for use before installing and using this software.

1.2 Product compliance

The PhysioPortWin product bears the CE marking "CE 0482" in accordance with the Council Directive on medical devices 93/42/EEC (including revision 2007/47/EC) and meets the essential requirements of Annex I of this Directive. It is a medical device software and is assigned to risk class IIa (according to MPG) and software safety class B (according to IEC 62304). MD code for the software is 1111 and GMDN code: 57967.

The technology developed at PAR Medizintechnik GmbH & Co. KG throughout the company complies with the EN ISO 13485 standard.

1.3 Marking

The following symbols are used on the product and label of the packaging:

Symbols on the product

Follow the instructions.
This symbol refers to safety-relevant information in the operating instructions.

CE 0482

CE Marking.
According to the EU Directive of the Council on medical products 93/42/EEC.
Notified body: MEDCERT GmbH

Manufacturer.
Next to this symbol the company name and address of the manufacturer is indicated.

Manufacturing date.
Next to this symbol, the manufacturing date is displayed in the format YYYY-MM.

SN

Serial Number.
Next to this symbol, the unique manufacturer-specific ten-digit serial number of the product is displayed

WEEE-Symbole indicates electrical and electronic equipment, which must not be disposed of with the normal, unsorted household waste but must be treated separately. Please contact an authorized representative of the manufacturer to obtain information regarding the disposal of your device.

Symbols on the packaging

Store at dry place.
This symbol indicates that the product must be protected from moisture.

Temperature limitation.
The temperature ranges for application or storage are indicated next to this symbol.

Air humidity limitation.
Next to this symbol the humidity ranges for application or storage are indicated.

Damaged labels must be reported to the manufacturer in order to replace them as soon as possible and ensure that the product can be identified. The information about the manufacturer is on the cover sheet of this manual, information about storage conditions can be found in section 3.2, for disposal in section 3.8. If you have any questions, please contact the customer service of PAR Medizintechnik (service@par-berlin.com).

2 Purpose

2.1 Intended Purpose

The software is used to set up PHYSIO-PORT and TONOPORT long-term blood pressure monitors and to manage and evaluate the results of such long-term measurements. It enables medical personnel to program the measuring devices to configure a long-term measurement using defined parameters such as the number of measuring intervals, interval between two individual measurements, inflation pressure, etc. Following a long-term measurement, the measurement results stored on the measuring device can be read out by software and stored in the internal software database. Using the database, healthcare professionals can manage any number of patients and measurements. Recorded measurement results can be evaluated according to various criteria at the push of a button. The results of the evaluation are presented in a descriptive form (graphically) and support the physician in the diagnosis of diseases, especially of the cardiovascular system.

The software is only designed for use with NIBP recorders of the PHYSIO-PORT and TONOPORT type. The software is not intended to be used in combination with other NIBP recorders or modules.

The software offers a GDT interface for the connection to external practice software and hospital information systems (HIS). The software can be run on computers in medical practices or hospitals that use a Windows operating system.

The patient group as well as the indication and contraindications depend on the intended purpose of the PHYSIO-PORT and TONOPORT.

2.2 Product relevant laws and standards

- 93/42/EWG (EU-Directive Medical Devices) + Modification 2007/47/EG, MPG (Medizinproduktegesetz, German Medical Device Act)
- Directive 2011/65/EU (RoHS 2) and ist amendment (EU) 2015/863 (RoHS 3), (EC) 1907/2006 (REACH)
- Regulation (EU) 207/2012
- Directive 2019/19/EU together with the standard DIN EN 50419
- DIN EN ISO 14971 Medical devices – Application of risk management to medical devices
- DIN EN 62304: Medical device software – Software life-cycle processes
- DIN EN 82304-1 Healthcare software – Part 1: General requirements for product safety
- DIN EN 1041 Information supplied by the manufacturer of medical devices
- DIN EN ISO 15223-1 Medical devices – Symbols to be used with medical device labels, labelling and information to be supplied – Part 1: General requirements

2.3 User requirements

To ensure safe use of the software, it is necessary for users to familiarize themselves with the product by means of these instructions for use.

Apart from a completed medical education, no special skills are required to use the software, as all functions are explained in detail in this document.

2.4 Description of software

The software can also be used to configure approved NIBP recorders (see section 3.1) for long-term blood pressure measurement. Measurement intervals can be configured separately for day and night.

The software reads out the stored data from a NIBP recorder connected to a PC and displays them via this software. The read-in data is stored in the user's system, so that it is also available for later analysis by the user.

The user has various display options at his disposal: as a graphical curve of the measured values during the measuring interval, as a histogram and as a pie chart. Individual values can be viewed, and minimum and maximum values including time can be examined, also separately for day and night phases. Furthermore, average values can be calculated over certain time intervals and the correlations between pairs of diastolic, systolic and average blood pressure can be displayed. There is the possibility to document the drug prescription in this program.

The software allows the administration of patient data, which can be converted to PDF-format and then be printed.

A GDT interface allows data exchange with external programs (practice software, hospital information systems HIS), which have a corresponding import function. The software does not interact directly with other programs.

The measurement parameters displayed by the software are described in section 2.5.

2.5 Explanation of parameters

The explanations in the following subsections serve to explain the individual parameters, which are clearly displayed with the aid of the software. The blood pressure measured on the upper arm (SYS, DIA, MAP and HR) can be used to assess the cardiovascular condition. The oxygen saturation can be used to assess the supply of oxygen. The three parameter-groups central or aortic blood pressure (cSys, cDia and cPP), augmentation (AugP and AIx) and pulse wave velocity (PWV) are suitable for assessing vascular stiffness or the status of vascular changes.

Note

The limit values given in the following subsections are only intended to assist and guide the user in evaluating the measurement results and are not to be regarded as mandatory requirements for the safe use of the software. The limit values can be freely selected according to user experience. The diagnosis is the sole responsibility of the physician using the software and should not be based solely on the values displayed in the software, but should be made in conjunction with further medical examinations.

2.5.1 Blood pressure

The software displays systolic (SYS), diastolic (DIA) and mean arterial blood pressure (MAP) as well as heart rate (HR). The (higher) systolic blood pressure results when the heart expels blood into the body's arteries; the (lower) diastolic blood pressure results when the pressure in arteries drops during the subsequent filling phase from the heart. In adults, systolic blood pressure should be in the range of 105-

130 mmHg and diastolic blood pressure in the range of 65-85 mmHg[1]. High blood pressure is a risk factor for cardiovascular diseases.

2.5.2 Oxygen saturation

The (pulse oximetry measured) oxygen saturation (SpO_2) indicates the proportion of arterial haemoglobin that has absorbed oxygen and is expressed in %.

2.5.3 Central blood pressure

The aortal pulse wave allows conclusions to be drawn about the hemodynamic conditions of the heart. The following three parameters provide information: central systolic blood pressure (cSys), central diastolic blood pressure (cDia) and central pulse pressure (cPP). The level of central systolic blood pressure determines afterload on the heart, i.e. the work required for each blood ejection. The level of central diastolic blood pressure is decisive for blood flow in coronary arteries and thus for the supply of oxygen to the heart. The difference between these two pressures is the pulse pressure, which is a measure for assessing degenerative changes in the major arteries. The higher central systolic blood pressure, the greater increase in left ventricular hypertension and the higher central pulse pressure, the worse vascular condition. Table 1 shows typical reference values for central systolic blood pressure (cBP_{SYS}) and central pulse pressure (cPP) depending on patient age and sex.

Table 1: Reference values for central blood pressure in relation to gender and patient age. The mean value ± one standard deviation is given in each case [2].

Age [Years]	Female		Male	
	cBP_{SYS} [mmHg]	cPP [mmHg]	cBP_{SYS} [mmHg]	cPP [mmHg]
< 20	98 ± 9	25 ± 6	103 ± 8	29 ± 5
20 – 29	101 ± 9	27 ± 7	105 ± 8	20 ± 6
30 – 39	105 ± 11	30 ± 8	109 ± 9	31 ± 6
40 – 49	109 ± 11	33 ± 8	113 ± 9	34 ± 6
50 – 59	115 ± 11	38 ± 8	115 ± 9	35 ± 7
60 - 69	118 ± 10	43 ± 8	117 ± 9	39 ± 7
70 – 79	119 ± 9	56 ± 8	118 ± 9	42 ± 7
≥ 80	120 ± 11	49 ± 12	120 ± 8	45 ± 9

2.5.4 Augmentation pressure and augmentation index

The increase of blood pressure by pulse wave reflection is called augmentation. The augmentation pressure is the pressure difference of the incoming wave to the pulse pressure caused by the reflected wave. The earlier the reflected wave is superimposed on the incoming wave, the greater the augmentation of the systolic pressure of the incoming wave.

[1] Deutsche Hochdruckliga e.V. DHL. *Patientenleitfaden Bluthochdruck* 2. Auflage 2019; 10

[2] M. R. Nelson, J. Stepanek, M. Cevette, M. Covalciuc, R. T. Hurst, A. J. Tajik. *Noninvasive Measurement of Central Vascular Pressures with Arterial Tonometry: Clinical Revival of the Pulse Pressure Waveform?* Mayo Clin Proc. 2010;85(5):460-472

The augmentation index indicates the percentage share of the augmentation pressure in the pulse pressure. Augmentation is an indirect parameter of arterial vessel stiffness, but a direct marker of the influence of pulse wave reflection on the aortic blood pressure curve. Augmentation has a characteristic course between the ages of 20 and 50 and is suitable in this age range for assessing vascular condition or cardiovascular risk. Table 2 shows typical reference values for augmentation pressure (AugP) and index (AIx) as a function of patient age and sex. Values that are above the range of the reference values indicate pathologically increased augmentation. In contrast, values that are below range of the reference values specified indicate a good vascular condition.

Table 2: Reference values for augmentation in connection with gender and patient age. The mean value ± one standard deviation [3].

Age [Years]	Female		male	
	AugP [mmHg]	AIx [%]	AugP [mmHg]	AIx [%]
< 20	1 ± 3	5 ± 10	-1 ± 3	- 2 ± 8
20 – 29	3 ± 4	9 ± 14	1 ± 4	2 ± 11
30 – 39	6 ± 5	20 ± 12	4 ± 5	12 ± 13
40 – 49	10 ± 5	28 ± 10	7 ± 4	19 ± 10
50 – 59	13 ± 5	33 ± 9	9 ± 5	24 ± 10
60 - 69	15 ± 5	34 ± 9	11 ± 5	28 ± 9
70 – 79	16 ± 5	35 ± 9	13 ± 5	30 ± 9
≥ 80	17 ± 7	37 ± 10	14 ± 5	30 ± 10

2.5.5 Pulse wave velocity

The contraction of the left ventricle leads to the expulsion of a pressure wave into the vascular system. This pressure wave is called the primary or outward wave. The speed of this wave, the pulse wave velocity, is indirectly proportional to the elasticity of arteries. The lower elasticity, the higher PWV.

The stiffness of vessels increases from the centre to periphery, which means that the velocity in different vessel sections is different. The PWV in a healthy and elastic aorta lies in a range of 4 - 6 m/s at the beginning of life, which shifts to higher values with increasing age. The wave ejected by the heart is reflected in the vascular tree at branches and points where the diameter of the vessel changes. The reflected wave travels back to the heart and is superimposed on the incoming wave. The result is the characteristic pulse waveform.

In the presence of healthy and elastic arteries, the superposition of the reflected wave in the aorta near the heart takes place during diastole. In stiffer vessels, where PWV is elevated, the superposition takes place during systole, changing the pulse waveform.

PWV is therefore a direct marker of arterial vessel stiffness and an independent predictor of a patient's cardiovascular risk. Compared to augmentation, PWV is suitable for assessing cardiovascular risk from the age of 50. Table 3 shows typical reference values for pulse wave velocity (PWV) as a function of

[3]M. R. Nelson, J. Stepanek, M. Cevette, M. Covalciuc, R. T. Hurst, A. J. Tajik. *Noninvasive Measurement of Central Vascular Pressures with Arterial Tonometry: Clinical Revival of the Pulse Pressure Waveform?* Mayo Clin Proc. 2010;85(5):460-472

patient age. Values above the range of the reference values indicate a pathologically increased pulse wave velocity. Furthermore, values of more than 10 m/s represent an additional risk marker for cardiovascular events. In contrast, values below the range of the reference values indicate a particularly good vascular condition.

Table 3: Reference values for pulse wave velocity in relation to patient age [4].

Age [Years]	Mean value (-2 SD to +2 SD) [m/s]	Median (10. - 90. percentile)
< 30	6.2 (4.7 – 7.6)	6.1 (5.3 – 7.1)
30 – 39	6.5 (3.8 – 9.2)	6.4 (5.2 – 8.0)
40 – 49	7.2 (4.6 – 9.8)	6.9 (5.9 – 8.6)
50 – 59	8.3 (4.5 – 12.1)	8.1 (6.3 – 10.0)
60 – 69	10.3 (5.5 – 15.0)	9.7 (7.9 – 13.1)
≥ 70	10.9 (5.5 – 16.3)	10.6 (8.0 – 14.6)

[4] P. Boutouyrie et al. *Determinants of pulse wave velocity in healthy people and in the presence of cardiovascular risk factors: 'establishing normal and reference values'*. European Heart Journal 2010;31:2338-2350.

3 Technical description

3.1 Technical data and system requirements

Name:	PhysioPortWin
Version:	v 1.6
Operating System:	Windows XP, Windows Vista, Windows 7, Windows 8 & Windows 10 respectively as 32-Bit-/64-Bit-Version
The software can be used with the following long-term blood pressure measuring devices:	TONOPORT V/VI PHYSIO-PORT PHYSIO-PORT UP PHYSIO-PORT AS (Pulse wave analysis function) PHYSIO-PORT DUO (Oxygen saturation measurement function)

Processor:	min. 1.6 GHz Dual Core
Memory:	min. 2 GB
Hard drive capacity:	min. 250 GB
Screen resolution:	min. 1 024 x 768 Pixel
Connectors:	USB (1.1, 2.0 or 3.0)

Vorsicht

• Safety for patients, users and third parties •

Devices may only be connected to each other or to parts of systems if safe coupling is ensured. The PC used must comply with the IEC 60601-1 or IEC 60950-1 standards.

3.2 Environmental conditions for the storage of the storage media

The storage media can be kept under following storage conditions:

- Temperature: -25 °C … 70 °C
- Relative Humidity: 10 % … 93 %, no condensation
- Store in dry place.

3.3 Accuracy of display

The PhysioPortWin software graphically displays blood pressure readings recorded by a long-term blood pressure monitor on the computer screen. The accuracy of the display corresponds to the accuracy of the recorded measurement values.

- Display accuracy blood pressure values: 1 mmHg
- Display accuracy pulse frequency: 1 bpm
- Display accuracy oxygen saturation: 1 %
- Display accuracy Pulse wave velocity: 0.1 m/s

3.4 Installation instructions

The PhysioPortWin software is installed as described in Section 4.1. The installation can be performed by the user (medical personnel). Necessary system libraries are included with the installation. There are no special requirements or restrictions for the installation of this software. If you have any questions regarding installation, please contact the customer service of PAR Medizintechnik (service@par-berlin.com).

3.5 Maintenance requirements

There are no requirements for regular maintenance of the software (e.g. updating). Changes/updates of the operating system, anti-virus software or firewall have no effect on this software. The required system libraries are automatically installed, but not automatically updated. Other system libraries have no effect on this software. In case of problems with the software, please contact the customer service of PAR Medizintechnik (service@par-berlin.com).
In case of necessary updates, you will be informed by the manufacturer. The manufacturer explains the update procedure.

3.6 Using the software in network

The software can be used in a network. This network must meet the following requirements:

- Read and write access to the patient database when two or more workstations share a database
- The HIS must support the GDT standard (see Section 3.7)

Installation of central database for several workstations

1. To set up a central database, a corresponding data directory must first be defined and released on a central server so that the software has read access to the data stored there and can store new data.
2. Install the PhysioPortWin software locally on the workstations on which the software is to be used.
3. Under [Settings], tab [System], the folder for the shared database is then entered; the integrated Explorer function simplifies the selection.
4. The workstation requires access rights to the central server so that the software can access the data. If access is not granted or the database is not (no longer) available, the error message appears: "Access to the database is not possible". This means that data archiving or analysis of archived data is not possible. The program does not automatically attempt to create a new data directory. The user can set this up on his local workstation, see point 3.

The software does not require the provision of network services. Therefore, changes to the network do not affect the functionality of the Software as long as the Software has access to the database.

Safety advice

• Network risk •

Running this software on a network can lead to previously unknown risks for patients, users and third parties. It is recommended that users identify, analyze, evaluate and manage these risks. Subsequent changes to the IT network may lead to new risks and therefore require a reassessment. Changes to an IT network include, for example, changes to configuration, adding or removing hardware or software components, updating or upgrading hardware and/or software platforms.

Safety advice

• Data protection •

To prevent data loss, the central server on which the data is stored and the workstation must be protected by up-to-date anti-virus software to ensure protection against malware.

3.7 Dependence on other applications, GDT interface

The software uses standard Windows functions, e.g. for printer output or PDF display. There are no dependencies on third-party programs. It is possible to use the GDT export to make patient data and evaluation results available to other applications that have a GDT import. The data transfer is done via files. There is no direct interaction between the PhysioPortWin software and the importing application of such data. For questions regarding GDR import, it is recommended to consult the manual of the corresponding application. For further questions about the software, please contact PAR Medizintechnik's customer service (service@par-berlin.com).

3.8 Disposal

The storage medium for this software must not be disposed of with the household waste, but separately with the electronic waste disposal. For information on the disposal of the storage medium, please contact the customer service of PAR Medizintechnik (service@par-berlin.com).

WEEE-Reg.-Nr.: DE63208995

3.9 Special features

The following sections explain software functions that are intended to make it easier for experienced users to use the software. Basically, the special functions described are not necessary for using the software.

3.9.1 Magnification function

The magnifying glass function can be used in the [Graphics] tab of the [Single values] tab. The integrated magnifying glass function is used for a more precise display of the measured values.

The magnifying glass increases the temporal resolution of the displayed section and can be shifted by an adjustable range of 10min - 4h. The time window can be selected by clicking on the down arrow. The arrows to the left and right are used to shift the time window.

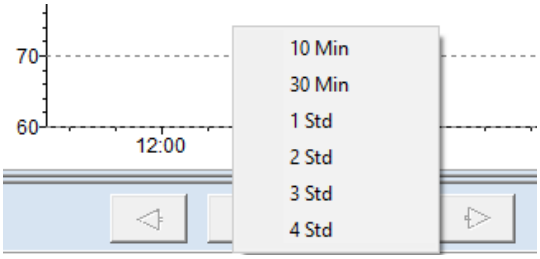


Figure 1: Selectable time windows for the magnifying glass function

By clicking on the time interval or by clicking in the graphics the magnifying glass is activated. A further click in the graph or on the button deactivates the magnifying glass and shows the complete evaluation again.

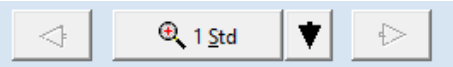


Figure 2: Magnification function

3.9.2 Zoom-Function

In the [PWA] tab it is possible to use a zoom function to analyze the curves in detail.

Keep the left mouse button pressed and draw a frame over the area you want to enlarge.

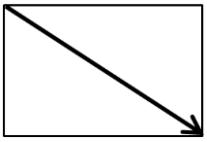


Figure 3: Magnification of a section of an image

Note

When drawing the frame, the orientation must be to the bottom right to enlarge the selected area. The zoomed area is reset with each new measurement. Frames that are too small will be ignored, if you want to enlarge a small area zoom several times.

Hold down the left mouse button in the desired graphic and draw a frame of any size to the top left, bottom left or top right to reset the zoom.

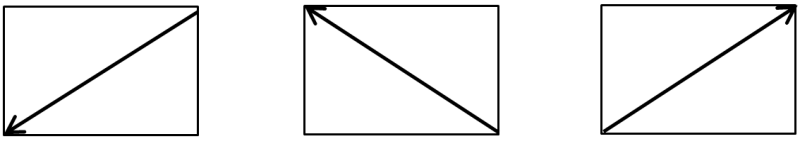


Figure 4: Resetting the magnification

4 Installation and start-up

4.1 Installation

To install the PhysioPortWin software, insert the USB stick into a free USB port.
The installation is then started as follows:

- Open the Windows-Explorer
- Select USB stick drive
- Double click on **setup.exe**

The selection menu for the installation language appears (the program language can also be easily changed later in "Settings"):

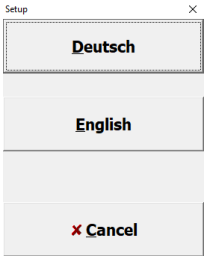


Figure 5: Selection menu Installation language

After selecting the language, the installation will start. The installation is continued via the [Next] button.

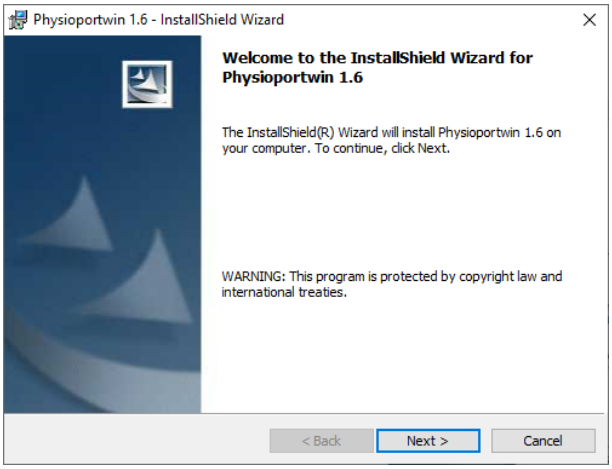


Figure 6: Software Installation

Afterwards the user information is requested and the user can choose whether the software should be installed for all users or only for the currently selected user. The installation is continued via the [Next] button.

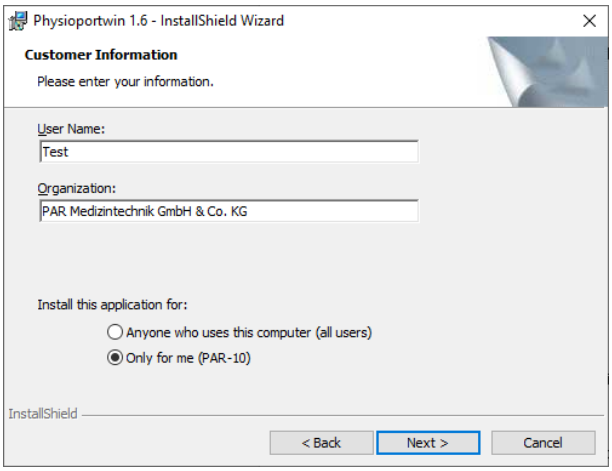


Figure 7: Enter the user information

The default directory for the installation is C:\Physioportwin\. By clicking the [Change...] button you can select a different directory.

Note: The drive letter C at the beginning of the directory structure and the directory path are exemplary and can be different for the user.

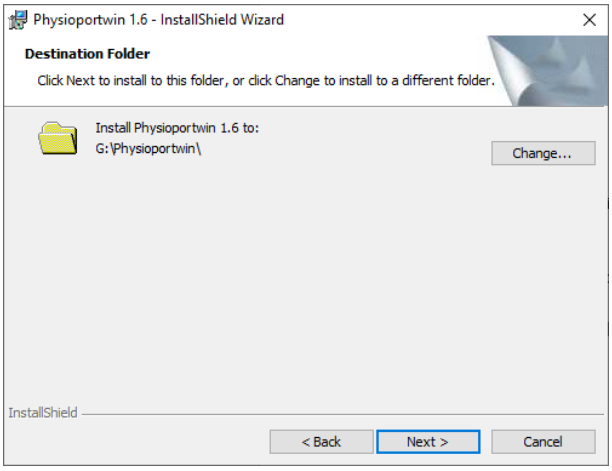


Figure 8: Installation path

Before the actual installation, all information is summarized once again. After confirming the [Install] button, the actual installation process begins.

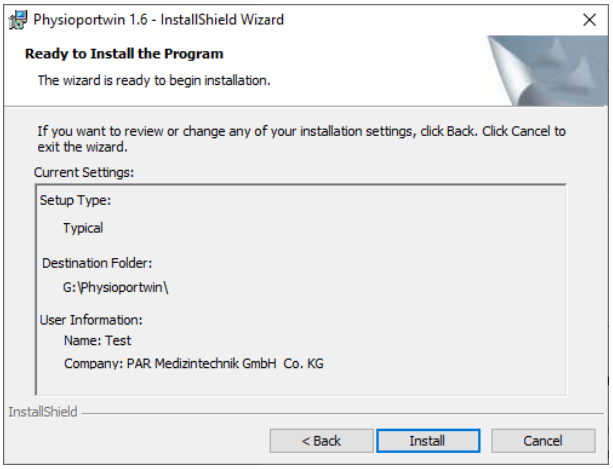


Figure 9: Installation Summary

The installation is completed via the [Finish] button and the installation wizard is closed.

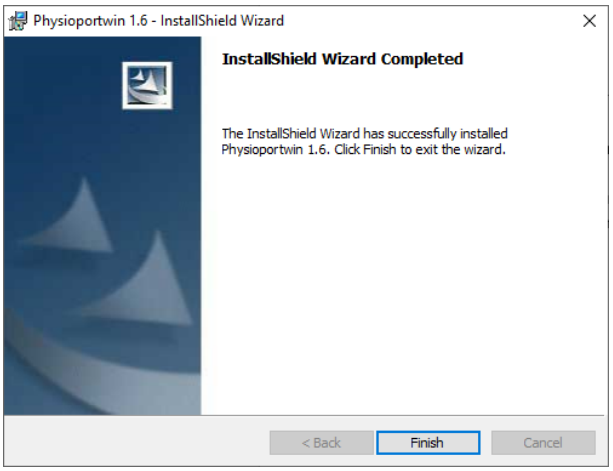


Figure 10: End of installation and program start

4.2 Activation of the program

After installation, the program must be activated. The program can be used for 14 days without activation, after that the program is only limited usable.

Before activation, the program must be started as described in section 4.3. The license file can be requested by clicking the "Order license file" button.

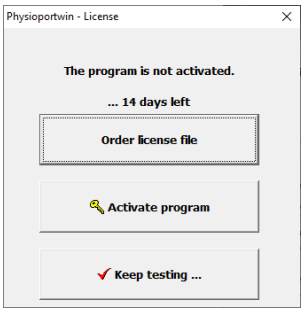


Figure 11: Program activation and license file request menu

After entering the serial number on the data carrier, the file "license.dat" is created. This file is sent by email to info@par-berlin.com .

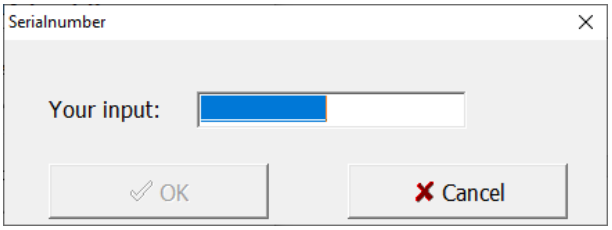
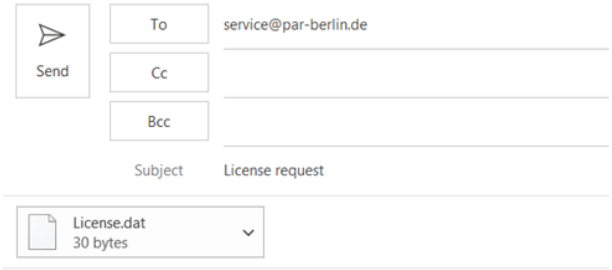


Figure 12: Input mask for serial number



Best Regards

Figure 13: Automatically generated email to the manufacturer

In return you will receive the activation file "PAR_Licence.dat" by email. By selecting the "Activate program" button, this file is selected and the program is activated.

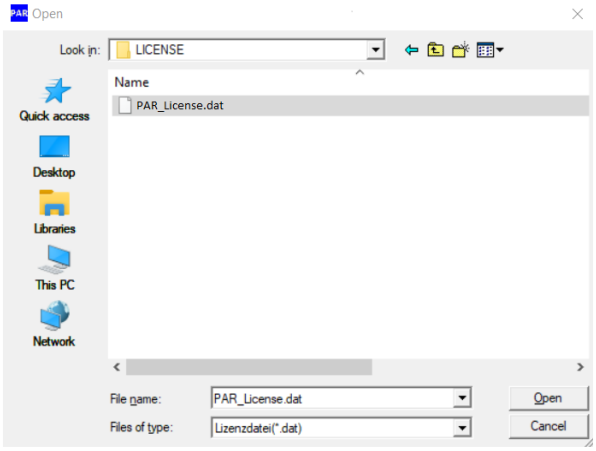


Figure 14: Selection of PAR_License.dat

4.3 Starting the program

A desktop icon is created during installation (see Figure 12). By double-clicking with the left mouse button on this icon, the program is started.

Figure 15: Desktop icon to start the software

Afterwards the registration must be done via the login mask.
Enter your user name and password here and confirm your entries with the [✓ OK] button.
If you start the software for the first time, enter the preset user name and password (see section 4.4.7). Please note the information in the above-mentioned section on data security.

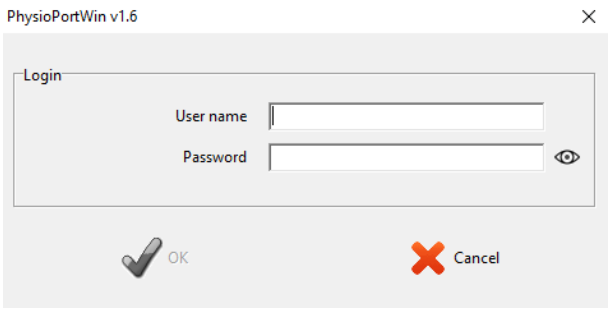


Figure 16: Login-Screen

The [✓ OK] button can only be selected if the user name and password are entered correctly.

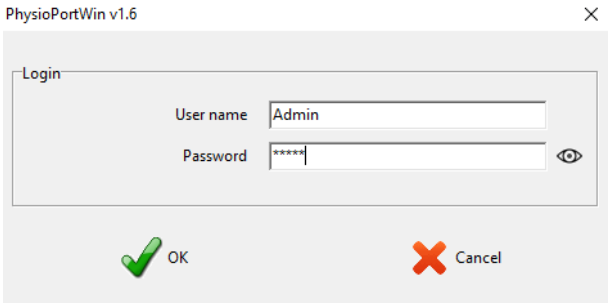


Figure 17: Visualization of a successful login

4.4 Settings

After starting the program, the main screen appears. To configure the software, go to the [Settings] page by clicking the corresponding button.
The various setting options are divided into several tabs, which are explained in the following sections.

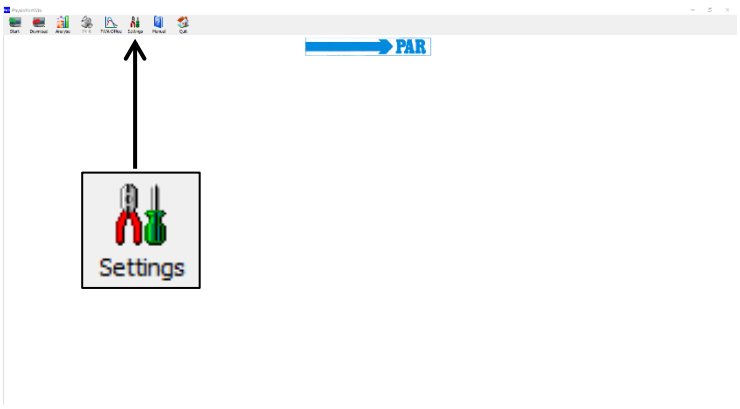


Figure 18: Main menu settings

4.4.1 System

All settings required for standard operation are made on this tab.
It is recommended to locate the connected recorder automatically by checking the corresponding setting option, see the figure opposite.

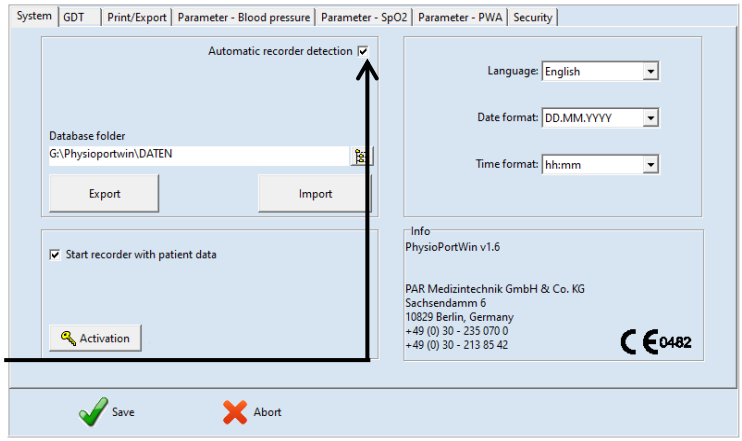


Figure 19: Settings page system

In case of technical problems or when connecting several recorders, the individual interfaces can also be permanently entered. To do this, uncheck the box "Automatically locate recorder" and then specify the COM port manually.

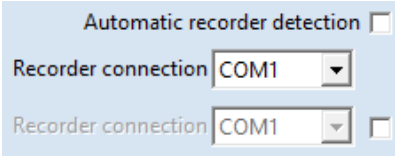


Figure 20: Recorder connection

This setting allows you to [Start] the recorder with or without transferring patient data.

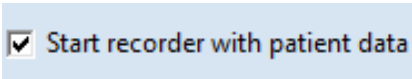


Figure 21: Entering patient data after [Start] the recorder

The folder for the database for archiving the data can be set (see Figure 22 and Section 4.5).

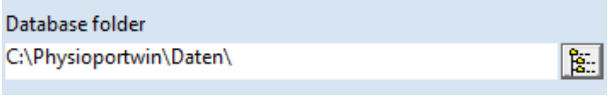


Figure 22: Folder/path for database

The [EXPORT] function saves the database completely in a backup directory. The [IMPORT] function restores a correspondingly backed up database.

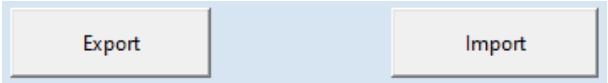


Figure 23: Backup of the database

Caution

• Data loss •

When [Import] a database, the current database is overwritten! The current database should be backed up BEFORE using the [Export] function to avoid data loss!

The program language and the corresponding date and time format can be adapted and set.

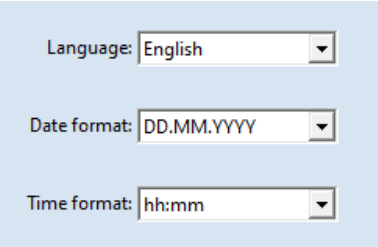


Figure 24: Language, Date and time format

Changes must be confirmed by entering the password when saving (see section 4.4.7).

4.4.2 GDT

On this tab, all settings are made to realize the connection to EDP systems via GDT interface.

The GDT interface (device data transfer) is a software interface mainly used in Germany for the exchange of patient data and evaluation results between practice/clinic EDP systems and medical devices.

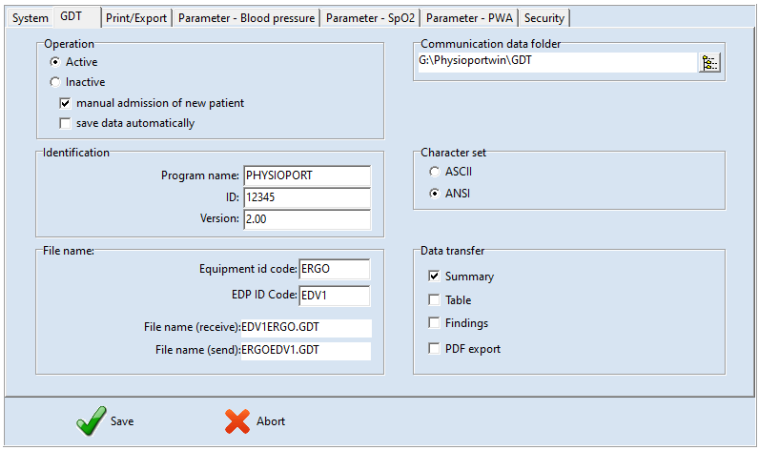


Figure 25: GDT-Settings

Please contact the IT provider which settings of the GDT interface are required for the corresponding IT system. All settings provided in the GDT standard (version 2.0) can be adjusted individually.

Operation:
With this setting, the GDT interface can be activated or deactivated. If the GDT interface is activated, the software checks at program start whether the defined GDT file is available and processes it. If no file is found, a "normal" program start takes place.

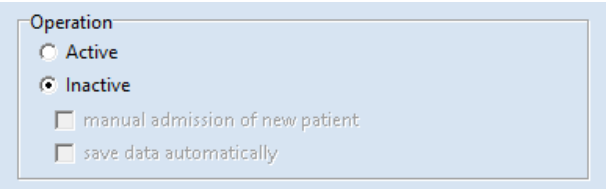


Figure 26: Activation of the GTD interface

Note

In GDT mode, manual patient re-admission should be inactive to avoid incorrect entries and mismatching patient master data (practice EDP and PhysioPortWin database).

Identification:

"ID" is a unique identifier consisting of a minimum of 1 and a maximum of 8 characters that uniquely identifies the PHYSIO-PORT system during GDT data transfer.

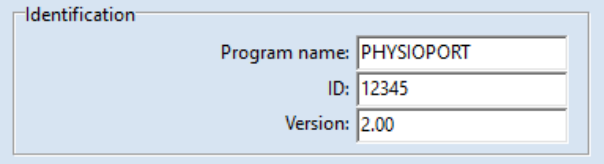


Figure 27: GDT-Identification

File name:

The "File names" field is used to define which file names are used for communication between the practice EDP and PhysioPortWin software.

The file names consist of a device abbreviation (1 - 4 characters), e.g. ERGO, and an EDP abbreviation (1 - 4 characters) for the practice EDP, e.g. EDV1.

The actual file names are composed of these two abbreviations, the file extension is .GDT.

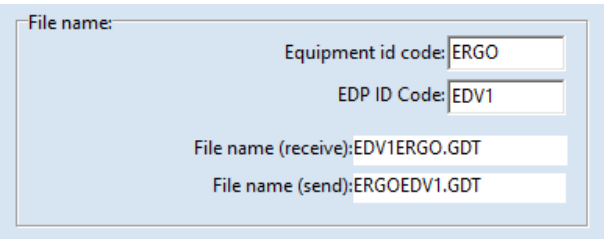


Figure 28: Filename

Directory of the communication files:

The folder for data transfer can be defined as desired. To avoid confusion in networks, a different folder should be set up for each workstation (e.g. on the local PC).

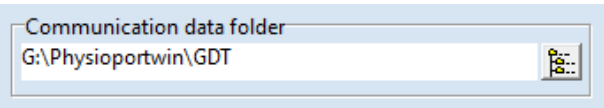


Figure 29: Communication files directory

Note

The GDT file must have been read by the practice EDP and then deleted before another GDT file can be generated.

Font set:

The character set used (ASCII or ANSI) is determined by selecting it accordingly concerns the representation of the letters äöüßÄÖÜ during data transfer.

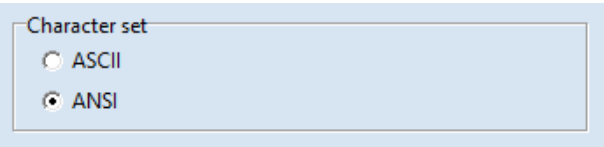


Figure 30: Font selection

Data transmission:
An appropriate selection determines which data is transferred to the Praxis-EDP.
When the menu item "PDF export" is activated, the GDT file contains a link to the simultaneously created PDF file.

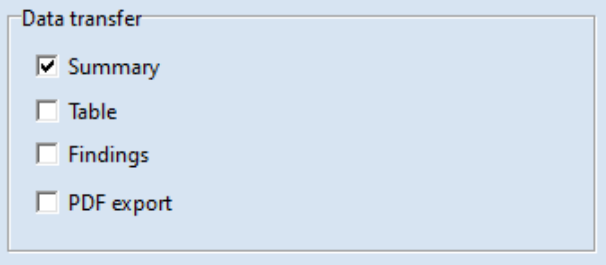


Figure 31: Selection of the data to be transmitted

Changes must be confirmed by entering the password when saving (see section 4.4.7)

4.4.3 Printing/Export

On this tab, all settings concerning the printout of evaluations and the export of data are made.

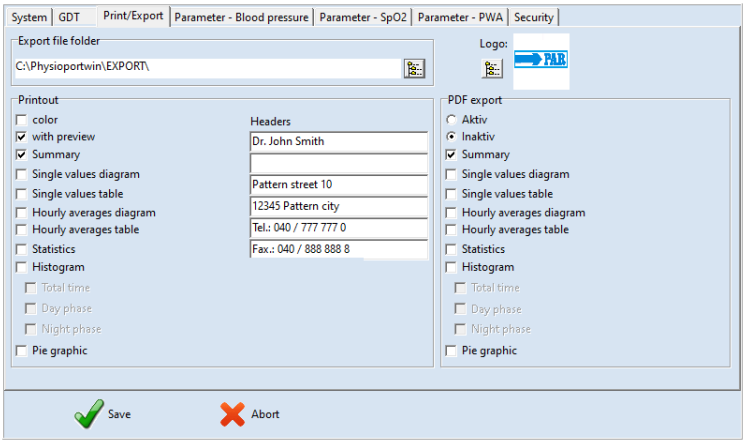


Figure 32: Setting page Printing/ Export

Printout:
Defining the standard print pages, print preview and color printout (e.g. for inkjet printers).
The header lines entered (e.g. hospital or practice address) are printed on each page of the printout.

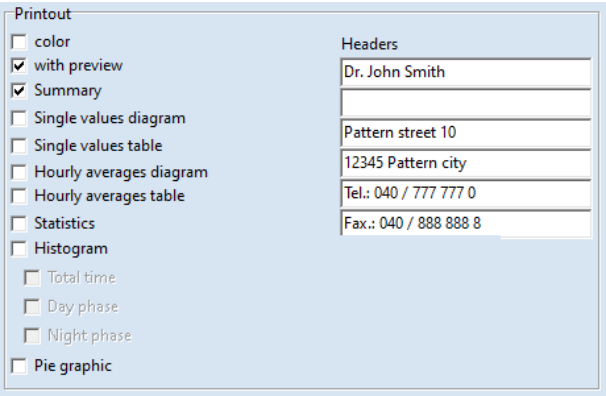


Figure 33: Printing configuration

Additionally, the logo of the clinic or practice can be displayed on the printout. For this purpose, the corresponding logo must be selected.

Figure 34: Logo preview for printing

PDF-Export:
Activation of the PDF export and selection of the standard exported pages. When exporting, the remaining pages can be optionally selected.

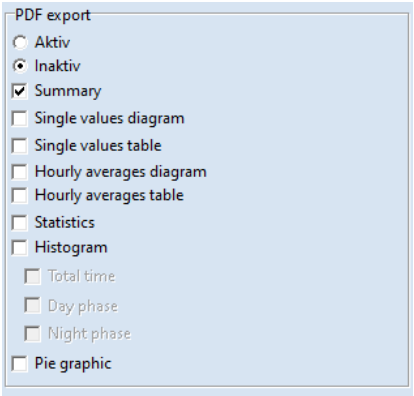


Figure 35: Setting page PDF export

Selection of the folder to save the PDF and CSV files.

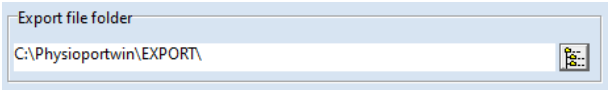


Figure 36: Folder for PDF export files

PhysioPortWin can also generate the printout pages as PDF files (File extension **.PDF**) and the measured values as CSV file (File extension **.TXT**), e.g. for further processing in Excel. The file name contains the following information:

P^<type>_<workstation>^<slot#>_<id>^<last>^<first>_<StartTime>_<exportTime>**.PDF / .TXT**

^	= Block separator
<type>	= "REPORT" for blood pressure values, "REPORT-PWA" for pulse wave analysis results or "REPORT-Overview" for the overview of the day/night analysis (see Figure 71)
<workstation>	= workstationname
<slot#>	= 1 (slotnumber on workstation)
<id>	= Patient ID
<last>	= Surname
<first>	= First name
<StartTime>	= Start time of PHYSIO-PORT recording in YYYYMMDDHHMMSS format
<exportTime>	= PDF creation time in YYYYMMDDHHMMSS format

z.B.: P^REPORT_Comp^1_12345^Maier^-Peter_20031216104632_20040318153145.pdf
P^REPORT-PWA_Comp^1_12345^Maier^-Peter_20031216104632_20040318153248.pdf
P^REPORT-Overview_Comp^1_12345^Maier^Peter_20031216104632_20040318153312.pdf

Changes must be confirmed by entering the password when saving (see section 4.4.7).

4.4.4 Parameter – Blood pressure

On the tab [Parameter - Blood pressure], you can define the parameters that are used by default when analyzing an evaluation. These parameters can later be changed individually for each individual evaluation. On this tab page, all settings of the parameters for the long-term blood pressure measurement can be made.

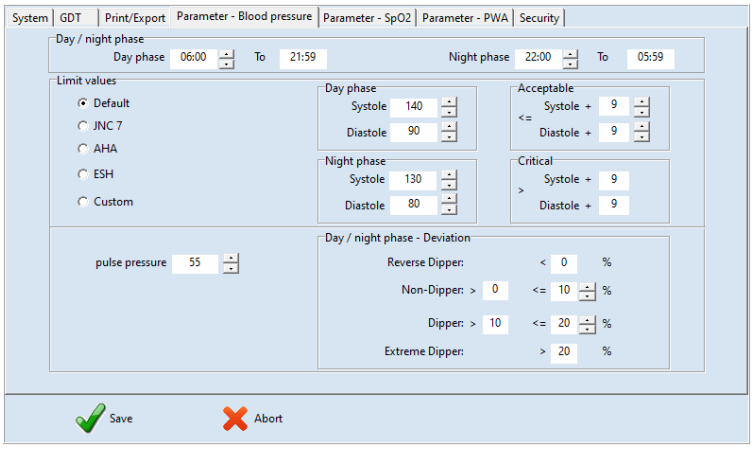


Figure 37: Page settings

Day-/Night Phase:
The standard times for the day phase and night phase can be set.

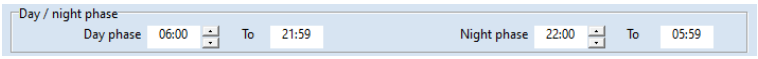


Figure 38: Standard values for day and night phase

Limits:
The values for the limit values of the day and night phase can be defined. These limit values are shown as lines in the graphical representation of the evaluation and are used in the statistical calculations.

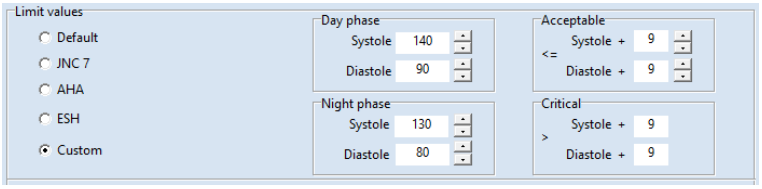


Figure 39: Blood pressure limits

Day/night phase - deviation:
The limits for the nightly pressure drop can be set.

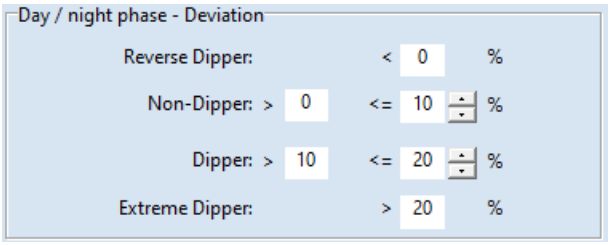


Figure 40: Setting the nightly pressure drop

Changes must be confirmed by entering the password when saving (see section 4.4.7).

4.4.5 Parameter SpO_2

On the tab [Parameter - SpO_2], you can set the limits for oxygen saturation (SpO_2).
Changes must be confirmed by entering the password when saving (see section 4.4.7).

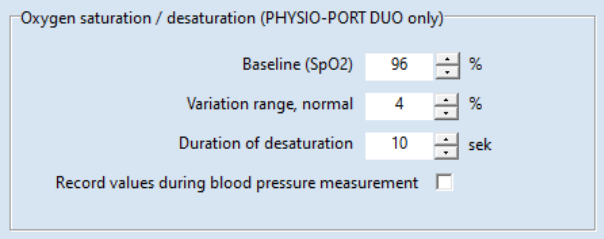


Figure 41: Settings and limit values for oxygen saturation

4.4.6 Parameter PWA

On the tab [Parameter - PWA], the limit values for the parameters of the pulse wave analysis can be set. These values are explained in detail in section 2.5.

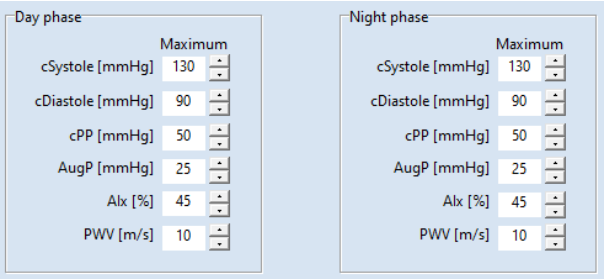


Figure 42: Setting options for PWA parameters.

Notes

The preset limit values must be adapted to the patient in accordance with Section 2.5 in order to enable a patient-specific evaluation of the measured values. The data in the listed tables are only a suggestion and can be freely adjusted by the user according to his experience.

Changes must be confirmed by entering the password when saving (see section 4.4.7).

4.4.7 Security/Authentication

In the [Security] tab, settings for authentication and security can be made.

Notes

The default user name is "Admin", the default password is "Admin". Note that the password is case sensitive.

Via the input field "New user name", the user name can be changed.
The password can be changed via the input field "New password". The new password must be repeated in the "Confirmation" input field. The input is encrypted, but by clicking on the symbol the password can be displayed as plain text.
In the drop-down list "TimeOut", you can set the time after which the program is locked. You can set 15, 30 or 45 minutes. The current time until the program is locked is displayed.

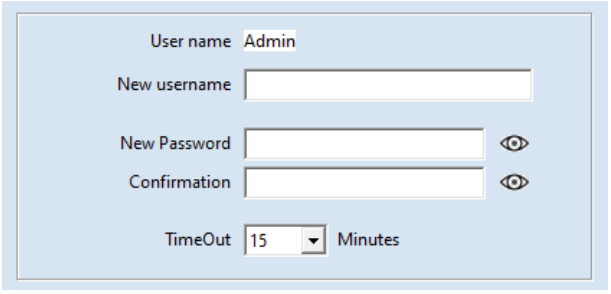


Figure 43: Settings for authentication and security.

After inactivity of mouse and keyboard for longer than the specified timeout, the software is locked. To unlock the software, the password used for login must be entered.

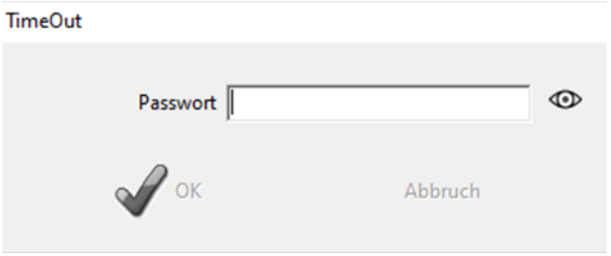


Figure 44: TimeOut Dialog

Each change must be confirmed by entering the password with the old password when saving.

If the password is entered correctly, the [✓ OK] button changes from grey to green, the settings made are active and you return to the main menu.

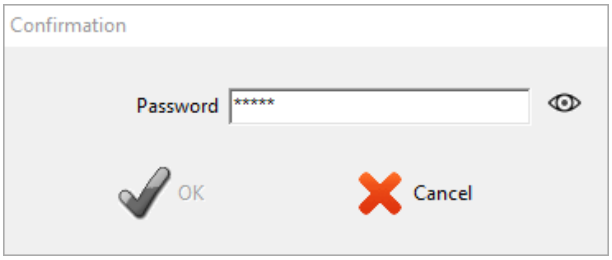


Figure 45: Incorrect password entry

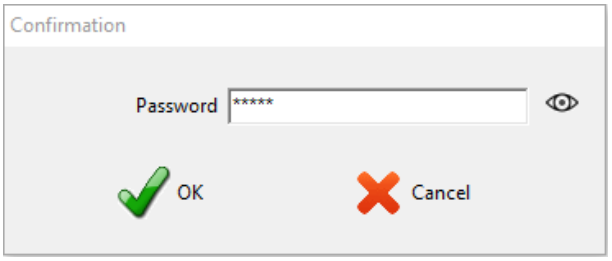


Figure 46: Correct password entry

Safety advice

• Data protection •

Before using the software for the first time, change the default username and password to ensure the protection of health and patient data.

4.5 Installation in the network

The PhysioPortWin software is network-compatible, i.e. patient data and evaluations can be stored centrally (usually on a "server") and this data can be accessed from all workstations.

First, an appropriate data directory is defined and released on a central server.

Then, a local program installation is performed on the workstations on which the PhysioPortWin software is to be used.

Under [Settings], tab [System], the folder for the shared database is then entered, the integrated Explorer function simplifies the selection.

Figure 47: Folder/path for database

4.6 Exiting the program safely

The menu item [Exit] is only available in the main menu. You can return to the previous menu from any submenu via the [× Cancel] menu area.

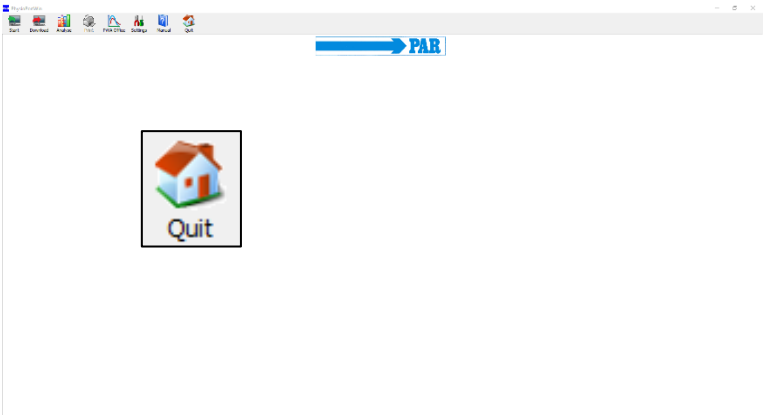


Figure 48: Exit main menu

Additionally, the [X] in the upper right corner of the screen allows you to exit the software from any submenu without returning to the main menu.

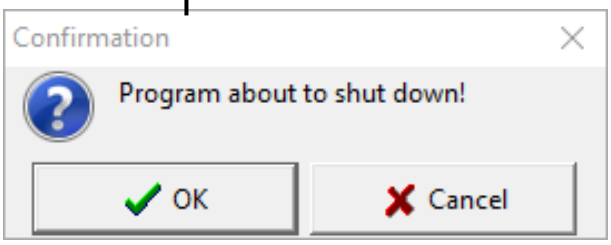


Figure 49: Confirmation dialog for program termination

In both cases, the confirmation prompt appears "The program is terminated!"
If you click on the [✓ OK] button, the program terminates definitely; if you click on the [× Cancel] button, the software remains active.

4.7 Uninstallation

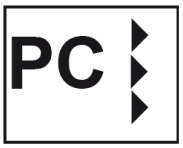
The program can be uninstalled as follows:

1. To delete all personal and health-related data, open the database directory (see Section 4.5); delete the "Data" folder and then right-click "Empty Trash" to empty the trash.
2. Call up the Windows control panel: press the key combination [Win] + [R] simultaneously, enter "control" in the input field and confirm with "OK" or [Enter].
3. In the "Uninstall program" menu, find the PhysioPortWIn v1.6 software in the list.
4. Right-click on the software to open a window and select the menu item "Uninstall". The software is uninstalled.

5 Start blood pressure measurement

5.1 Connecting the recorder

To configure a long-term measurement, a compatible recording recorder of the PHYSIO-PORT or TONOPORT type (see section 3.1) must be connected to the PC via USB cable and switched on. After the self-test and capacity indication, the display of the recorder shows the symbol for "PC connection".



5.2 Starting the program

To configure a recorder, call up the [Start] main menu by clicking the corresponding button.

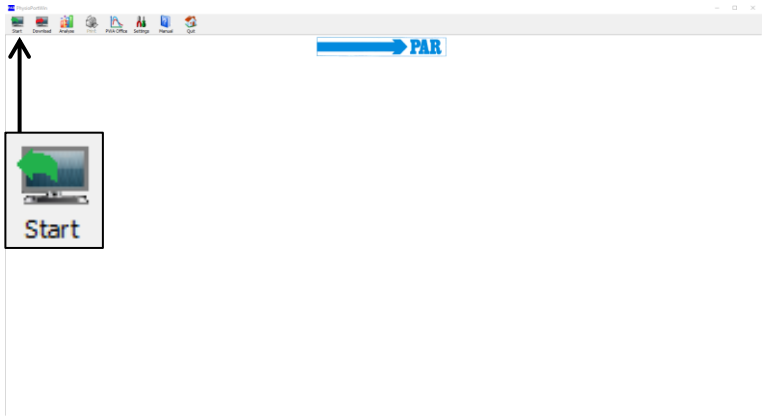


Figure 50: Start main menu

5.3 Select Patient

5.3.1 Known patient

Patient search:

In the field "NAME" enter the 1st letter of the last name of the patient you are looking for - all patients whose names begin with this letter (in the example with "M") will appear. The desired patient is selected by double-clicking on the corresponding line.

By means of the buttons [PWA] and [SpO2], the data sets can be filtered according to the parameters.

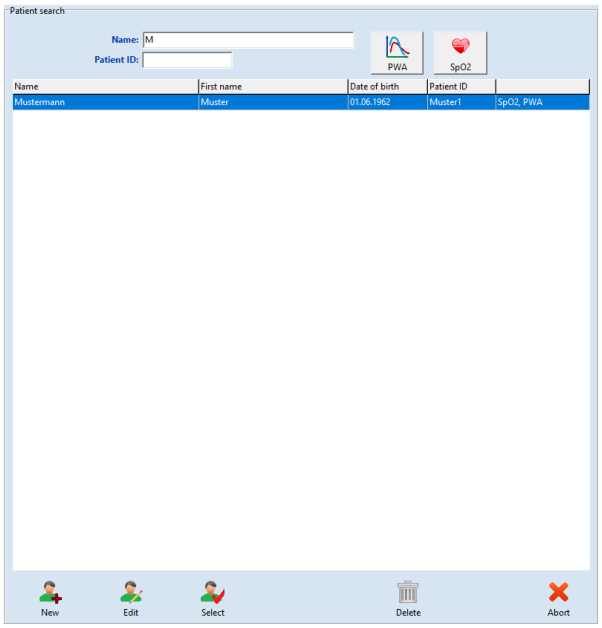


Figure 51: Patient selection screen, all patients with "M"

5.3.2 Create a new patient

If the patient you are looking for is not yet in the database, the new patient data can be entered directly. To do this, open the input mask with the [NEW] button, enter all necessary data and save them in the database with [Save].

If required, the current medication can be entered by the patient.

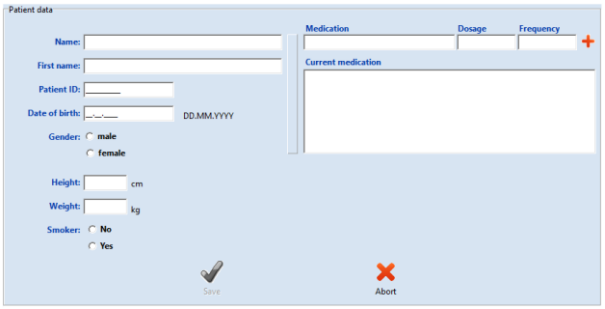


Figure 52: Patient new admission

5.3.3 Edit patient data

Once patient data has been entered, it can be edited and changed at any time using the [Edit] button in the patient search mask.

Note

The patient ID cannot be changed after it has been entered and saved because it is unique.

5.4 Configuring recorder

After selecting the desired patient, the screen for configuration / programming the recorder for long-term measurement appears.

Only for recorders with SpO_2 function, the "Measurement" area appears, which can be used to determine whether only blood pressure, only SpO_2 or both parameters should be determined.

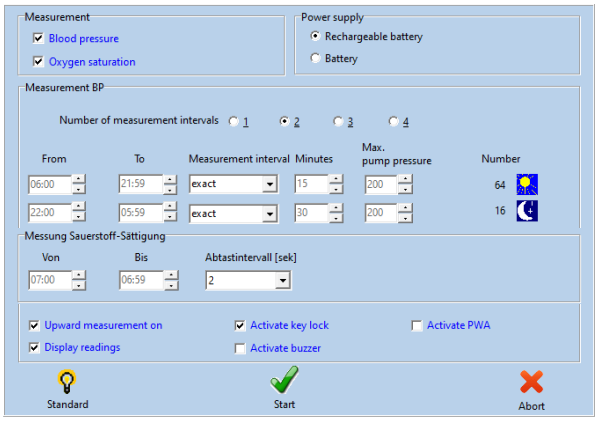


Figure 53: Measurement parameters

Number of measuring intervals:
Up to 4 different measuring intervals can be set, two intervals (day and night phase) are offered as standard. For each measuring interval, the interval, measuring distance, minutes and maximum pump pressure can be set individually.

Figure 54: Determination of the number of measuring intervals

Power supply:
It is determined with which type (battery or rechargeable battery) the current long-term measurement is performed.

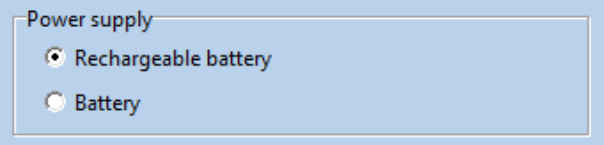


Figure 55: Determining power supply

Interval duration (From … To …):
Start and end of the respective interval can be set by the hour. The measuring intervals can be set separately for recorders with SpO_2 function.

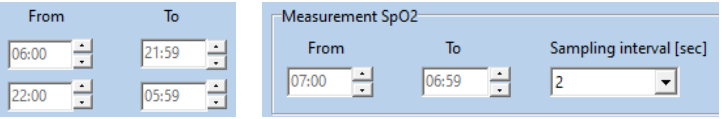


Figure 56: Time window for the individual blood pressure measurement intervals (left) and for SpO_2 measurement (right)

Measuring distance:
With the "exact" setting, the measurements are taken exactly at the set minute intervals. With the "approx." setting, the measurement intervals vary randomly by ± 2 minutes by the set time.

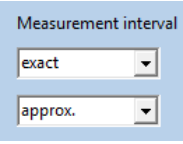


Figure 57: Setting the accuracy of the measuring distance

Measuring interval:
The interval between successive measurements can be configured between 2 and 120 minutes.

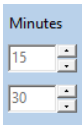


Figure 58: Setting the time interval between measurements

Max. Pump pressure:
Limits the maximum cuff pressure to the set value between 200 mmHg and 280 mmHg.

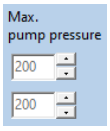


Figure 59: Setting the maximum cuff pressure during a blood pressure measurement

Quantity:
The total number of set measurements is displayed both for each individual measuring interval and for 24 hours.

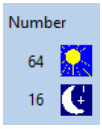


Figure 60: Number of measurements per interval

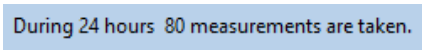
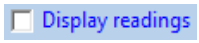
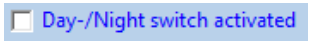


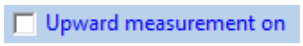
Figure 61: Number of measurements during long-term measurement



The blood pressure values are shown on the display of the recorder.

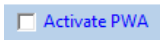


If ticked the day-/night switch of the recorder is activated.



The blood pressure measurement is performed with the upward measurement method (Inflation Measurement Technology)

The internal beep (optional) can be switched on and off. If the beep is active, an acoustic signal sounds after switching on, before the measurement and in case of an incorrect measurement.



Activates the pulse wave analysis function if the monitor supports it. If this function is activated, a pulse wave analysis is performed after each blood pressure measurement.

Standard:
The [Standard] button resets the parameters to the values shown in Figure 53.
After setting the desired configuration, press the [Start] button to start the recorder.

Figure 62: Button to reset the performed configuration

First, it it checked whether there are any measurements in the recorder that have not yet been read in - if so, a corresponding warning is issued.
If not, the memory of the recorder is cleared and the new patient data and measurement intervals are transferred to the recorder.

CAUTION

• Patient confusion •

The recorder must be restarted by the PhysioPortWin software before each new measurement. Otherwise, new measurements are assigned to the old patient (who is still stored in the recorder). Only when a new long-term measurement is started will the old patient data and measurement values be deleted from the recorder.

6 Read in recorder data

6.1 Connecting the recorder

To read in and then archive the measurement data from the recorder, connect the recorder to the PC according to section 5.1.

6.2 Start archiving

The archiving of measurement data can be started with the [Download] button in the main menu.

The measured values are read out from the recorder and stored in the database for the corresponding patient.

Then the graphical evaluation of the results is displayed, which is explained in section 7.

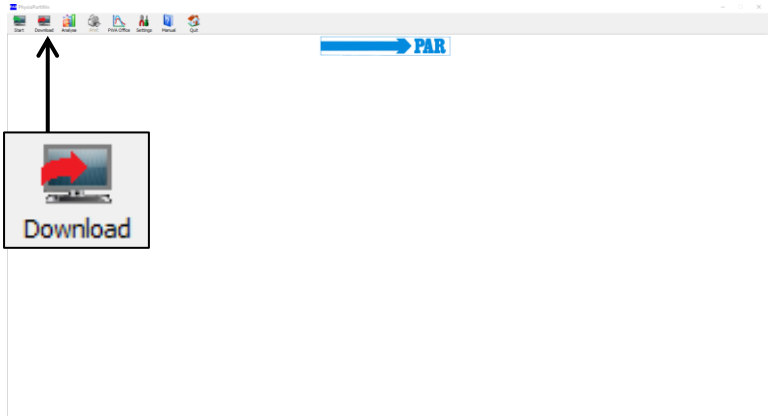


Figure 63: Read main menu

If data is received incorrectly from the connected device, an error message appears and the read-in process must be restarted after acknowledging the message.

Note

All available data is always read in from the recorder during reading.

7 Measurement analysis

7.1 Start analysis

The [Analyse] button is used to call up and display stored analysis.

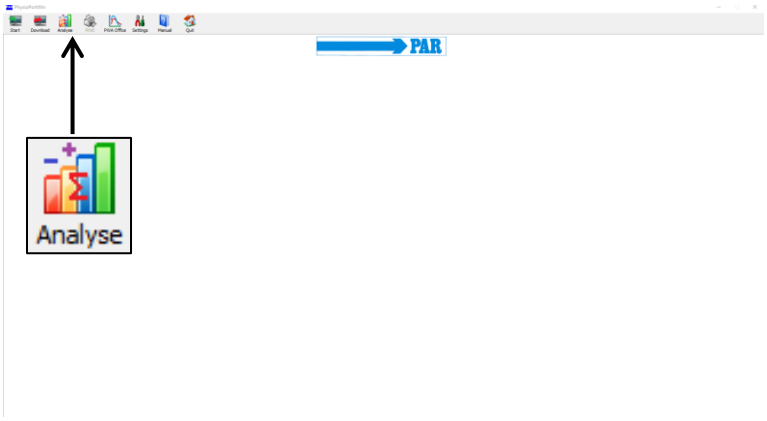


Figure 64: Main menu analysis

7.2 Search / Delete analysis

The selection mask of the patient database appears and the patient can be selected according to section 5.3.1. The screen for [Select] the analysis that is stored in the database for the selected patient appears.

In the selection window, the saved analysis is called up by double-clicking on the corresponding date or by marking and clicking on the [Select] button.

To delete a specific evaluation from the database, select the corresponding date line in the selection mask (line appears in blue) and then press the [Delete] button.

This evaluation is deleted after a corresponding query.

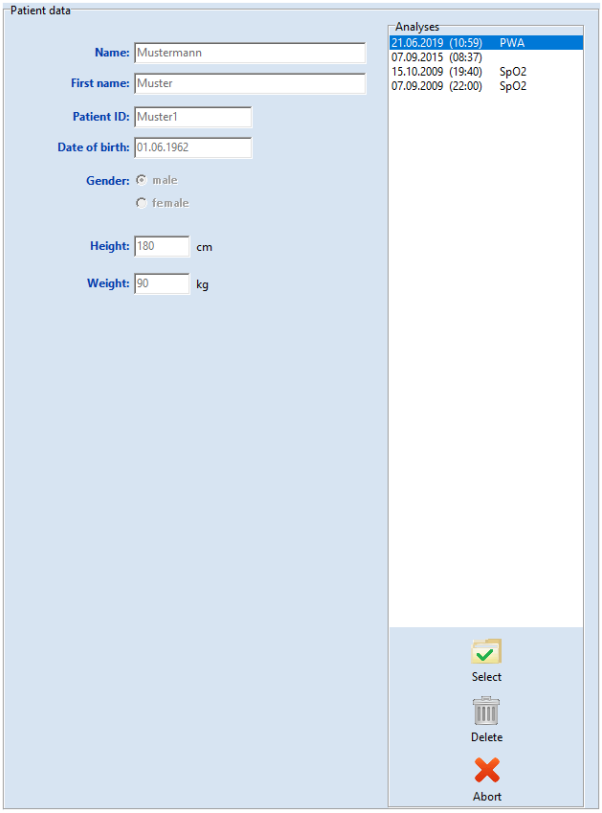


Figure 65: Analysis selection mask

Warning

• Loss of data •

Make a regular backup of your database, including individual records, so that you can restore data in the event of database or record corruption. Customer service can help you with the recovery.

If a record in the database is damaged, an error message appears and the record can no longer be analyzed.

7.3 Illustrations

The other display formats can be called up by clicking on the corresponding index card.

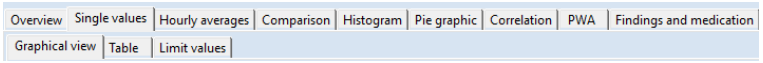


Figure 66: Choose display

7.3.1 Single values

Graphical view:

After activating a specific evaluation, the stored measured values are first displayed graphically.

The diagram shows the results of all individual measurements. The set limit values for day and night phase (see Settings) are shown as red lines.

By moving the cursor over the corresponding measured value curves, each individual measured value is displayed.

During a PHYSIO-PORT measurement, a graphic of the SpO_2 values is also displayed.

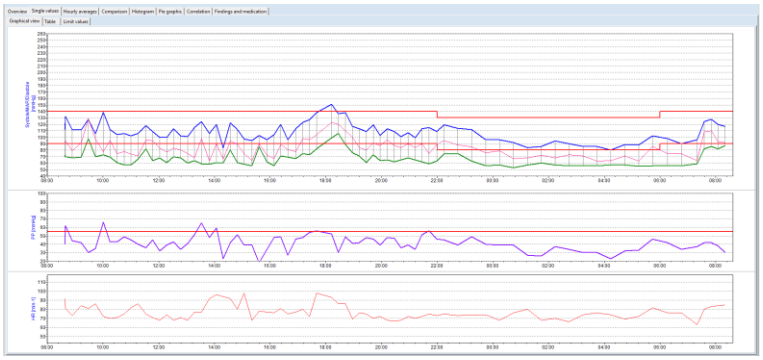
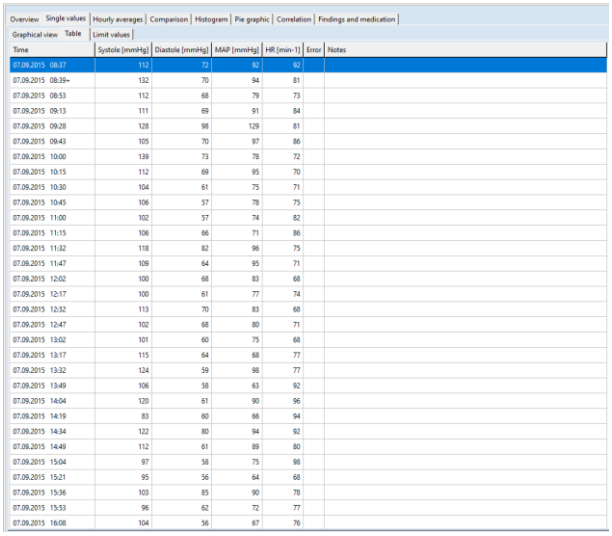


Figure 67: Graphic of the single values

Table:

In the tabular representation, all measurement results are listed with date / time, systole, diastole, heart rate and mean pressure.

Additional measurements that were triggered manually via the start-stop button are marked with "+" sign after the time, values from the night phase are marked by "*" and values from an upward measurement are highlighted by "^".



Time	Systole [mmHg]	Diastole [mmHg]	MAP [mmHg]	HR [min-1]	Error	Notes
07.09.2015 08:17	112	72	92	92		
07.09.2015 08:39+	132	70	94	81		
07.09.2015 08:53	112	68	79	73		
07.09.2015 09:13	111	69	91	84		
07.09.2015 09:28	128	98	129	81		
07.09.2015 09:43	105	70	97	86		
07.09.2015 10:00	139	73	78	72		
07.09.2015 10:15	112	69	95	70		
07.09.2015 10:30	104	61	75	71		
07.09.2015 10:45	106	57	78	75		
07.09.2015 11:00	102	57	74	82		
07.09.2015 11:15	106	66	71	86		
07.09.2015 11:32	118	82	96	75		
07.09.2015 11:47	109	64	95	71		
07.09.2015 12:02	100	68	83	68		
07.09.2015 12:17	100	61	77	74		
07.09.2015 12:32	113	70	83	68		
07.09.2015 12:47	102	68	80	71		
07.09.2015 13:02	101	60	75	68		
07.09.2015 13:17	115	64	68	77		
07.09.2015 13:32	124	59	98	77		
07.09.2015 13:49	106	58	63	92		
07.09.2015 14:04	120	61	90	96		
07.09.2015 14:19	83	60	66	94		
07.09.2015 14:34	122	80	94	92		
07.09.2015 14:49	112	61	89	80		
07.09.2015 15:04	97	58	75	98		
07.09.2015 15:21	95	56	64	68		
07.09.2015 15:36	103	85	90	78		
07.09.2015 15:53	96	62	72	77		
07.09.2015 16:08	104	56	67	76		

Figure 68: Table of individual values

Note

• Deleting individual measurements from a data set •

To delete individual measurements, activate the line in the table with a single mouse click (line appears in blue) and then press the [Delete] button. After a corresponding query, this measurement is deleted.

Limit values:

The limit values, day/night phase, tabular and graphic individual values are displayed in summary form. Both the limit values and the day/night phase can be set individually here. For the limit values, the following settings are available as described in Section 4.4.4.

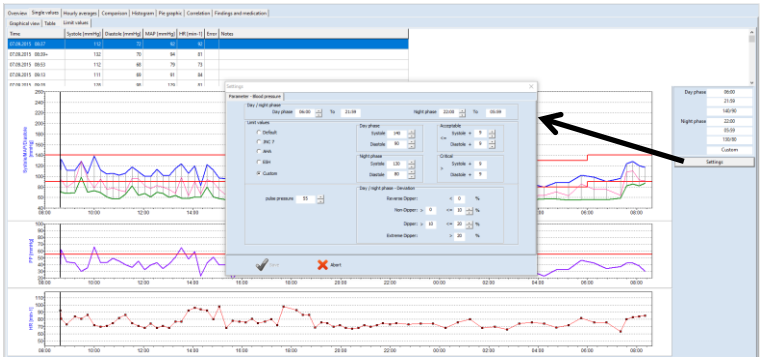


Figure 69: Display and setting of individual values, day/night phase and limit values

7.3.2 Overview

The [Overview] shows the numerical summary of the long-term blood pressure measurement / (SpO_2 monitoring optionally below) and statistical evaluations both for the entire monitoring period and separately for day and night phase.

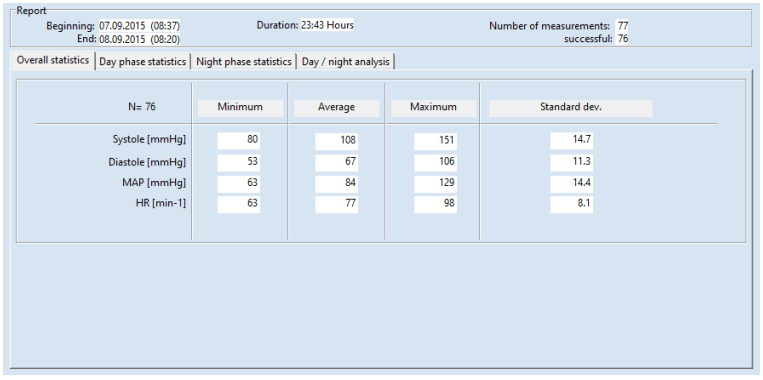


Figure 70: Overall statistics of a long-term measurement

The software calculates Dipper, Non-Dipper, Extreme Dipper or Reverse Dipper values in the overview of the day/night analysis.

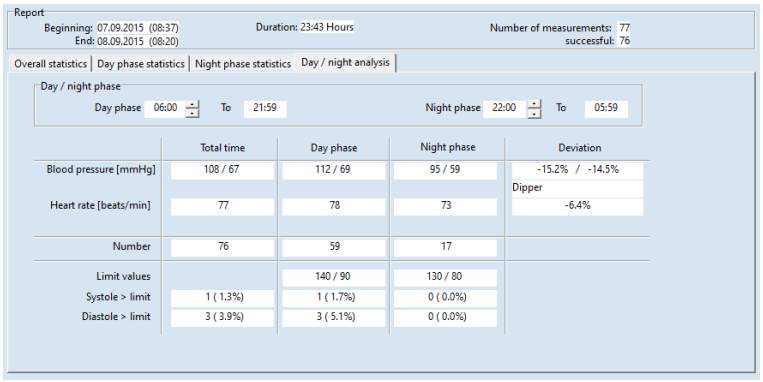
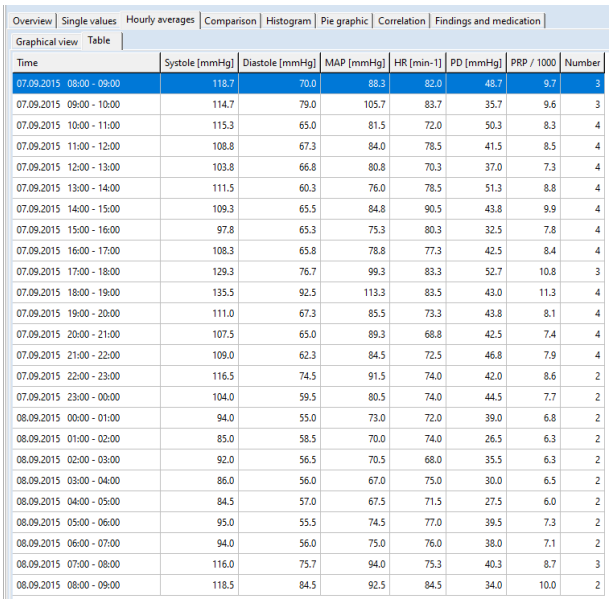


Figure 71: View of a day/night analysis with information about dipper type of patient

7.3.3 Hourly averages

The hourly mean values of all clinically significant, measured parameters including pulse pressure (difference between systole and diastole) and PRP ((systole times heart rate)/1000) are displayed in the tab of the same name. A graphic display is also available (see [Graphic] tab page).



Overview | Single values | Hourly averages | Comparison | Histogram | Pie graphic | Correlation | Findings and medication

Graphical view | Table

Time	Systole [mmHg]	Diastole [mmHg]	MAP [mmHg]	HR [min-1]	PD [mmHg]	PRP / 1000	Number
07.09.2015 08:00 - 09:00	118.7	70.0	88.3	82.0	48.7	9.7	3
07.09.2015 09:00 - 10:00	114.7	79.0	105.7	83.7	35.7	9.6	3
07.09.2015 10:00 - 11:00	115.3	65.0	81.5	72.0	50.3	8.3	4
07.09.2015 11:00 - 12:00	108.8	67.3	84.0	78.5	41.5	8.5	4
07.09.2015 12:00 - 13:00	103.8	66.8	80.8	70.3	37.0	7.3	4
07.09.2015 13:00 - 14:00	111.5	60.3	76.0	78.5	51.3	8.8	4
07.09.2015 14:00 - 15:00	109.3	65.5	84.8	90.5	43.8	9.9	4
07.09.2015 15:00 - 16:00	97.8	65.3	75.3	80.3	32.5	7.8	4
07.09.2015 16:00 - 17:00	108.3	65.8	78.8	77.3	42.5	8.4	4
07.09.2015 17:00 - 18:00	129.3	76.7	99.3	83.3	52.7	10.8	3
07.09.2015 18:00 - 19:00	135.5	92.5	113.3	83.5	43.0	11.3	4
07.09.2015 19:00 - 20:00	111.0	67.3	85.5	73.3	43.8	8.1	4
07.09.2015 20:00 - 21:00	107.5	65.0	89.3	68.8	42.5	7.4	4
07.09.2015 21:00 - 22:00	109.0	62.3	84.5	72.5	46.8	7.9	4
07.09.2015 22:00 - 23:00	116.5	74.5	91.5	74.0	42.0	8.6	2
07.09.2015 23:00 - 00:00	104.0	59.5	80.5	74.0	44.5	7.7	2
08.09.2015 00:00 - 01:00	94.0	55.0	73.0	72.0	39.0	6.8	2
08.09.2015 01:00 - 02:00	85.0	58.5	70.0	74.0	26.5	6.3	2
08.09.2015 02:00 - 03:00	92.0	56.5	70.5	68.0	35.5	6.3	2
08.09.2015 03:00 - 04:00	86.0	56.0	67.0	75.0	30.0	6.5	2
08.09.2015 04:00 - 05:00	84.5	57.0	67.5	71.5	27.5	6.0	2
08.09.2015 05:00 - 06:00	95.0	55.5	74.5	77.0	39.5	7.3	2
08.09.2015 06:00 - 07:00	94.0	56.0	75.0	76.0	38.0	7.1	2
08.09.2015 07:00 - 08:00	116.0	75.7	94.0	75.3	40.3	8.7	3
08.09.2015 08:00 - 09:00	118.5	84.5	92.5	84.5	34.0	10.0	2

Figure 72: Tabular representation of the hourly average values

7.3.4 Comparison

A comparison of two measurement series both in graphical and tabular form is possible in the [Comparison] tab.

On the left side of the display, the currently selected measurement series is shown. A measurement series can be selected for comparison using the "Date" drop-down menu on the right-hand side.

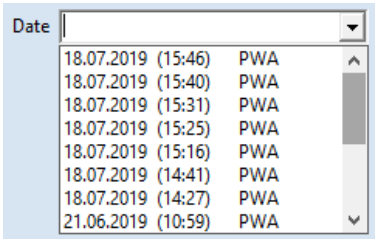
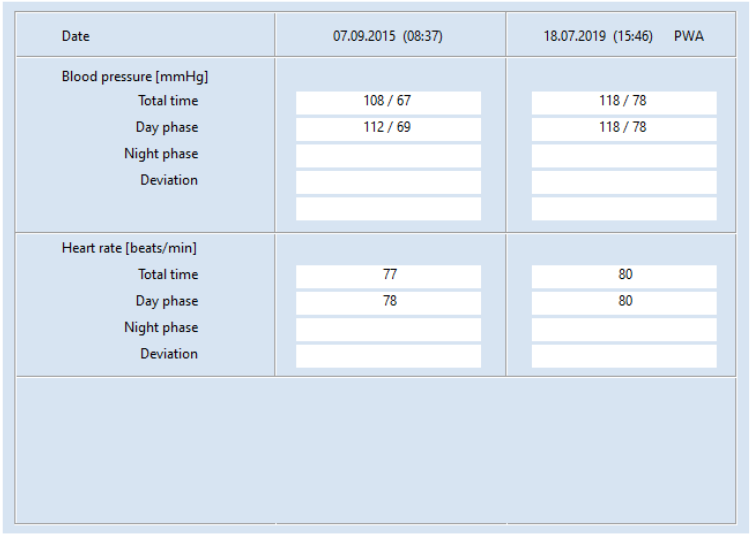


Figure 73: Dropdown to select available measurement series for comparison



Date	07.09.2015 (08:37)	18.07.2019 (15:46) PWA
Blood pressure [mmHg]		
Total time	108 / 67	118 / 78
Day phase	112 / 69	118 / 78
Night phase		
Deviation		
Heart rate [beats/min]		
Total time	77	80
Day phase	78	80
Night phase		
Deviation		

Figure 74: Tabular comparison of two measurement series of a patient

7.3.5 Histogram

The frequency of certain blood pressure values/value ranges as well as the heart rate during the day (see tab [Day phase]), at night (see tab [Night phase]) and in the entire measuring interval (see tab [Total time]) can be represented at a glance using the histogram display.

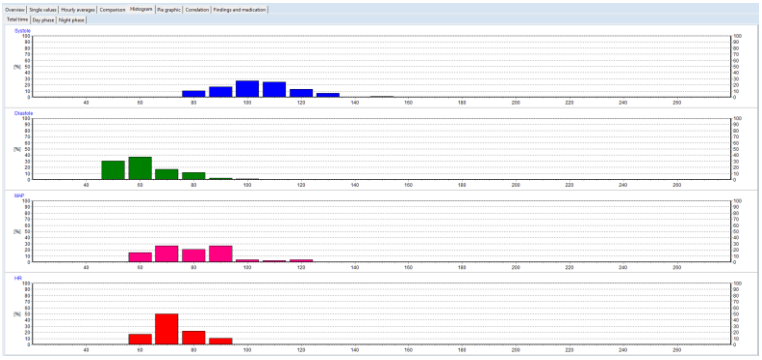


Figure 75: Histogram display of the total measuring time

7.3.6 Pie graphic

The measured values can also be displayed as a pie chart, so that the proportion of critical measured values that exceed the set limit value can be visually recorded.

Figure 76: Display of the measured values as a pie chart

7.3.7 Correlation

In the [Correlation] tab, the correlation of the blood pressure parameters can be displayed. A combination of two blood pressure parameters can be selected via a drop-down menu.

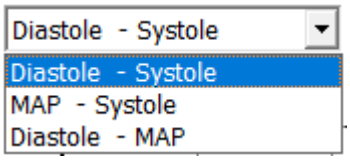


Figure 77: Dropdown for selecting the parameters for correlation display

The diagram shows the correlation between diastolic and systolic blood pressure. Each point corresponds to one measurement.

In addition, the relationship between blood pressure values and mean arterial pressure can be displayed.

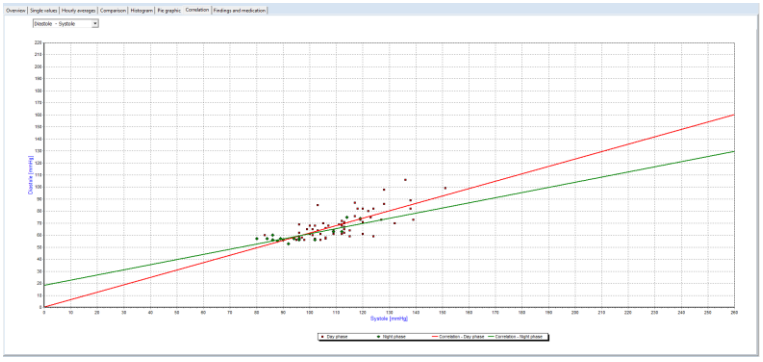


Figure 78: Correlation of systolic and diastolic blood pressure values

7.3.8 Findings and medication

In the tab [Findings and Medications], the user can enter and save a finding for the current measurement series. This text is also printed on the summary page and can be transferred to the practice EDP.

In addition, the user can view the current medication if he has inserted it in the patient file and adjust it if necessary.

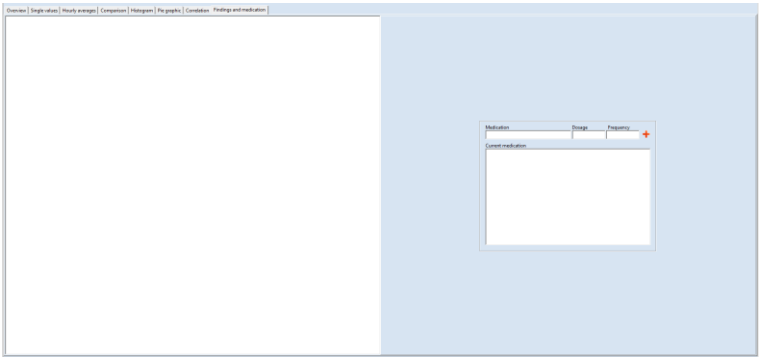


Figure 79: Freely editable findings and medication list

7.4 Evaluation of pulse wave analyses

7.4.1 Overview of Measurement series

Start the analysis via the [analysis] button (see section 7.1). Via the button [PWA], a patient filtering takes place and only patients with pulse wave analyses are displayed. The patient search is described in section 5.3.1. Then select the measurement series (see Section 7.2).

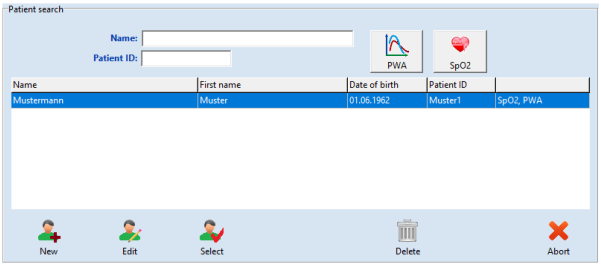


Figure 80: Patient search

Note

Measurements without abbreviations contain blood pressure readings. The abbreviation SpO_2 indicates that the measurement contains oxygen saturation data. The abbreviation PWA indicates that the measurement contains pulse wave analysis data.

Click the [PWA] tab (1) to view the results of the selected test.
The navigation area on the left side lists all measurements of the measurement series. By clicking on the date of the examination (2.1), an overview of all measurements of the examination is displayed on the right side and you get to the overview of all measurement ranges. By clicking on the time of a measurement (2.2), the results of this single measurement are displayed as described in section 7.4.2.

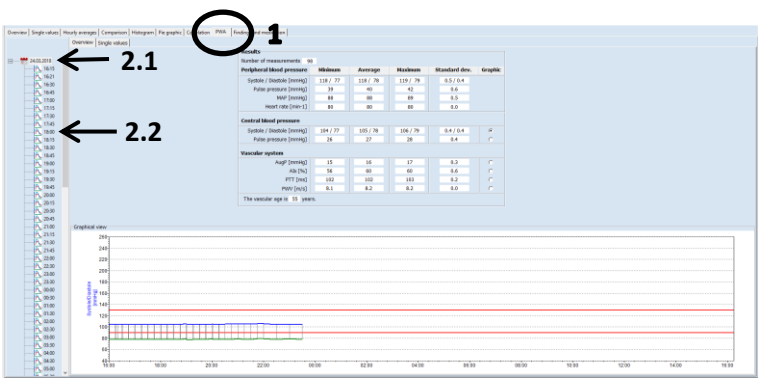


Figure 81: Complete overview of PWA measurement series

Overview:
This tab shows an overview of the entire measurement series.
The number of measurements, minimum, average, maximum and standard deviation of the peripheral and central blood pressure and the parameters of the pulse wave analysis (vascular system) of the measurement series are displayed.
In the "Graphics" column, the temporal course of each parameter can be displayed individually.
The set limit values (see section 4.4.6) are shown as red lines in the graphic. The limit values can be changed directly via the [Settings] button.

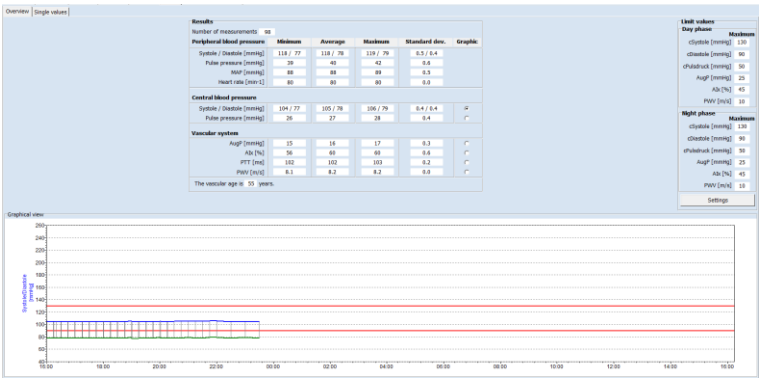


Figure 82: Complete overview of the PWA data of a measurement series

Single values:

This display can be reached by clicking on the [Single values] tab.

The time of measurement and the measured values of central systolic blood pressure (cSystole) and central diastolic blood pressure (cDiastole), central pulse pressure (cPP), augmentation pressure (AugP) and augmentation index (AIx), pulse transfer time (PTT) and pulse wave velocity (PWV) are listed in a table.

Overview | Single values

Time	cSystole [mmHg]	cDiastole [mmHg]	cPP [mmHg]	AugP [mmHg]	AIx [%]	PTT [ms]	PWV [m/s]
24.03.2018 16:15	105	78	27	16	59	102	8.2
24.03.2018 16:21	105	78	27	16	60	102	8.2
24.03.2018 16:30	105	78	27	16	60	102	8.2
24.03.2018 16:45	105	78	27	16	60	102	8.2
24.03.2018 17:00	105	78	27	16	60	102	8.2
24.03.2018 17:15	105	78	27	16	59	102	8.2
24.03.2018 17:30	105	78	27	16	60	102	8.2
24.03.2018 17:45	105	78	27	16	59	102	8.2
24.03.2018 18:00	105	78	27	16	59	102	8.2
24.03.2018 18:15	105	78	27	16	60	102	8.2
24.03.2018 18:30	105	78	27	15	58	102	8.1
24.03.2018 18:45	105	78	27	16	59	102	8.2
24.03.2018 19:00	106	79	27	16	60	102	8.2
24.03.2018 19:15	105	78	27	16	59	102	8.2
24.03.2018 19:30	105	78	27	16	59	102	8.2
24.03.2018 19:45	105	78	27	16	60	102	8.2
24.03.2018 20:00	105	79	26	15	59	102	8.1
24.03.2018 20:15	105	78	27	16	59	102	8.2
24.03.2018 20:30	105	78	27	16	59	102	8.2
24.03.2018 20:45	105	78	27	16	60	102	8.2
24.03.2018 21:00	106	79	27	16	60	102	8.2
24.03.2018 21:15	105	78	27	16	60	102	8.2
24.03.2018 21:30	105	78	27	16	60	102	8.2
24.03.2018 21:45	106	79	27	16	60	102	8.2
24.03.2018 22:00	106	79	27	16	60	102	8.2
24.03.2018 22:30	105	78	27	16	60	102	8.2
24.03.2018 23:00	105	79	26	16	60	102	8.1
24.03.2018 23:30	105	78	27	16	60	102	8.2
24.03.2018 00:00	105	78	27	16	59	102	8.2
24.03.2018 00:30	105	78	27	16	60	102	8.2
24.03.2018 01:00	105	78	27	16	60	102	8.2
24.03.2018 01:30	105	78	27	16	60	102	8.2

Figure 83: Single value table of the PWA data of a measurement series

7.4.2 Detailed analysis of a PWA measurement

Overview:

The patient data (top left), a graphic representation of the peripheral pulse wave (bottom left) and the results of the individual measurement are displayed. Invalid pulses are marked in red and are not taken into account in the analysis.

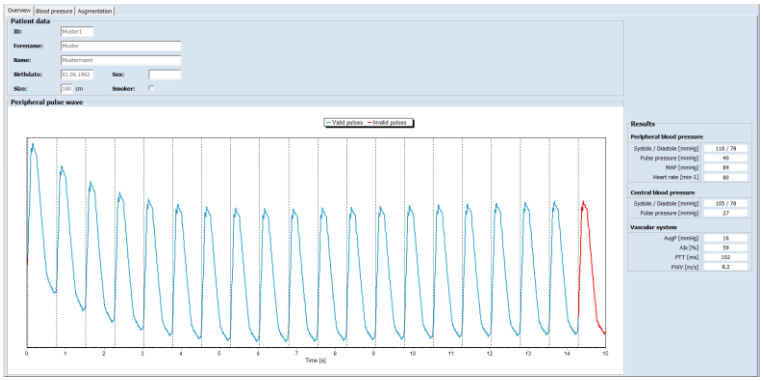


Figure 84: Overview of the PWA data of a single measurement

Blood pressure:

The [Blood pressure] tab displays the mean peripheral and the reconstructed aortal pulse wave.

You also receive a display of the blood pressure values determined.

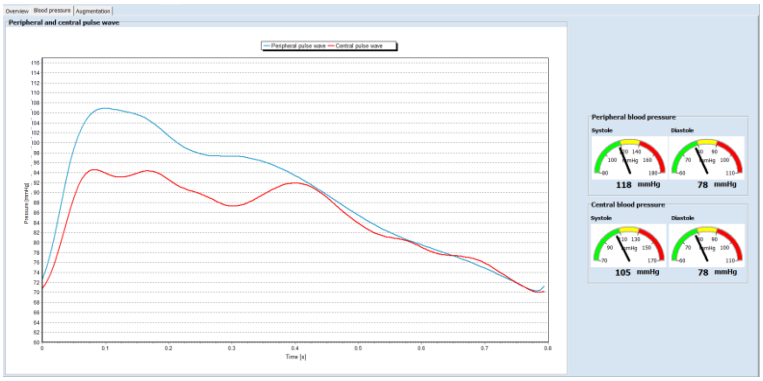


Figure 85: Display of the blood pressure values

Augmentation:
The [Augmentation] tab shows the decomposition of the aortic wave into its propagating and reflected components. These waves are used to determine the augmentation. Points P1 and P2 for determining the augmentation parameters are shown in the Pulse wave separation action area.
On the right, the augmentation pressure (AugP), which is calculated from the difference between P1 and P2, and the augmentation index (AIx), which indicates the percentage of the augmentation pressure in relation to the pulse pressure, are displayed.

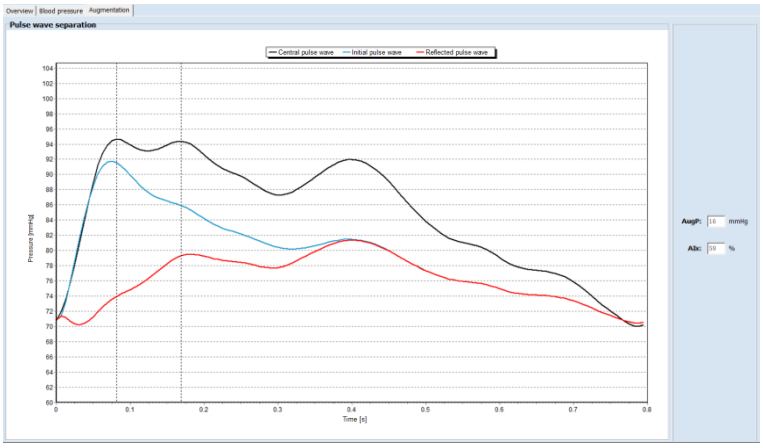


Figure 86: Display of pulse wave separation and augmentation

8 PWA Office

The menu item [PWA Office] is used to perform a single measurement with direct display of the measurement results of a pulse wave analysis in order to obtain a quick statement about the vessel condition in practice. This single measurement is not intended to replace the long-term measurement function, but should be used to justify a long-term measurement.

8.1 Preparation

Start this measurement function by clicking the [PWA Office] button. The patient search is described in section 5.3.1. If the patient is not yet included, a new patient can be created as described in section 5.3.2.

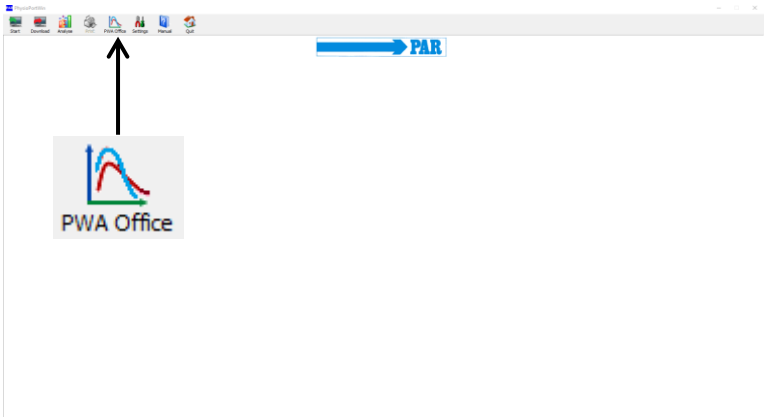


Figure 87: Main menu PWA-Practice

Start the recorder and connect it to the PC according to section 5.1.

Note
Make sure that the selected instrument supports the pulse wave analysis function (see section 3.1).

Click the [Start] button to start a measurement.

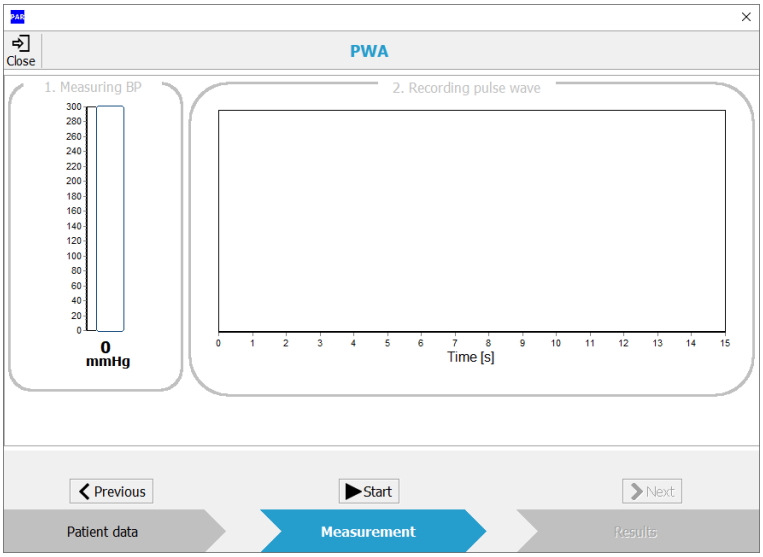


Figure 88: PWA-Pratice

You cannot start measurement when the recorder is turned off or not connected to the PC. In this case, the [Start] button is disabled and the message "Search device" is displayed.

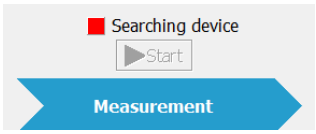


Figure 89: Error indicator "Search Device“

8.2 Description of the measuring procedure

The device starts the pulse wave analysis by default with a blood pressure measurement.
In the action area "1. Measuring BP", the current cuff pressure is displayed. After a successful blood pressure measurement and after reaching the determined MAD, the action area is coloured green.
In the PWA practice area, different colour codes are used to indicate the status of the measurement to the user. The meaning of the colour code is explained opposite.

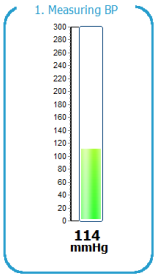


Figure 90: Active measurement

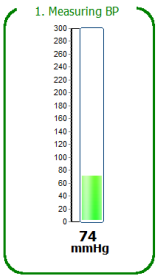


Figure 91: Measurement completed

Gray - Deactive not yet executed

Blue - Active

Green - Successfully completed

Red - Manual abort or incorrect measurement

The measurement can be aborted at any time by clicking the [Stop] button.

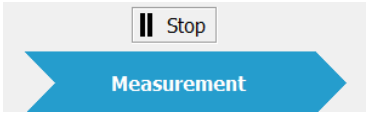


Figure 92: Button to stop measurement

Immediately afterwards, the pulse waves are recorded at the level of the mean arterial pressure. At the end of the recording, the individual pulse waves are displayed separately by their foot points (vertical dashed lines), pulses not used for analysis are marked in red and the signal quality is evaluated based on the number of usable pulses.

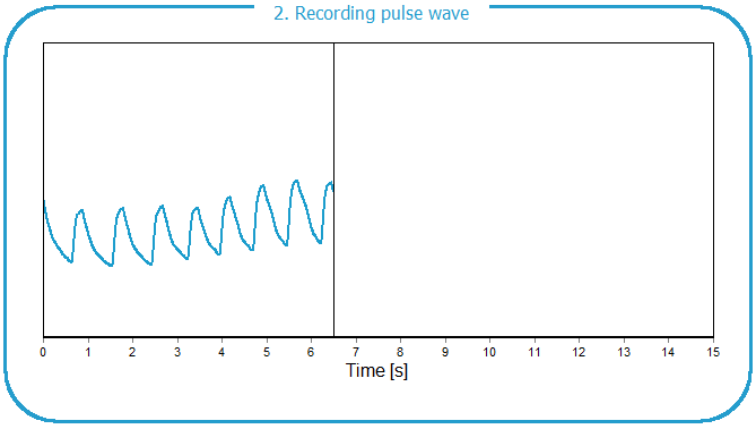


Figure 93: Recording the pulse waves on upper arm

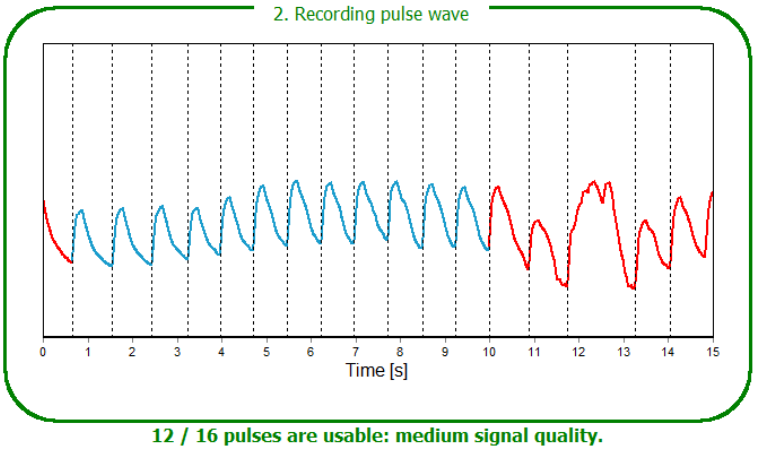


Figure 94: Finished pulse wave recording

By clicking the [Next] button or the [Results] button in the lower navigation area, the results of the pulse wave analysis can be viewed directly. The result area corresponds to the evaluation of a PWA measurement (see section 7.4.2).

Figure 95: Navigation area of the menu item PWA Practice in the "Measurement" section

Note

All successful measurements are automatically stored in the patient database as a single record.

The [Back] or [Measurement] button can be used to return from the result range to the measuring range in order to carry out another new measurement.

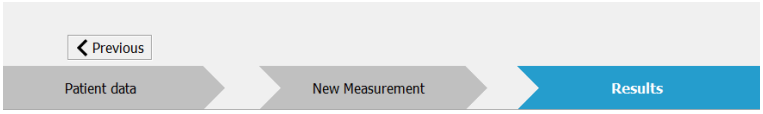


Figure 96: Navigation area of the menu item PWA Practice in the "Results" section

Use the [Exit] or [X] button to return to the main menu.

Figure 97: "Exit" button in the PWA Practice menu

9 Additional buttons

9.1 Print

The [Print] button allows you to print the results.

The scope of the printout, i.e. which tabs are to be printed, can be defined individually; a standard format can be predefined under [Settings] (see Section 4.4.3 - Printout).

The integrated print preview, which is activated by selecting "with preview", allows a preliminary evaluation of the created print pages.

The [Print] button starts the printing process.

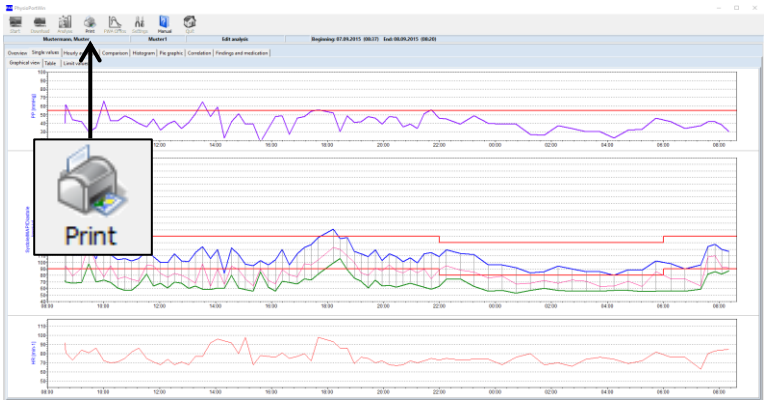


Figure 98: Selection of the menu item "Print"

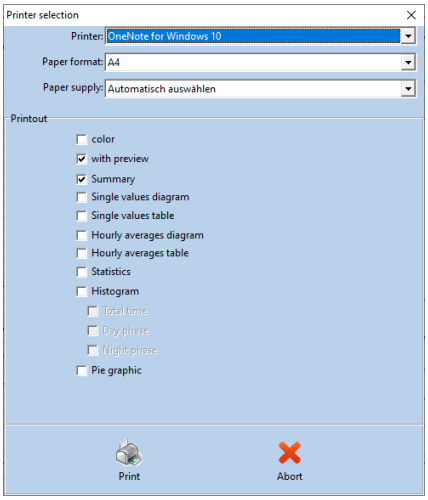


Figure 99: Print dialog

Note

The menu item "Print" can only be selected if a measurement series is open.

9.2 PDF-Export

The [PDF Export] button allows to save the results in PDF format.

The scope of the export, i.e. which tabs are to be exported, can be defined individually; a default format can be predefined under [Settings] (see Section 4.4.3 - PDF Export).

The [PDF Export] button starts the export.

Figure 100: Selection of the menu item "PDF export"

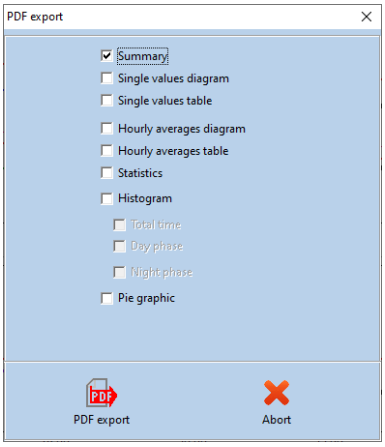


Figure 101: PDF-Export-Dialog

Note

The menu item "PDF export" can only be selected if a measurement series is open.

9.3 GDT - Export to practice-EDP

The [GDT Export] button enables the exchange of patient data and evaluation results between practice/clinic EDP systems and the PhysioPortWin.

This menu is only available if the practice-EDP interface to the PhysioPortWin software is activated under [Settings] (see section 4.4.2).

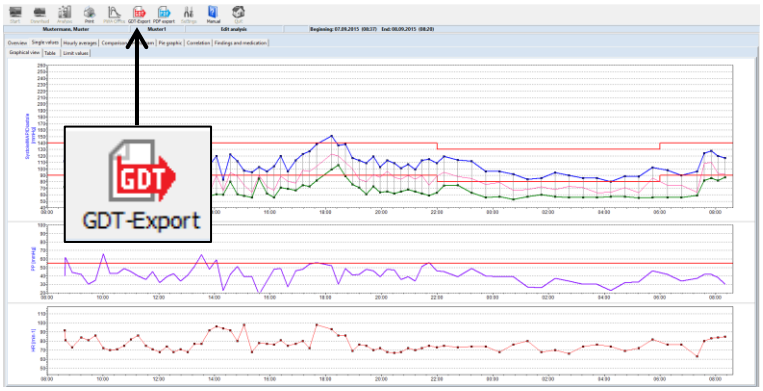


Figure 102: Selection of the menu item "GDT-Export"

With the help of the button [GDT Export], a GDT file is created according to the settings made and stored in the configured directory. The successful creation of the GDT file is confirmed by the software via a dialog.

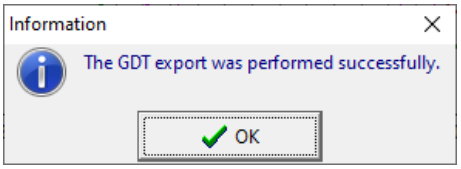


Figure 103: Confirmation of successful GDT export

Note

Only one GDT file can be created at a time for the practice/clinic EDP system. This GDT file is automatically deleted when it has been read by the EDP system. If a GDT file has not yet been read, an error message is displayed.

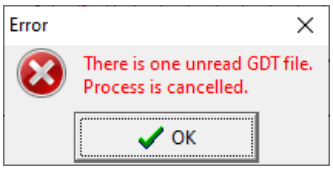


Figure 104: Error message due to an unread GDT file

9.4 CSV-Export

The [CSV Export] button allows you to save the single value table in CSV format and generates a formatted text file with all measured values.

The button can be found on the [Single values] tab with the sub-tab [Table] (see Figure 105), on the [PWA] tab with the sub-tab [Single values] and on the [Overview] tab with the sub-tab [Day/night analysis].

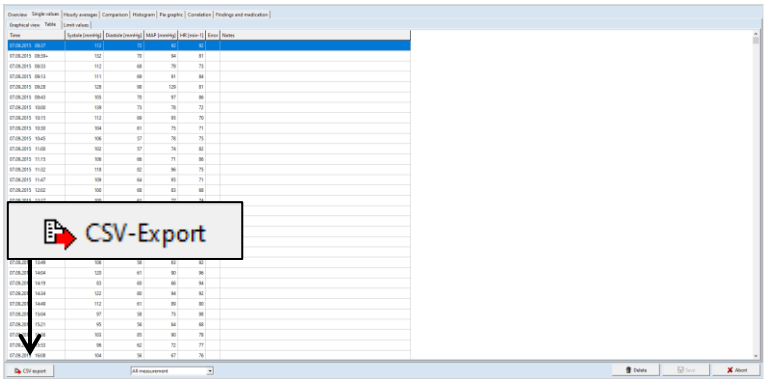


Figure 105: Selection of "CSV export"