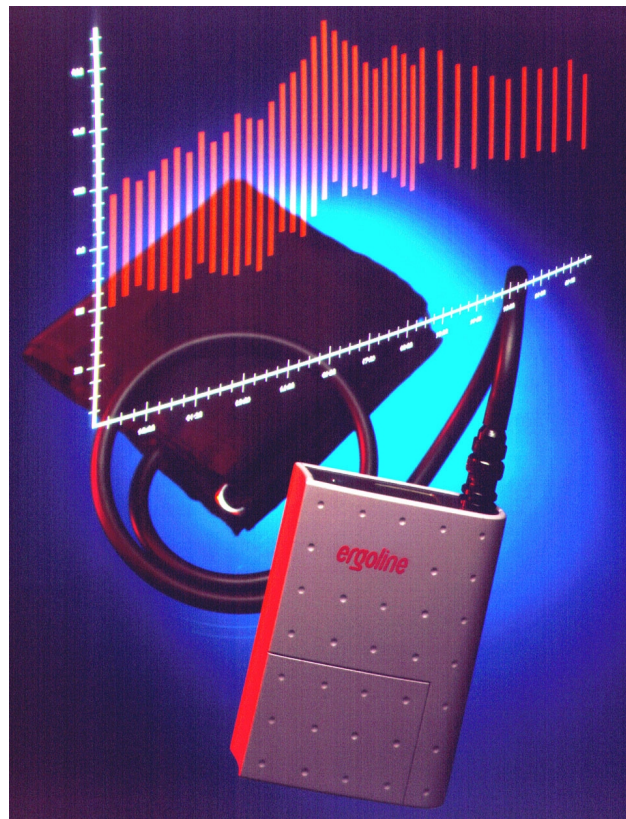


***ergoline***

**Operation Manual**  
**ergoscan 24**  
**24 hour Ambulatory**  
**Blood Pressure Monitor**

Art-No: 475.069 ♦ Version: 01/02

**CE** 0123



## **Operation Manual for ergoscan 24 - 24 hour Ambulatory Blood Pressure Monitor**

Printed in Germany

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This Operation Manual is not registered for automatic update in case of eventual alterations.

Information regarding the latest version is available from the manufacturer.

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## **Declaration of Conformity**

For the following mentioned product

product:           **24-hours blood pressure monitor**

models:           **ergoscan 24**

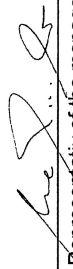
we declare that the product is in conformity with the following standard:

### **EC-Directive 93/42/EEC of the council of June 14<sup>th</sup>, 1993 on medical devices**

The quality assurance system of ergoline GmbH is certified by the TÜV Product Service GmbH, according to EN ISO 9002/1994 and EN 46002/1993, as well as 93/42/EEC Annex V, (CE 0123).

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Bitz, 1<sup>st</sup> January 2002

  
Representative of the management  
for the quality assurance management

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## 1. Quick Reference for Busy Professionals

### 1.1 Software

#### 1.1.1 Software Installation

- ◆ Place CD into CD-ROM drive
- ◆ Select menu item „**Run**” from the windows “**Start**” menu.
- ◆ Select menu item „**Browse**” and select CD-ROM drive (usually “**D:**”).
- ◆ Mark „**Setup**” or „**Setup.exe**” with the right mouse button.
- ◆ Select „**Open**” and confirm subsequently with “**OK**”.
- ◆ Set language version for software in next screen, e.g. “**Englisch (USA)**”, and confirm with „**OK**”.
- ◆ Subsequently follow instructions on screen.
- ◆ Complete installation by confirming with „**Finish**” - computer will start anew.

#### 1.1.2 Attaching the Ambulatory BP-Recorder to the PC

- ◆ Connect the BP recorder with the RS232 interface cable supplied along with the equipment to a free interface (COM1-COM4) on the PC.
- ◆ „**PC**” will appear on the recorder’s display.
- ◆ „**Connection with BPR ESC 024-A 01.5 established**” will appear along the upper edge of the ergoscan 24 window.

#### 1.1.3 Starting the Program

- ◆ Double-click on the program’s start icon on the windows desktop or select „**Programs**” from the start menu, select file “**ergoline**”, and then select from the popup menu the item „**ergoscan 24**”.

**1.1.4 Define New New Patient Record or recall Patient from Patient Data Bank**

- ♦ Select **"Patient Manager"** via menu **"Window"** - **"Patients"**, or select directly via **"F3"**.
- ♦ *To enter a new patient record*, click the **„New“** button on the right side in the patient window.
- ♦ Enter the patient's data according to the mask headers (Name, First Name and Date of Birth are mandatory), then confirm input with **„Save“**, and close **"Patient Manager"** with **"Close"**.
- ♦ *To search for a patient*, enter under section **"Select patient"** the first characters + **"\*"** of a stored patient in text box **"Name"**, e.g. **"Sm\*"** for **"Smith"**, and delete the **"\*"** in text box **"Identification"**; then initiate search by pressing **"Search"**.  
If the patient is already in the data bank, either his name or a list with all patients with the same characters will appear.  
If a list of patients is displayed, click on the requested patient and confirm with **"Accept"**, a.  
Close **"Patient Manager"** with **"Close"**.

**1.1.5 Programming the Recorder**

- ♦ After closing the **"Patient Manager"**, the patient window is displayed.
- ♦ Click on **„Start . .“**.
- ♦ Enter the necessary parameters into the mask as indicated.
- ♦ Set the check boxes in the mask for **„turn on display“** and **„turn on beeper“** by clicking on them so that they show tick marks.
- ♦ Click on **„Start“** in order to transmit the data to the recorder.
- ♦ Confirm the message with **„OK“**.

## 1.2 The Blood Pressure Recorder

### 1.2.1 Attaching the Blood Pressure Recorder

- ♦ Place the cuff, with the tube to the top, on the patient's upper left arm. The tube connection should end up about in line with the middle of the brachial artery (see illustration in Section 5.6).
- ♦ Attach the recorder, with its case, on the belt.
- ♦ Attach the cuff tube to the recorder by sticking the tube onto the Luer-Lock cone and locking it with a quarter-turn twist.

### 1.2.2 Reading the Blood Pressure Recorder

- ♦ Connect the recorder to the PC as described under Section 1.1.2.
- ♦ Click on the menu item „**Window**“, submenu „**Read Blood Pressure**“.
- ♦ The window with the patient's data will appear on the screen.
- ♦ Click on „**OK**“.

### 1.2.3 Data Evaluation

- ♦ Once the data has been read, a graphic evaluation of the means will appear on the screen.



### 1.2.4 Printing Data in DIN A4 Format, Portrait

- ♦ Call up menu „**File**“, menu item „**Print**“.
- ♦ Choose the display type and click on it.
- ♦ Confirm with „**OK**“.
- ♦ Confirm with „**OK**“ in the next window, too.

### 1.2.5 Printing Data in DIN A4, Landscape

- ♦ Call up menu „**File**“, menu item „**Print Setup**“.
- ♦ **Click** on „**Landscape**“ format.
- ♦ Proceed as in Section 1.2.4.

## 2. Introduction

The 24-hours Ambulatory Blood Pressure Monitoring system ergoscan 24 consists of the following components:

Quantity	Description	Art-No
1	ergoscan 24 recorder with carrying case	120.476
1	Blood pressure cuff	220.520
1	interface adapter with cable, six to nine pin SUB-D	220.605
1	CD with evaluation software	

The ergoscan 24 blood pressure recorder was specifically developed for ambulatory blood pressure monitoring. The patient's blood pressure is measured in predetermined time intervals throughout his normal daily routine. The evaluation of these measurements will provide the doctor with an exact „blood pressure picture“ of the patient. The doctor is no longer dependent on sporadic measurements alone.

**The following special features make the ergoscan 24 System distinct:**

- \* Systole and diastolic blood pressures are determined by the oscillometric method.
- \* The VelCro® fastener on the cuff makes it possible for the patient to put the cuff on himself.
- \* Very short measuring period are made possible by processor controlled maximum pump pressure, and the pressure deflation rate being dependent on the actual blood pressure amplitude (relief to the patient).
- \* Erroneous measurements cause an automatic retry after a suitable pause.
- \* Individual measurements may be activated by a green push button on the recorder.
- \* Measured values can be viewed on the recorder's LCD.
- \* Measurement intervals need only to be programmed once according to the doctor's instructions (Recommendation of the „High-pressure League“. Day phase adjustable in 15 minute increments, night phase in 30 minute increments).
- \* Evaluation data can be retained indefinitely. Impact resistant plastic housing prevents damage.

## 3. Blood Pressure Recorder

### 3.1. Technical Specification

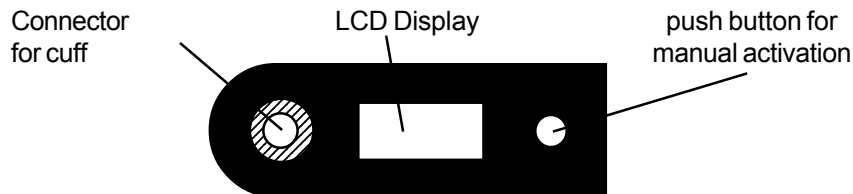
The blood pressure recorder, the actual recording device, is accommodated in an impact resistant plastic housing with dimensions of 111 x 83 x 28 mm.

It consists of:

- \* measurement electronics with Computer and data memory
- \* a pneumatic System
- \* an operating and display unit

### 3.2. Operation

The operating elements on the recorder are:



**Top:**

- Connector for cuff
- LCD display (3x7 segment display)

symbols: Sys = systole  
Dia = diastole  
P = pulse

- push-button for manual activation (supplementary measurement)

**Bottom:**

- slide switch ON / OFF
- jack for interface cable - interface BP recorder to PC

**Front:**

- compartment for batteries

The ON/OFF switch is located on the bottom of the recorder.

1 stands for ON and  
0 stands for OFF

The **START/STOP** button is intended for manual activation of a single measurement or, when a measurement is already in progress, to break off the measurement. The LCD will display resulting measurement values following completion of a measurement by using the abbreviations described above. Values are displayed for about 30 seconds, after which the display is turned off to save battery power.

## 3.3. The BP Recorder's LCD Display

- 888            When a measurement has been initiated, 888 will be shown in the display. The pressure system will be calibrated to the 0 value during this time. Once calibrated, the pump will start. It will pump up the cuff to the pressure required for proper determination of systole and diastole.
- e.g.: 010,025    While the cuff is being pumped up and while air is being released from the cuff the LCD will display the actual cuff pressure.
- e.g.: 139, 82    Following a completed measurement, the values for systole, diastole and heart rate will be displayed alternately in the three character display. Thereafter, the display will be turned off again until the next measurement.
- PC            The ambulatory BP-Recorder is connected to the PC.

### 3.3.1 Error Codes

The most important error codes are listed below:

- E07            Pressure > 320 mmHg
- E08            Pressure increase above 30 mmHg, < 5 mmHg/sec
- E10            Offset + Gain are not calibrated
- E11            Offset deviation is too large (cannot calibrate, measurements are in error)! The unit must be readjusted. Contact an authorised ergoline service location (index in Appendix) for this adjustment.
- E17            Pumping too long (pressure system / cuff is leaking).
- E18            No diastolic pulse up to 150 mmHg.
- E19            Pressure deflation takes too long.
- E20            Not enough pulses to determine frequency.
- E21            Not enough pulses beyond mean maximum to oscillation.
- E22            Not enough valid diastolic pulses.

- E23 No pulse after diastole.
- E25 Not enough pulses prior to mean maximum.
- E26 Not enough valid pulses to determine systole.
- E27 Invalid pulse after systole.

Error codes E17 ... E27 activate a new measurement after about 2 minutes.

### **3.4. Safety and Maintenance**

#### **3.4.1. Safety Instructions**

The recorder is operated by batteries, not an electrical outlet. This eliminates the possibility of endangering the patient with defective electrical installations. The recorder must be kept absolutely dry because the unit's capabilities can be impaired by moisture. Even though the unit may get wet, there will be no danger to the patient. Advise the patient before monitoring his blood pressure that entering a sauna, shower or similar activity is not possible with the device attached.

**The air tube and cuff should be inspected to be intact and new batteries should be inserted each time the recorder is attached to a patient. This should insure that correct measurements can be made over a 24 hour period.**

Type ergoscan 24 ambulatory BP Recorder may only be operated with software released by ergoline.

**Care should be taken to advise** the patient that the attachment of the ambulatory BP Recorder may be detrimental to activities such as operating machines or driving a vehicle.

## 3.4.1.1. Standard Notification

The basis for the operating instructions is formed by the following standards:

DIN EN 1060-1:	Non-invasive Sphygmomanometers; General Requirements
DIN EN 1060-3:	Non-invasive Sphygmomanometers; Expanded Requirements for Electro-mechanical Sphygmomanometers
DIN IEC 62D (Sec.) 76:	Electrical Medical Devices: Indirect Measuring Blood Pressure Monitoring Devices; Special Safety Regulations
DIN EN 60601-1:	Electric medical devices; Part 1: General directions for safety

## 3.4.1.2. Additional Safety Comments:

- ◆ The safety and reliability of the device is warranted when the parts named on Page 10 (device & accessories) are used exclusively.
- ◆ Kinking, squeezing or other diameter reducing actions to the cuff pressure tube should be avoided.
- ◆ After the cuff is placed on the patient's arm, a check should be made to ensure that circulation in the upper arm is still adequate for the device to be worn for the entire 24 hour period.
- ◆ The construction of the device is such that a defibrillator discharge will not affect it.



**The company ergoline is only then responsible for the safety and reliability of the device when:**

- all changes, enhancements, repairs and all other work on the device is carried out by an authorised ergoline person (e.g. authorised ergoline dealer).
- the operating instructions are followed when the device is used.
- maintenance and calibration intervals are maintained.

### **3.4.2 Care**

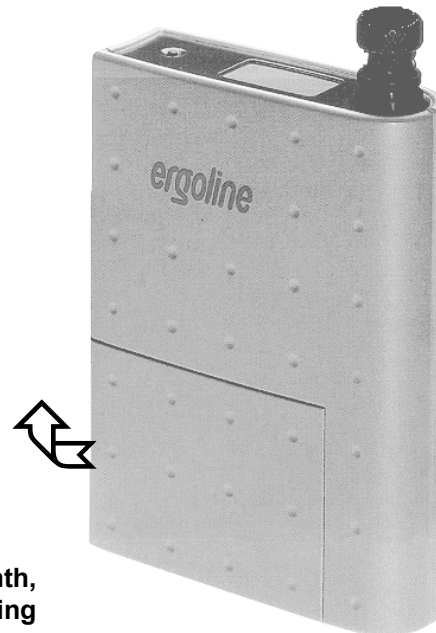
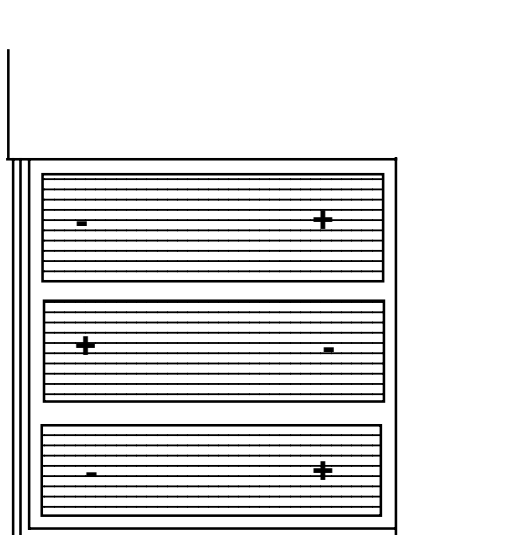
If the unit should become dirty, it may be cleaned with a clean soft cloth, moistened with light soapy water if necessary. Acids and alkalis (household cleaners) are not to be used at any time to clean the unit. Strong disinfectants are also not to be used on the unit. This can lead to severe damage to the housing and/or cuff which may adversely affect the unit's functionality. Disinfectants such as Fugaten spray, Lysoform or Promanurn N are recommended.

### **3.4.3 Maintenance**

The ergoscan 24 blood pressure recorder must **receive maintenance and be calibrated at 24 month intervals**. Maintenance and calibration may only be performed by authorised ergoline service locations. The date of the last calibration will be confirmed by a calibration mark on the unit. This is located in the battery compartment behind the installed batteries.

## 3.4.4. Replacement of Batteries

Open the battery compartment at the front of the unit by lifting the cover (see arrow). Replace the batteries as shown in the diagram.



**Attention:** If the unit is to be out of service for over a month, the batteries must be removed (danger of leaking batteries).

### **3.4.5. Environmental Protection/ Disposal**

The user is responsible for the environmentally safe disposal of consumable. Our products are marked in accordance with the stipulations for recycling and disposal law and the concept has been carried out in a resource saving manner.

## 3.5 The Blood Pressure Monitoring Process

### 3.5.1 Preparing for Blood Pressure Monitoring

Prior to making an appointment with a patient for placement of the blood pressure recorder, he should be informed about the type of clothing he can wear during the test interval (preferably clothing with belt) and about the course of the day.

### 3.5.2 Blood Pressure Monitoring Unit Start and Placement

Program and start the sphygmomanometer as described in Section 5.5. Place the cuff on the patient. If the patient normally performs strenuous activity, advise him that his arm is to be kept calm during measurements as otherwise, error measurements may result. **The patient is to wear the recorder for a period of 24 hours.** Thereafter, he should turn off the recorder to preserve battery current. To read the data into the PC proceed as described in Section 5.1.

### 3.5.3 Patient Instructions

If the cuff becomes uncomfortable during a measurement, the patient can interrupt the measurement by pressing the green push button “**Start - Stop**” on the top of the recorder. The patient should be instructed how to place the cuff correctly on himself so that he can put it on again and continue to record proper measurements if it should slip or become displaced. If the cuff is not positioned correctly, the LCD on the recorder may display error codes. Please observe the safety precautions (Section 3.4.1) as well.

The patient should be advised that the recorder must remain absolutely dry. There is no personal danger to the patient if the unit should become wet, however, if this should happen, the recorder should be turned off and sent to ergoline GmbH for inspection and possibly repair.

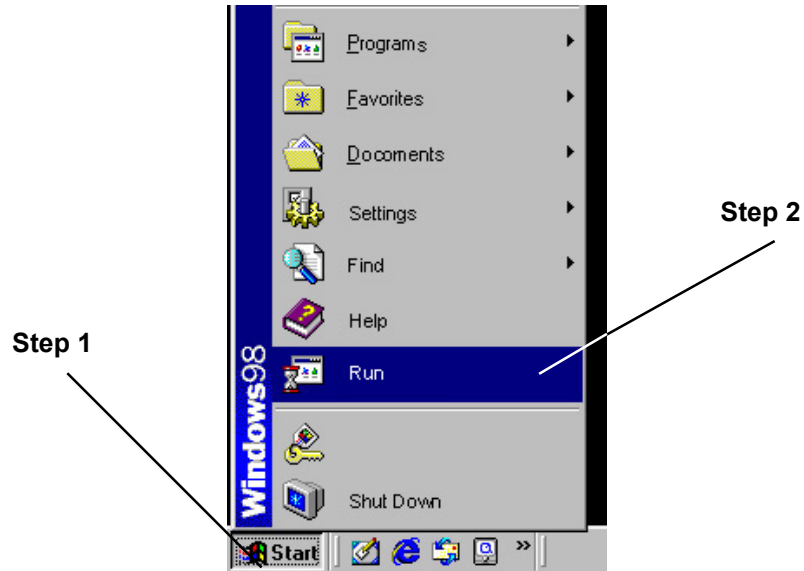
### 3.6. Technical Data

Dimensions:	111 x 83 x 28 mm
Weight:	approx. 250 g, including batteries
Power:	3 batteries, MIGNON LR6 Alkali / Mangan
Battery capacity:	With one set of batteries between 140 and 180 measurements may be carried out. A 24 hour test period conforming to the "High-pressure League" recommendation will result in about 80 measurements.
Display:	LCD for measured values and error codes
Measuring principle:	Oscillometric Measurement Procedure
Measurement range:	
Pulse Frequency	40 to 230 beats
Systolic Blood Pressure	70 to 260 mmHg
Diastolic Blood Pressure	40 to 150 mmHg
Test memory:	up to 320 complete measurements, data can be stored indefinitely
Test duration:	patient dependent - between 30 and 45 seconds
System requirements:	PC (80486) with a clock rate of at least 66 MHz and operating system Windows 95/98/2000 or Windows NT; hard disk with at least 10 MB of free disk space; graphic printer

Intended usage specs:	temperature range: +10°C to 40 °C
relative humidity:	10% ..... 85%
air pressure:	700hPa to 1060 hPa
voltage:	2.8 V - 4.5 V
current draw:	about 300 mA while pumping up about 140 mA while releasing pressure about 80 mA during calibration and display about 300 µA in standby operation

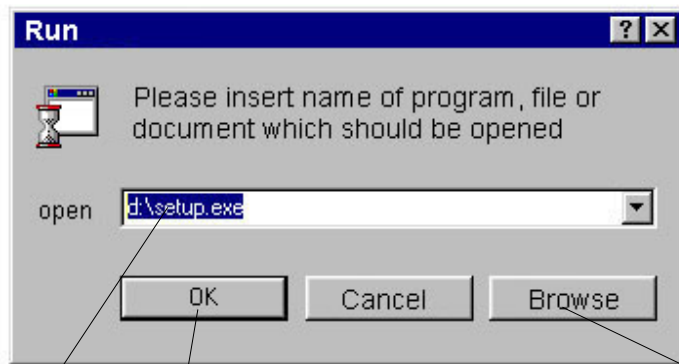
## 4. Installation of Software

### 4.1. Calling Up the Installation Program



Select the menu item “**R**un” from the start menu.

## 4.2. Choosing the Installation Program



- 1) Place CD into CD-ROM drive
  - Select „**Run**” from windows “**Start**” menu.
  - Select menu item „**Browse**”
- 2) Select CD-ROM drive (usually “D:\”.)
  - Mark „**Setup**” or „**Setup.exe**”
  - Select „**Open**”
- 3) To begin with the installation confirm with “**OK**”.

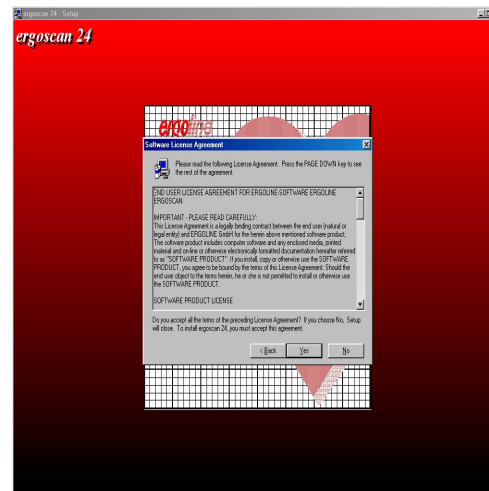
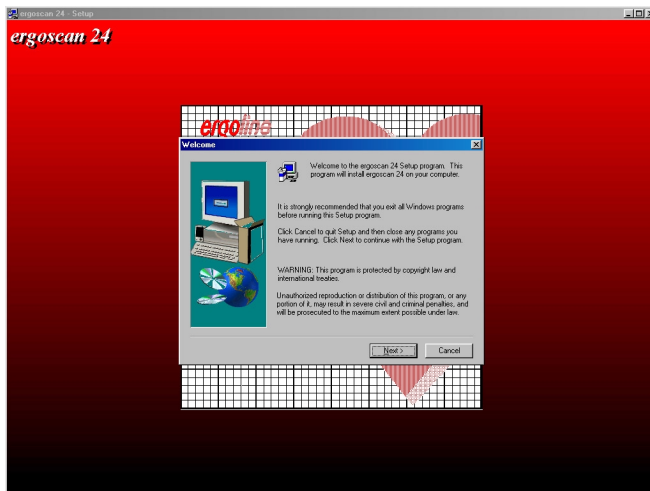


### 4.3. Select Language for Software

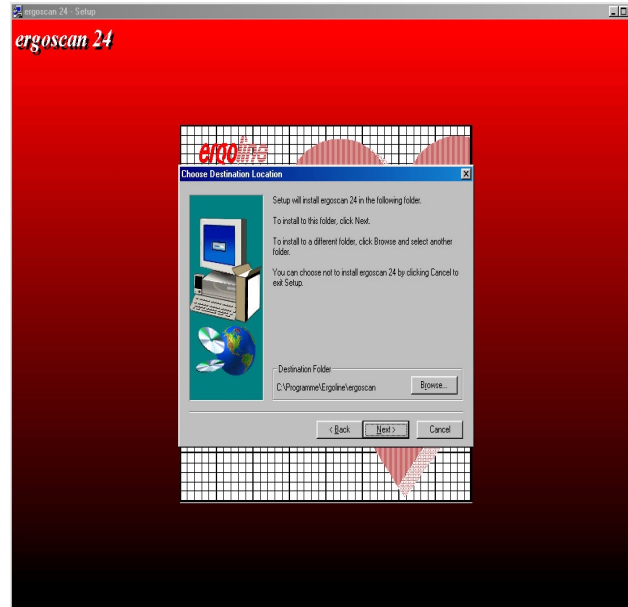


Select language for the evaluation software, either “**Deutsch (Standard)**” or “**English (USA)**”. Confirm with “**OK**” to proceed with the installation.

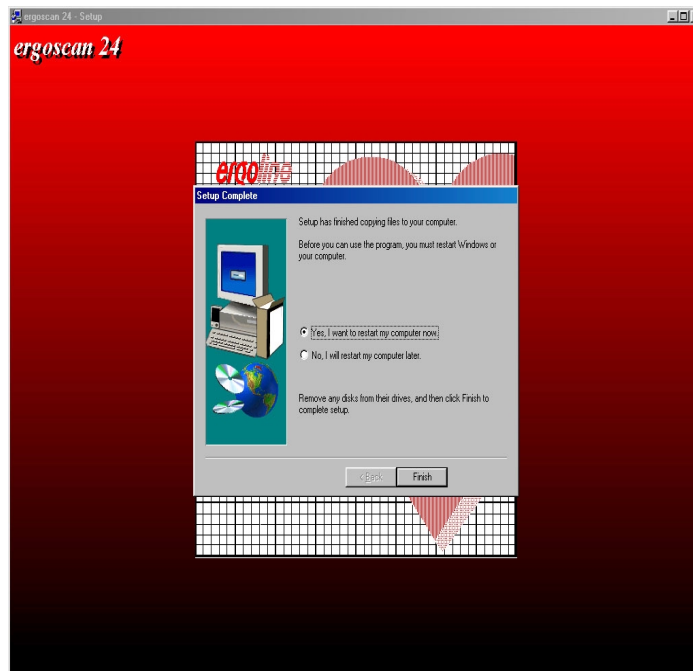
## 4.4. Installation Procedure



Prior to installation, your confirmation to the licence agreement is required. Upon confirmation with „Yes“, the installation does continue.



You will be asked to complete the window above to give all the required information to the installation program. This window appears automatically after the installation program has been started. If you should decide to use another path to install the program, you may enter your choice here. Click on “**Continue**” to proceed with the installation.



In order to complete the installation, a restart of the PC is required. Click on button „**Finish**“. Thereby, the installation will be completed, and the PC is started anew in order that all software entries become effective.

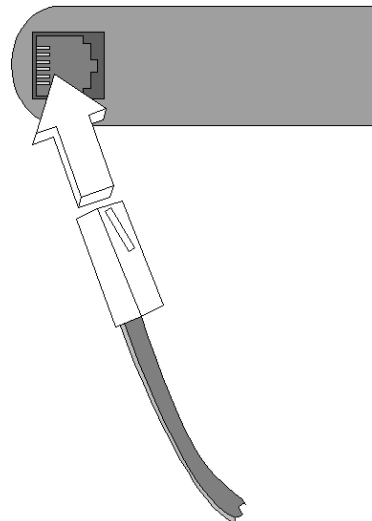
## 5. Preparing the Monitoring System for Measurements

### 5.1. Connecting the Blood Pressure Recorder

Connect the blood pressure recorder to a free COM port (COM1, COM2, COM3 or COM14) on the PC with an RS232 cable. The display of the recorder will now show "PC". The message "no sphygmomanometer attached" along the upper edge of the ergoscan 24 window will now change to "**connection with BPR ESC 024-1 01.5 established**".

#### Note:

The sequence in which you carry out items 5.1 and 5.2 is of no importance. However, prior to executing item 5.3, both of these items should be completed.

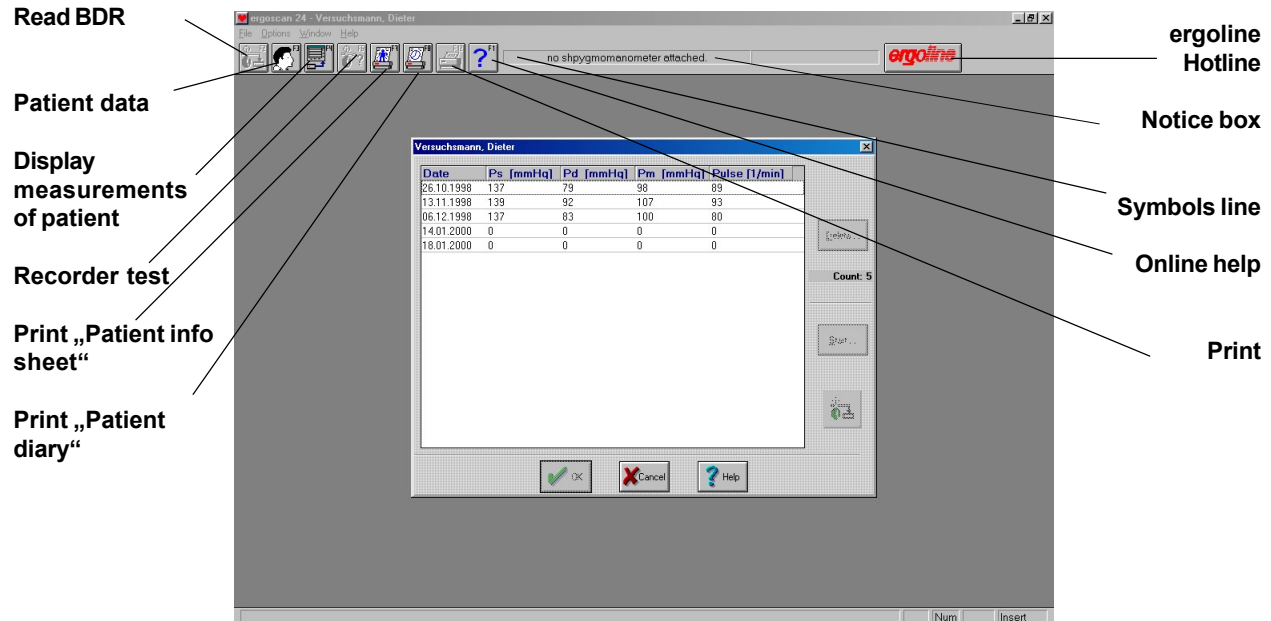


## 5.2 Starting the ergoscan 24 Program

Start the program with a double-click on the desktop icon or via

„Start menu“ - „Programs“ - „ergoline“ - „ergoscan24“

The primary window of the application, as shown below, will appear on the screen:



### 5.3 Recall Patient Record from the Data Bank

**1.** Call-up „Patient Manager“:

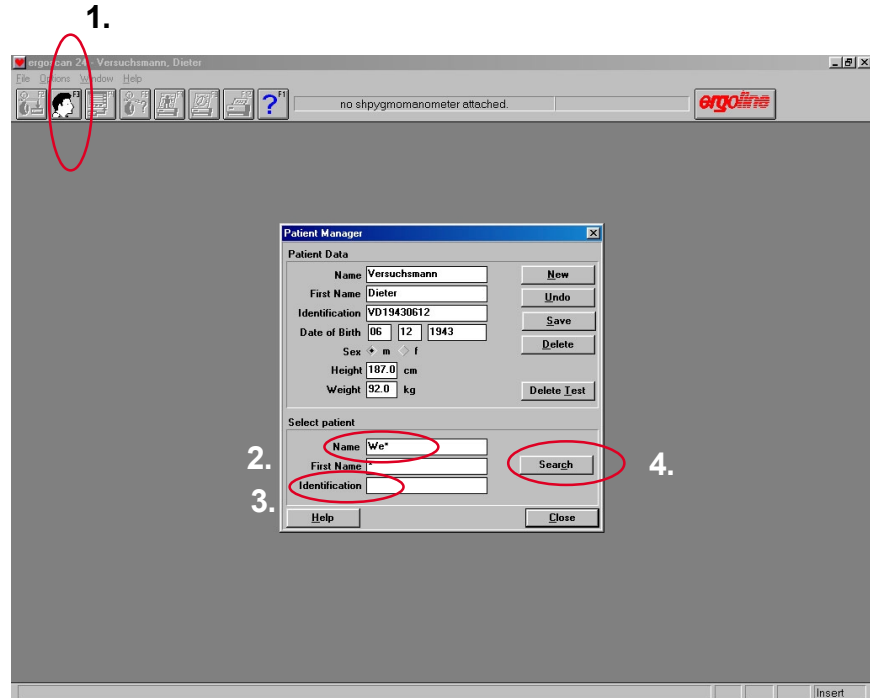
- via patient symbol
- or
- via function key “F3”

The data of the current patient are displayed.

**2.** Enter in box „Name“, the first characters (with „\*“ at the end) of the required patient.

**3.** Delete in box „Identification“ the character „\*“.

**4.** Initiate search by pressing „Search“.



# Preparing BP measurem.

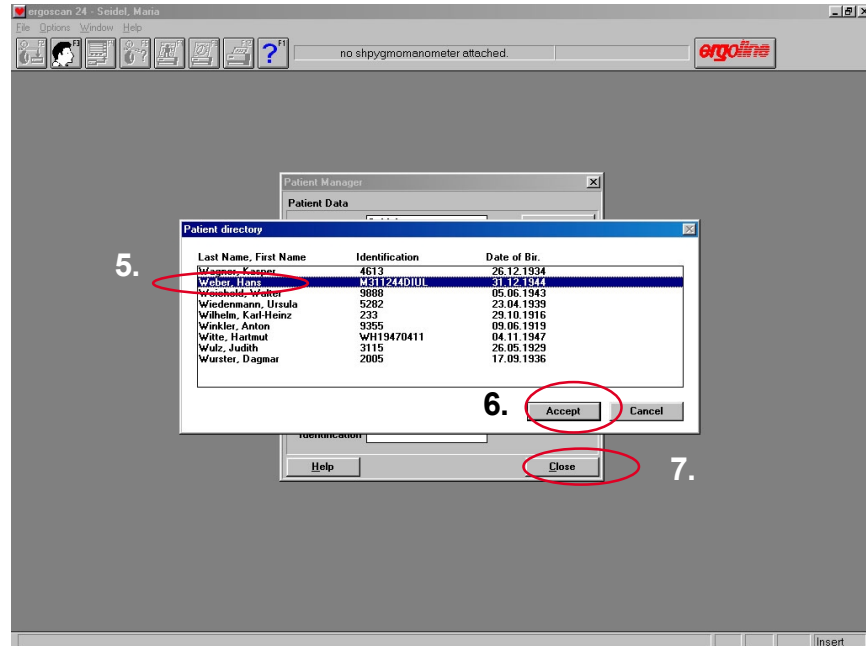
ergoscan 24

If only a single patient with this initial characters is stored in the data bank, then the patient data are directly taken over. Otherwise, a chart with all patients with the same initial characters will appear.

5. Selecting the requested patient with the left mouse button (highlighted in blue).
6. Confirm selection with „OK“ .  
The list of patients is closed.
7. Subsequently, close the „Patient Manager“ with button „Close“.

## Note:

As alternative, it is also possible to search a patient using his „Identification“.





## 5.4. Creating a Patient Record

### 1. Select "Patient Manager"

- via patient symbol
- or via
- function key „F3“



The data record of the current patient is displayed.

### 2. With button „New“, all input boxes of the patient data are cleared, and now the data of the new patient can be entered.

#### Note:

- \* The next input box can be selected by pressing the tabulator key on the keyboard.
- \* The date of birth has to be entered in form: „DD.MM.YYYY“.
- \* In case, no entry 's done in text box „**Identification**“, then the patient identification is generated automatically out of the patients initials and has date of birth, e.g. „**SM19600120**“ for Smith Michael, born on Jan. 20, 1960

### 3. After confirmation with „Save“, the patient data are stored in the data bank .

### 4. Subsequently, close „Patient Manager“ with button „Close“ .

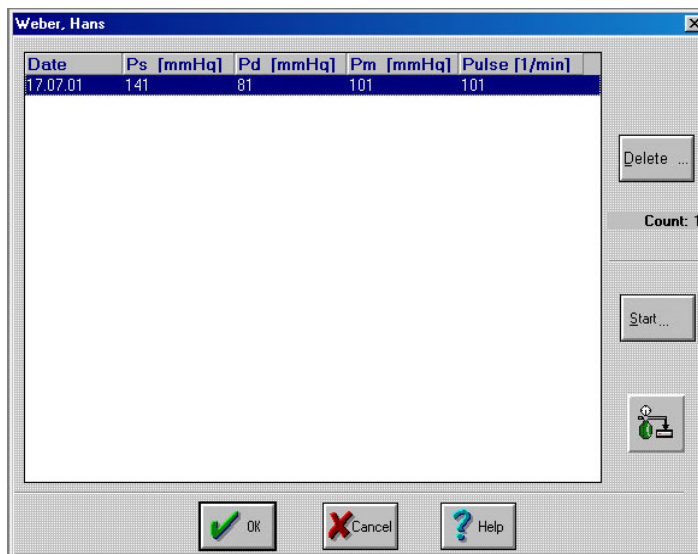
2.

3.

4.

## 5.5. Programming the Recorder

Once you have located the patient's record in the database, or created a new record for him, as the case may be, click on the **“Start...”** button in the patient window.



### Note:

The button „Start ... “ and symbol

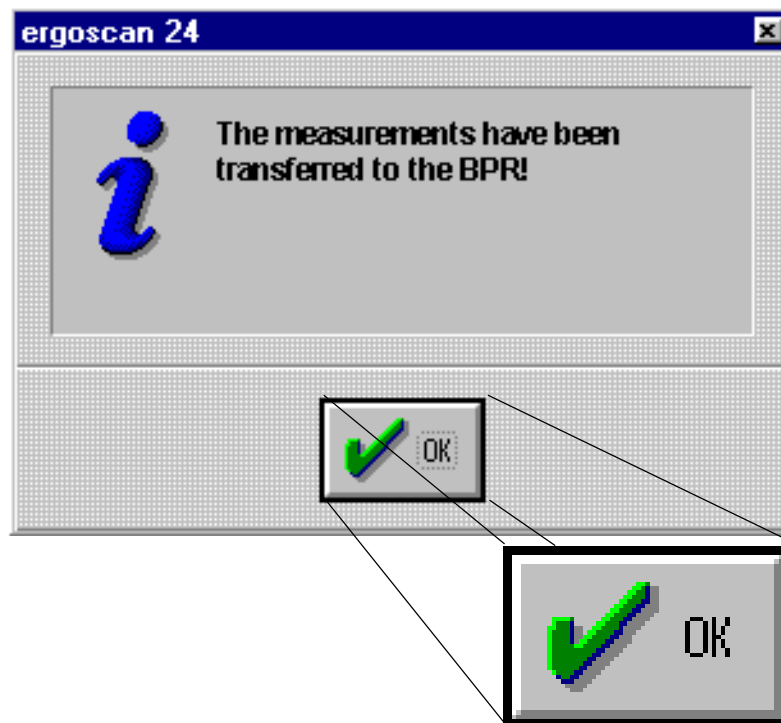


( for **reading data**) in the measurement window, will only become active when a blood pressure recorder is being connected.

The program itself will make suggestions for the programming of the recorder. You can accept these by simply clicking on the **“Start”** button. If you wish to make changes to the default settings, enter the appropriate data into the fields of the data window. Take care to ensure that the check boxes for **„turn on display”** and **“turn on beeper”** are marked with check marks when programming the recorder. If they aren’t already so marked, then mark them accordingly so that the display of the recorder and beeper will be activated. Be sure that your entries make sense and do not lead to time overlaps. Once all the data have been entered, click on **“Start”** so that the entries will be transferred to the recorder.

## Preparing BP measurem.

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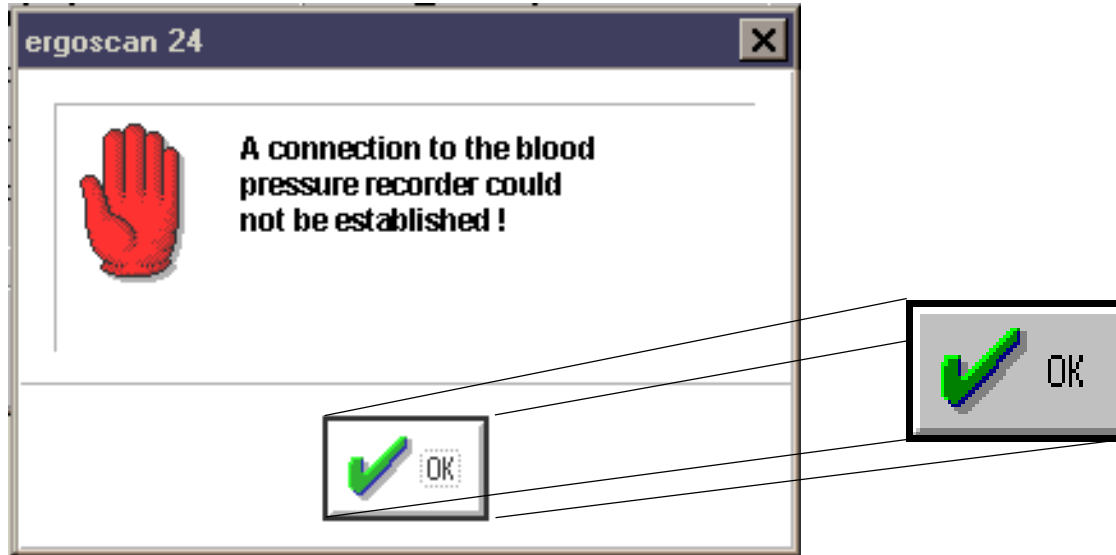


Please also observe the instructions in Chapter 6, Item 1, "**Connect Re-corder**".

The message box, as shown above, will appear after the data has been successfully transmitted to the recorder. Confirm this message by clicking on "**OK**".

**Note:**

If transmission to the recorder was not possible, the warning message, as shown below, will appear. Please confirm this message by clicking on the “OK” button.



If this message appears, check:

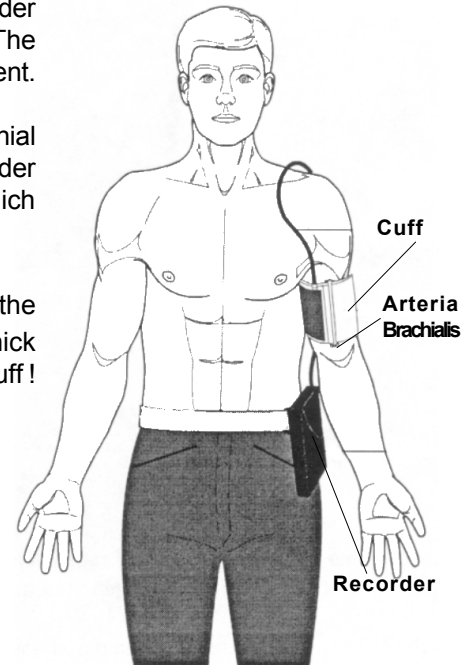
1. the connection between PC and recorder and
2. the condition of the batteries.

### 5.6. Connecting and Attaching the Cuff

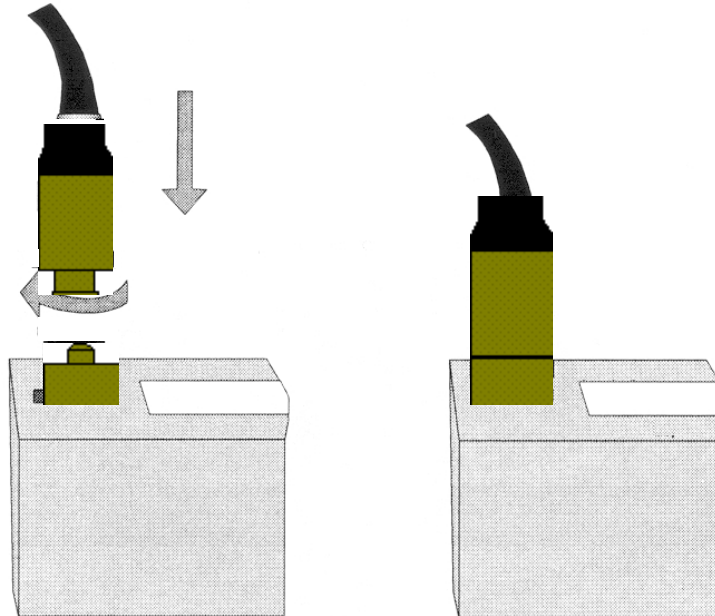
Disconnect the cable between the recorder and PC. The programmed recorder will now switch over to the ready state. The display on the recorder is off. The recorder will start automatically at the time of the first scheduled measurement. Place the cuff on the arm of the patient as follows:

The spot on the cuff marked with a cross should end up in line with the brachial artery. The tube of the cuff should be routed up and over the patient's shoulder and then down to the recorder. The recorder itself is in a carrying case, which has a loop, so that it can be comfortably worn on a belt.

**Note:** The patient may wear a thin T-shirt or light shirt beneath the cuff. Loose clothing can also be worn over the cuff. Thick clothing, e.g. pullovers, should never be worn under the cuff !



Fix the connector of the air tube of the cuff to the hose connector on the recorder by pushing the tube onto the connector and making a quarter-turn twist.







## 6. Reading the Recorder after the Measurement Period

### 6.1. Connecting the Recorder

Connect the blood pressure recorder to a free COM port (COM1, COM2, COM3 or COM4) on the PC with the RS232 interface cable.

On the display of the recorder appears now :

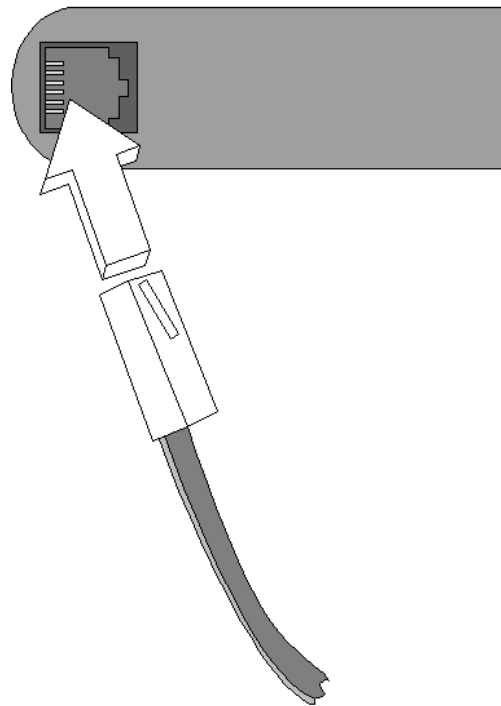
„PC“

The message at the upper edge of the ergoscan 24 window will change from :

„*no sphygmomanometer attached*“,

to

“*connection with BPR ESC 024-A 01.5 established*”



## 6.2. Reading the Stored Data



The current patient data present in the recorder are displayed in this window. Click on the “OK” button to read in the data.

### Note:

If the patient data are not shown when the read-in window is displayed or the display along the upper edge of the window changes to

***“no sphygmomanometer attached”,***

battery voltage is no longer sufficient.

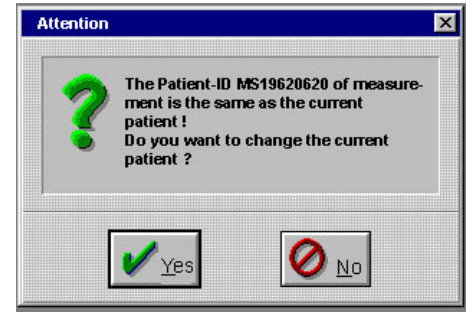
Please put new batteries in the recorder.

The screenshot shows a dialog box titled 'Measurements read in for patient'. It contains several input fields and a summary section. The 'Name' field is filled with 'Weber', and the 'First Name' field is filled with 'Walter'. The 'Date of Birth' field is filled with '14.02.29'. The 'Sex' field has two radio buttons: 'männlich' (selected) and 'weiblich'. Below these fields is a section titled 'Number of measurements' which contains a table with the following data:

Total	76
error readings	2
repeated readings	3

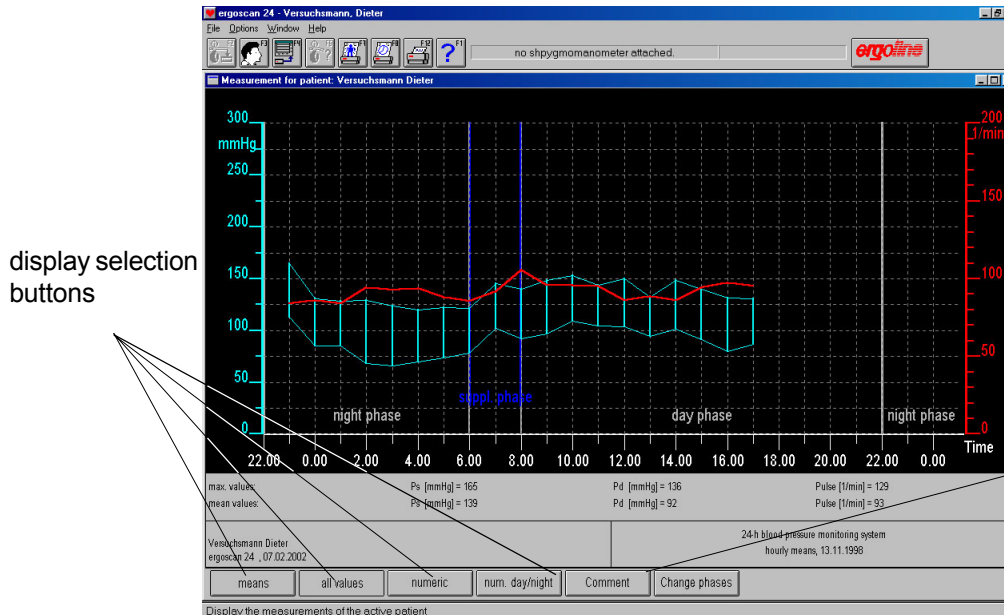
At the bottom of the dialog box, there are three buttons: 'OK' (with a green checkmark icon), 'Cancel' (with a red X icon), and 'Help' (with a question mark icon).



**Attention:** In case, the stored patient/measurement data in the recorder should be transferred to **another PC**, and the patient record is not contained in the PC's data bank, the corresponding comment is displayed. In such a case, the patient record can be entered subsequently, too.  
- the identification has to be exactly the same..



## 6.3. Evaluation

A graphic evaluation of median values will appear automatically after the data has been read in from the recorder. By clicking on the desired selection button you can display any of the values or switch to the numeric display. Furthermore, commentary can be added to complement the measurement.



Individual measurements can also be displayed numerically by pressing the button  in the evaluation window. When the button  is subsequently pressed, the original graphic display will appear again.

**Numeric Display**



☒ display hourly averages
 ☐ display error measurements and ignored measurements

☒ display all values

Patient: Versuchsmann, Dieter Date: 13.11.1998

Time	Ps [mmHg]	Pd [mmHg]	Pm [mmHg]	BP-Ampl.	Pulse [1/min]
23:00	165	113	130	52	84
00:00	130	85	100	45	86
01:00	128	85	99	43	84
02:00	129	68	88	61	94
03:00	123	66	85	57	93
04:00	120	69	86	51	94
05:00	122	74	90	48	88
06:00	121	78	92	43	85
07:00	145	102	116	43	91
08:00	139	92	107	47	105
09:00	148	97	114	51	95
10:00	152	109	123	43	95
11:00	143	104	117	39	95

Maximum values: Ps: 165 Pd: 136 Pulse: 129  
 Average values: Ps: 139 Pd: 92 Pulse: 93

Delete ...  

# Evaluation

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The values for day and night phases can also be displayed as mean and maximum values. By activating the



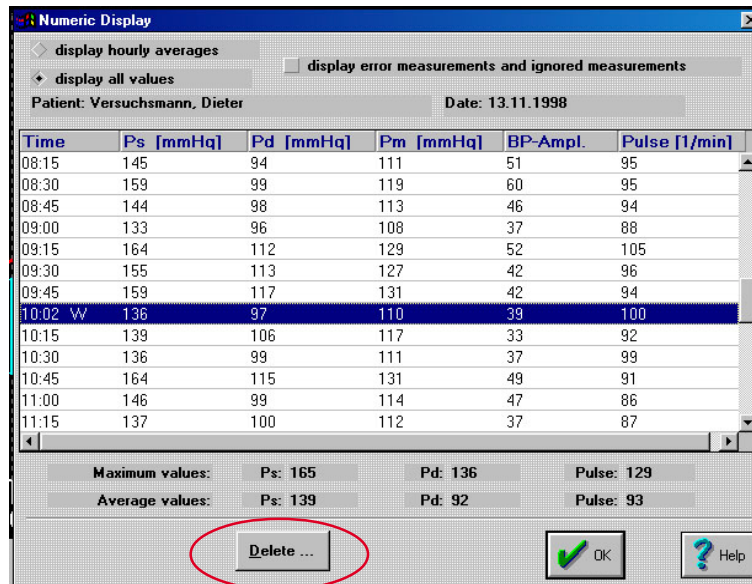
button, the original graphic display will appear again.

Day / Night phase numeric display							
	Total time:		Day phase:		Night phase:		Day ->
	22:37 - 17:30		08:00 - 22:00		22:00 - 06:00		Night:
	Avg	Max	Avg	Max	Avg	Max	
Ps [mmHg]:	139	165	142	164	127	165	-10 %
Pd [mmHg]:	92	136	96	117	77	113	-19 %
Pm [mmHg]:	107	145	111	131	94	130	
BP-Ampl.:	46	65	45	63	49	62	
Pulse [1/min]:	93	129	93	105	88	98	-5 %
Measurement count:	69		40		16		
Repeat measurements:	3		1		1		
Error m. and ignored meas.:	2		1		1		
	Count	%	Count	%	Count	%	
Ps > 140 mmHg:	30	45	21	54	1	7	
Pd > 90 mmHg:	40	60	29	74	3	20	
Pulse > 100 / min:	8	12	4	10	0		

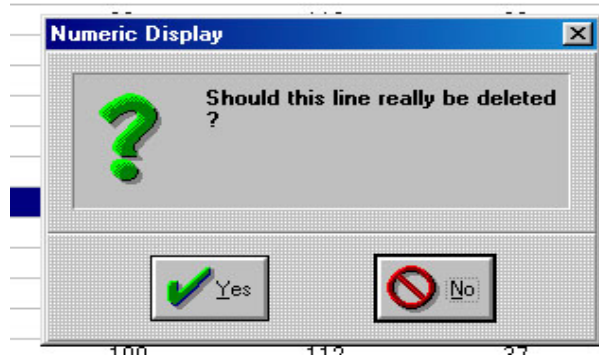



If one or more measurements appear to be obviously erroneous measurements, even though this was not indicated by either the program or the recorder, you can delete these values later-on. To do this, go into the numeric evaluation window and click on the line with the flawed value. This will then be displayed with a blue background and the “Delete” button at the bottom edge of the window will be activated.

Now click on the “Delete” button.





As soon as you have clicked the “Delete” button in the numeric display window, the dialogue box shown below will appear.

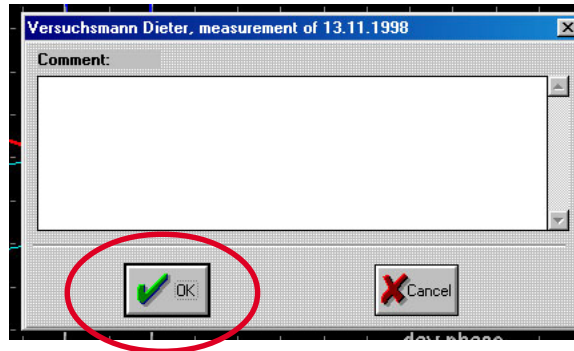


Upon confirmation with „ “, this measurement is deleted, and the this values are no longer used for the evaluation.



If you wish to add a comment to this patient's measurement, this can be done from the evaluation window. This commentary will then be printed out with the presentation of measurement data when that is done. To enter a comment, click on the button  in the evaluation window. The window illustrated below will then appear.

Here you can enter any desired comment. Click on the  button to conclude the operation and return to the evaluation window.

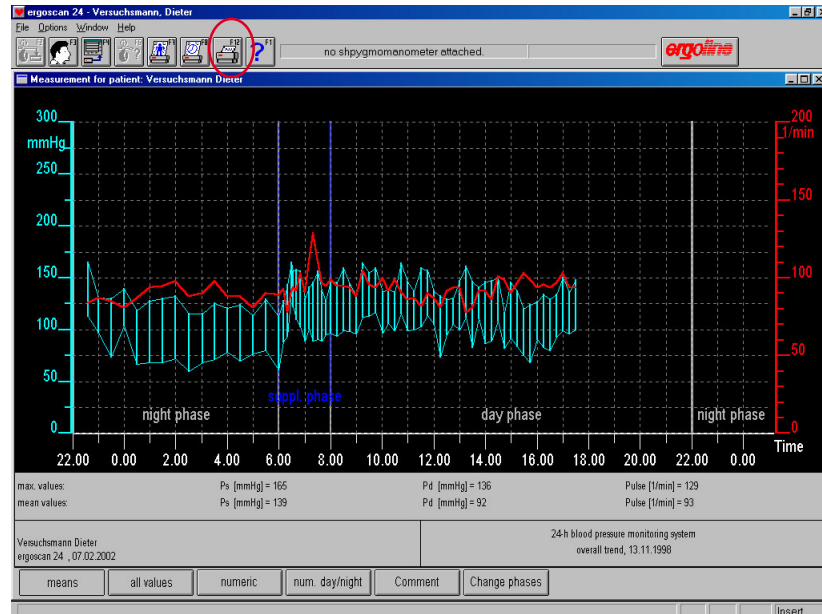


## 6.4. Printing Measurement Results

The measurement results remain in your database for as long as you continue to need them. They can also be called up as often as you like. However, it is sometimes helpful to make printed versions of these measurement results so that they can be included in the patient's file or in a diagnostic folder. Dependent upon the number of measurements that were programmed, these can be printed for evaluation in either the portrait or landscape modes.




Printing can be started by clicking on the “**Print**” tool in the toolbar..

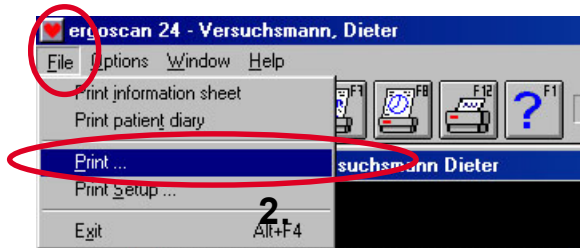


### 6.4.1 Printing Measurement Results in DIN A4 Format

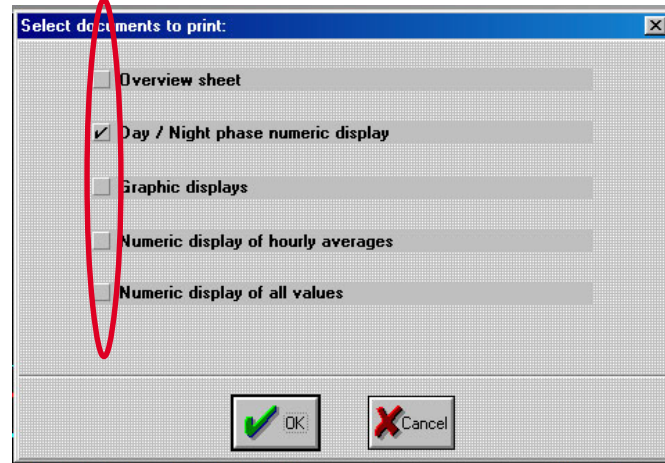
Printing can also be initiated with the function key <F12> or from the tool bar. To start printing from the tool bar select “**Print**” from the “**File**” menu. A new window then will appear in which you can specify the type of representation that you wish to have printed.

Use the check boxes in this window to make these specifications and then click on the  button to complete the operation

1.



3.



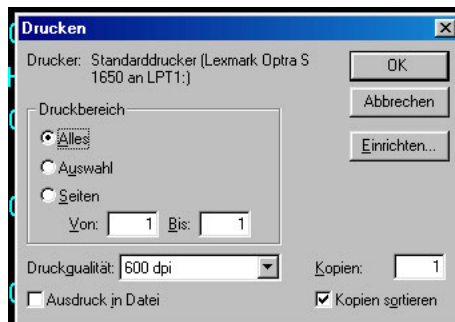
Enter the number of copies that you wish to have printed in the window that now appears. You already made the entries for print range in the previous window, however, these can certainly be altered again here if desired. Printing will result in a total of six pages whereby these individual pages are split up as follows:

- Page 1:        numeric presentation of day/night phases  
                graphic presentation of hourly mean values
- Page 2:        numeric presentation of day/ night phases
- Page 3:        graphic presentation of hourly mean values  
                graphic presentation of all values
- Page 4:        numeric presentation of hourly mean values
- Pages 5 & 6:    numeric presentation of all values.

When you have made your selection, click on

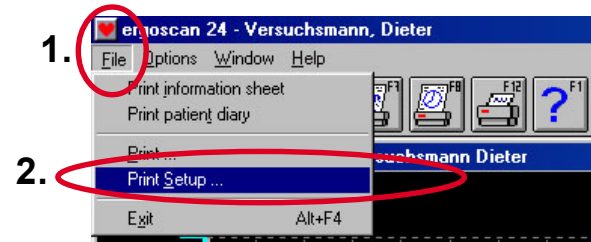


. The printer will then be started.



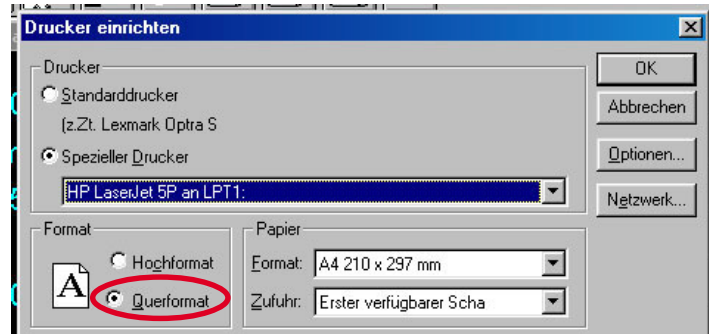
### 6.4.2. Printing Results in Mode „DIN A4 Landscape“

If you have collected many measurements in the recording, it may be advisable for an exact evaluation to print the results in mode “DIN A4, landscape”. This can be done by clicking on the **“Print setup”** menu item from the **“File”** menu.



In the window that follows, click on **“Landscape”** and then on **“OK”**. The evaluation window will reappear. Now proceed as described in Section 6.4.1.

3.



## 7. Additional Measurement Settings

### 7.1 Setting Error Measurement Limits

The limits, which determine which measurements are in error during the recording, can be set in the dialogue window called up by the menu item “**Test error criteria**” in the “**Options**” menu. When measurements are to be re-evaluated, as described in Section 6.3 “**Evaluation**”, the limits can be established here.

The dialog box is titled "Criteria for statistical evaluation and repeat measurements". It contains two main sections: "Criteria for statistical evaluation" and "Criteria for repeat measurements".

**Criteria for statistical evaluation:**

- Systolic limits:** Maximum: 140
- Diastolic limits:** Maximum: 90
- Pulse limits:** Maximum: 100


**Criteria for repeat measurements:**

- Systolic limits:** Maximum: 200, Minimum: 80
- Diastolic limits:** Maximum: 140
- Pulse limits:** Maximum: 150

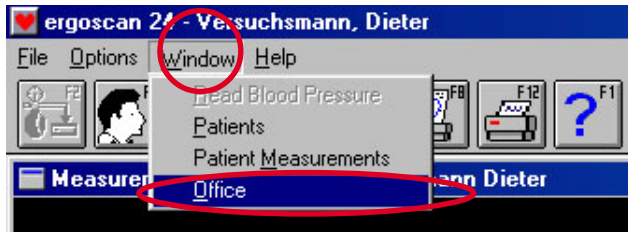
At the bottom, there are four buttons: "OK" (with a green checkmark icon), "Cancel" (with a red X icon), "Help" (with a blue question mark icon), and "Standard".

## 8. Test Functions and General Settings

### 8.1 Entry of Surgery or Clinic Identification

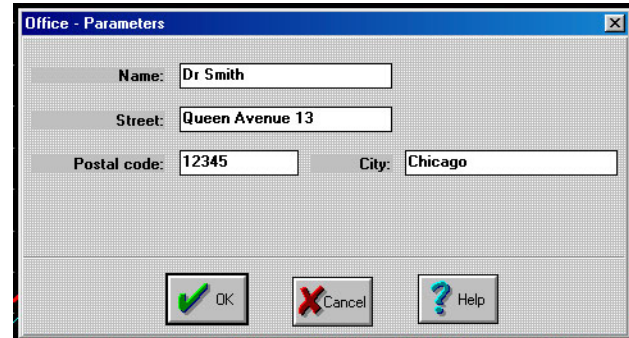
The window for entering office or clinic identifying information is reached from the menu “**Window**”, menu item “**Office**”. Once the  button is clicked, this data are established, and will then appear on every print-out.

1.




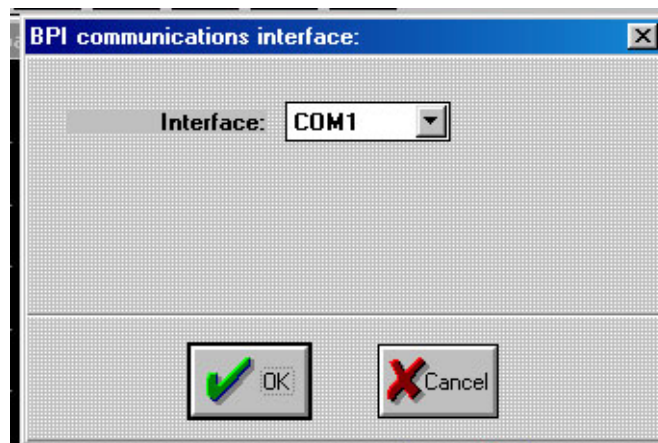
2.

3.



### 8.2. Changing the Interface

Normally COM2 is used as the interface port for the recorder. If you want to use another port, it can be selected from the dialogue box reached by the menu item **"Interface"** in the **"Options"** menu. Open the list box field labelled **"Interface"** by clicking on the down arrow and then click on one of the COM ports offered in the list. Once the  button is clicked, the selected port will become the interface responsible for handling the recorder.






### 8.3. Recorder Test

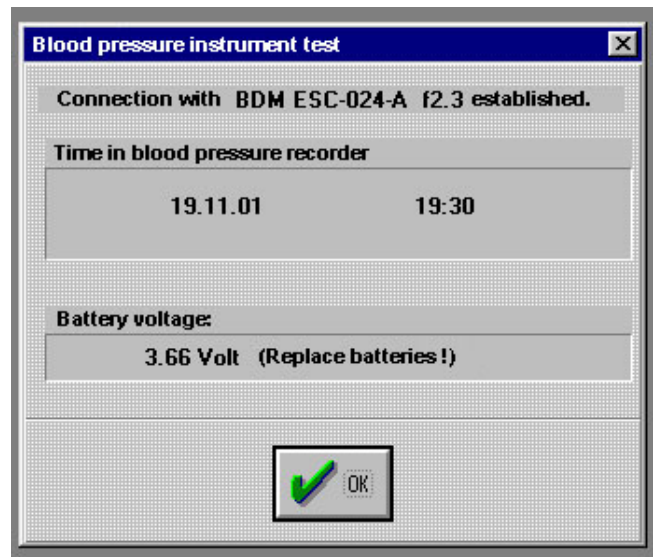
A quick test of the recorder is available under the menu item

Menu „**Options**“ - Menu item „**Instrument test ...**“

This test reads the date, time and battery voltage from the recorder. You terminate the test by clicking on the button 

#### Note:

The computer's current date and time are transmitted to the blood pressure recorder each time that it is started anew.



**Note:** The date and time can only be read out of the recorder when it has been already used once since otherwise the real-time clock in the recorder has no start value. Lack of a valid clock value is indicated in the window with “?”. A battery voltage must always be shown except when the battery voltage is too weak to operate the interface of the recorder.

**Please consider:** Even when a sufficient voltage is indicated, a new set of batteries should be inserted each time before the recorder is attached to a patient. This is because the power consumption is so great that used batteries would not likely be able to carry out all of the programmed measurement cycles.

### Abbreviations:

BPR	=	blood pressure recorder
Sys	=	systolic blood pressure in mmHg
Dia	=	diastolic blood pressure in mmHg
P	=	pulse (min <sup>-1</sup> )





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