AMEDTEC ECG pro®

CardioPart 12

12-Lead ECG

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Instruction Manual

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AMEDTEC *ECGpro CardioPart* 12 fulfils the general demands of the directive 93/42/EEC for medical products as well as the regulations of the Medical products Act.

AMEDTEC Medizintechnik Aue GmbH maintains a certified quality management system according to DIN EN ISO 13485 and a certificated quality assurance system according to MDD 93/42/EEC, Annex II.

This Instruction Manual refers to the software version declared on the enclosed CD.

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Intended Use

The devices CardioPart 12 USB and CardioPart 12 Blue as well as the user software are designed for recording, analysing and storing the 12-channel resting and exercise ECG.

It can be used with adults, adolescents, children, infants and newborns of all ethnic groups.

The devices and the software are intended for use in clinics, hospitals, medical care centres and medical practices.

The devices may only be operated on the patient on doctor's orders. Only trained and instructed medical personnel may apply the electrodes and operate the device and user software.

With the exception of the electrodes, the CardioPart 12 USB and CardioPart 12 Blue are not intended for direct contact with the patient's skin.

Indication

The resting ECG is used to clarify the following symptoms:

- Diseases of the cardiovascular system
- Myocardial ischemia
- Myocardial infarction in patients with chest pain
- Heart hypertrophy
- Cardiac arrhythmia
- Disorders of the electrophysiology of the heart
- Disturbances of the pacemaker and stimulus conduction systems

The resting ECG can also be used to screen for cardiac abnormalities and to evaluate pacemaker functions.

The exercise ECG is performed:

- for clarification of thoracic pain
- to record the physical resilience
- in patients with cardiac risk factors
- for the assessment of residual haemorrhage
  - after myocardial infarction,
  - after revascularisation using interventional techniques, or
  - after aortocoronary bypass surgery

Contraindications

Contraindications only apply to the exercise ECG:

- Acute coronary syndrome
- Symptomatic high-grade aortic valve stenosis
- Decompensated heart failure
- Acute pulmonary embolism
- Acute inflammatory heart disease
- Acute aortic dissection
- Blood pressure crisis at rest >180/100 mmHg
- Acute leg vein thrombosis
- Acute severe general illness
- Extracardiac diseases with clearly limited life expectancy (≤ 6 months)

Description

The devices CardioPart 12 USB und CardioPart 12 Blue are connected to a PC on which the AMEDTEC *ECGpro* user software is installed.
The devices convert the ECG signals recorded via electrodes into digital signals and transmits the digitized ECG to the software.

The software controls the device and displays the ECG on the computer monitor during recording. The user software also controls other devices, such as bicycle ergometers and blood pressure monitors. Once the recordings have been finished, they are stored.

The CardioPart 12 WLAN, on the other hand, records ECGs independently without being connected to a computer. After saving the recording, it is transferred to the central database.

When they have been stored, the recordings can be viewed, edited, and printed. Optionally, the recordings can be transferred to a hospital or practice network for further use. The unit reads and processes data from the hospital information system and practice software.

All features and their operation are described in the **AMEDTEC ECGpro CardioPart 12** manual.

The software runs locally or in a network.

The software was developed for the Windows operating system and runs on PCs with Intel or Intel-compatible processors. Information about the supported operating systems can be found in the **AMEDTEC *ECGpro* installation manual** in the section **Hardware and software requirements**.

The CardioPart 12 USB and CardioPart 12 Blue devices as well as the AMEDTEC *ECGpro* application software are in Risk Category IIa as per MDD, Appendix IX and <u>are not</u> approved for applications with direct contact with the heart.

The safety regulations listed in the instructions for use for the CardioPart 12 USB and CardioPart 12 Blue devices apply.

Operation of the CardioPart 12 WLAN is not covered by this document.

For information on using the CardioPart 12 WLAN please refer to the **AMEDTEC *ECGpro* CardioPart 12 WLAN Instruction Manual**.

Putting into Operation

Connecting Devices

1. Mains Connection

Operate all devices which belong to the ECG system in the same circuit. Such devices - besides PC, monitor and printer - may be suction electrode equipment, bicycle and treadmill ergometers, blood pressure measuring instruments and others.

Arrange **non-medical electric devices (PC, printer, monitor)** in such a way that the distance between these devices and the patient is **at least 1.5 metres**. If this distance is not guaranteed, these devices must be operated through a safety isolating transformer. The safety isolating transformer must fulfil the demands of IEC 60989. Observe the **safety instructions** as laid out in instruction manuals of AMEDTEC *ECGpro* CardioPart 12 USB and AMEDTEC *ECGpro* CardioPart 12 Blue.

For all questions of safety, contact your dealer or our service.

2. CardioPart 12 USB Acquisition Device

Connect the CardioPart 12 USB to an USB 2.0 port of your PC.
If you connect the device to an USB 2.0 port for the first time, it must be installed at this port. Carry out the installation and follow the instructions of the instruction manual of AMEDTEC *ECGpro* CardioPart 12 USB.

3. Bluetooth Adapter

If you want to use *CardioPart 12 Blue*, connect the Bluetooth adapter, Art. No. 001 517, to an USB 2.0 port of your PC and configure the interface. Follow the instructions of the chapter **Connecting CardioPart 12 Blue** of the instruction manual of AMEDTEC *ECGpro* CardioPart 12 Blue.

4. Patient's Cable

Use patient cables labelled with **AMEDTEC** exclusively and pay attention to the attached operating manual. CE conformity for use with these patient cables has been checked and declared.

Screw the patient cable firmly to the device

- If the patient cable is connected to the patient's body via the electrodes, it must be connected to the device for safety reasons.
- Only disconnect the patient cable from the device for disinfection and in case of service. Reconnect it before entering the patient environment.
- In principle, the sequence is as follows:
  1. Always connect the patient cable to the device first.
  2. Only then connect the patient cable to the patient via the electrodes.
  3. After ECG recording, first disconnect the patient from the patient cable.
  4. Disconnect the patient cable from the device (if necessary) only after completing this step

If you use a suction electrode equipment instead of the patient's cable, connect it using the **ECG adaptor**, Art. No. 011.0270. Only ever use suction electrode systems that are supplied by AMEDTEC or whose usability has been confirmed by AMEDTEC.

5. Exercise Equipment

Connect to the PC a bicycle ergometer or treadmill ergometer if you wish to carry out exercise investigations.

AMEDTEC *ECGpro* controls the bicycle and treadmill ergometers listed on page **12** of chapter **Stress Test** Settings**.**

☞ Connect the RS232 interface of the exercise equipment with a RS232 interface of the PC. For the types EGT and Ergoselect, use the **Elmed / ergoselect interface cable**, Art. No. 018.0102. Should no RS232 interface be available, use an USB converter.

Not all USB converters are suited for the connection of exercise equipment. Therefore, use, only the USB/Serial converter, art. No. 001 659 from AMEDTEC Medizintechnik Aue GmbH.

6. Blood Pressure Metre

Use a bicycle ergometer with integrated blood pressure module or an external blood pressure metre if you wish to measure the blood pressure automatically.

AMEDTEC EC*Gpro* controls the following blood pressure metres:

- *Tango* blood pressure metre
- *Cycle* blood pressure metre
- *Spengler* blood pressure metre
- *Metronik BL-6* blood pressure metre

Connecting the Tango blood pressure metre to CardioPart 12 USB

Connect the RS232 interface of the blood pressure metre with a RS232 interface of the PC. Use the **Tango-PC RS cable**, Art. No. 001.585. Should no RS232 interface be available, use an USB converter at the PC.

Not all USB converters are suited for the connection of blood pressure metres.
Therefore, use, only the USB/Serial converter, art. No. 001 659 from AMEDTEC Medizintechnik Aue GmbH.

Connect the Tango's QRS Trigger inlet with the LPT interface of the PC. For that, use the **CardioPart 12 USB → Tango-PC QRS Trigger cable**, Art. No. 011.0240.

Connecting the Tango blood pressure metre to CardioPart 12 Blue

Connect Tango's RS232 interface with the **CardioPart 12 Blue →PC QRS Trigger reception module**, Art. No. 016.0270.

Use the USB plug to connect the reception module to a USB port of the PC.

Connect the Tango's QRS Trigger inlet with the BNC plug of the reception module.

Connecting the Cycle blood pressure metre

Connect the RS232 interface of the blood pressure metre with a RS232 interface of the PC. Use the **Tango-PC RS cable**, art. No. 001.585. Should no RS232 interface be available, use an USB/Serial converter at the PC.

> Not all USB converters are suited for the connection of blood pressure metres.
> Therefore, use, only the USB/Serial converter, Art. No. 001 659 from AMEDTEC Medizintechnik Aue GmbH.

Connecting the Spengler blood pressure metre

Connect the RS232 interface of the blood pressure metre with an USB port of the PC.

Connecting the Metronik BL-6 blood pressure metre

Connect the RS232 interface of the blood pressure meter with a RS232 interface of the PC. Use the Elmed / ergoselect interface cable, Art. No. 018.0102. Alternatively, you can use the USB cable included with your blood pressure meter to make a USB connection.

General Settings

1. Installing the AMEDTEC *ECGpro* User Software

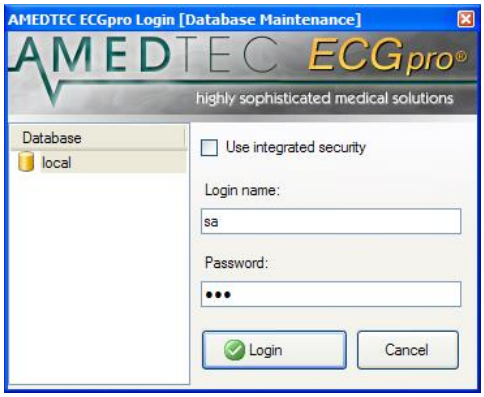
Should the *ECGpro* software not yet be installed on the PC, perform the installation.
Use the installation-CD supplied and follow the instructions of the **AMEDTEC *ECGpro* Installation Manual**.

2. User Management

Launch *ECGpro*, as described in section **Start of Program** at page **15**.

By default the active Windows user is added to AMEDTEC ECGpro users. For administrating the number of users and the rights of users, start the user management.

In the Windows start menu, chose: **Start ▶ Programs ▶ AMEDTEC ECGpro ▶ AMEDTEC ECGpro User Management**. The AMEDTEC *ECGpro* login for the database administration appears



☞ Log in with "sa" as username and with the „Strong password " used on installation of the MSSQL server.

If you are a Windows administrator for the PC on which the database is installed, you can log in with integrated security. In this case you need no password.

If your installation is a network, you must also have administrator's rights for the PC on which the data bank is installed.

☞ Enable the checkbox **Use integrated security.**

Now your Windows username is displayed, and you can log in. Refer to section **Logging in as User** on page **15**.

If you log in once again, the option **Use integrated security** can be already activated.

☞ Log in as active user.
For that, read section **User administration** in the **AMEDTEC *ECGpro* settings** instruction manual.

If necessary, create more users. You can do that also at any later time by opening the **User Management** in "*File* | *Settings...* | *Security* | *User Administration*".

3. CardioPart 12 USB Acquisition Device

Upon delivery, CardioPart 12 USB is factory selected for acquisition. Deactivate CardioPart 12 USB if you wish to use a different acquisition device.

☞ Open "*File* | *Settings...* | *Devices* | *CardioPart 12 USB"* and disable the **Use CardioPart 12 USB** check-box.

4. CardioPart 12 Blue Acquisition Device

Upon delivery, *CardioPart 12 Blue* is not factory-selected for acquisition. Before the *CardioPart 12 Blue* can be used, it must be activated and added to the list of the available devices.

☞ Make sure that the interface for the Bluetooth adapter was installed, and that the adapter was connected to the PC.

☞ Open "*File* | *Settings...* | *Devices* | *CardioPart 12 Blue*" and enable the **Use CardioPart 12 Blue** check-box.

☞ Switch your *CardioPart 12 Blue* device on.

☞ Click **Search** to let the software find the device in the air.
In case of a successful search, the acquisition device will appear in the device list.

☞ Activate or deactivate specific devices by clicking the corresponding check box.

☞ Also read sections **Connecting Devices** and **General Settings** in the **AMEDTEC *ECGpro* CardioPart 12 Blue Instruction Manual**, as well as section **Devices** in the **AMEDTEC *ECGpro* Settings** document.

5. CardioPart 12 WLAN Acquisition Device

☞ For information on setting up the CardioPart 12 WLAN devices please refer to the **AMEDTEC *ECGpro* CardioPart 12 WLAN Setup Guide**.

6. Clinic Data

☞ In menu "*File* | *Settings...* | *General* | *Clinic data",* enter name, address and phone number of the practice or hospital.
These data are printed out by the ECG modules every time.

7. Selecting Test Procedures

☞ In menu "*File* | *Settings…* | *12 Lead ECG* | *Test procedures*", select from the group **Test procedures** which test examinations should be carried out in this job.

☞ Deactivate all the other test procedures.

☞ Deactivate all test procedures if the job should not be used for ECG acquisitions.

8. Selecting Starting Behaviour

Open "*File* | *Settings…* | *General* | *Environment*".

Select **Start up with Test procedure** if *ECGpro* should return to a preset test procedure after the program start and after the saving.
By default, the **Resting 12** procedure is set. To change this setting, select a different procedure. The procedures enabled in the preceding point are offered for selection.

☞ Select **Start up with Module: Data Management** if you always wish to start in the patient or acquisition administration, and if you also wish return there after saving.

9. Print Formats

☞ Open "*File* | *Settings…* | *12 Lead ECG* | *Printing*".

☞ For each of the record types of resting ECG, Rhythm ECG and Stress test ECG, create a set of print formats by moving formats from the left selection box to the right one. From these print formats, you can make your choice then for every printing process.

☞ In the **Used printing formats** box, you can activate the check box for the formats which should be printed by default.

☞ For every test procedure, print formats and printing parameters can differ from the values set here. For that, read section **Examinations** in the **AMEDTEC *ECGpro* settings** instruction.

10. Printer

By factory selection, the ECG is printed on your **System Default Printer**.
You can select a different printer.

Open "*File* | *Settings…* | *12 Lead ECG* | *Printing*" and select a **Default printer**.

11. ECG download from Fukuda recorder

For downloading ECG data from Fukuda recorder make following setting in **AMEDTEC *ECGpro***:

☞ Open "*File* | *Settings…* | *Medical information systems* | *Fukuda Denshi*".

- ☞ Activate the plugin.
- ☞ Enter the path the FTP server stores the data to.
- ☞ The mask must be ***.ecg**.
- ☞ Change the time imnterval if AMEDTEC ECGpro should look for ECG data in a shorter or longer time period.

The background service is able to download ECG data also if AMEDTEC ECGpro is not running. Please read in document **Settings** the chapter **BackgroundService**.

Stress Test Settings

1. Exercise Equipment

☞ Activate the bicycle / treadmill ergometer and make the necessary settings in the device driver. For that, read section **Devices** in the **AMEDTEC *ECGpro* settings** instruction.

EC*Gpro* controls the following ergometers and treadmills:

Device	Settings in *ECGpro*
Bicycle ergometer ergoselect 50, 100, 150, 200, 400, 600, 1000, 1100, 1200, 4, 5 10, 12	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *ergoselect*
Viasprint 200P	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *ergoselect*
Supine ergometer ergoselect 1000 L	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *ergoselect*
Stress echo cardiography ergometer ergoselect 1200 EL	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *ergoselect*
Stress Echo Table 100 MED	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *ergoselect*
Bicycle ergometer ergometrics 900	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *ergometrics 900*
Bicycle ergometer EGT 2100 / 2200	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *EGT 2100 / 2200*
Bicycle of manufacturer Lode	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *Lode*
Bicycle ergometer mb1 … mb4	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *medical bike*
Bicycle ergometer SanaBike 150 / 250	*File* | *Settings...* | *12 Lead ECG* | *Bicycles* | *SanaBike 150 / 250*
Treadmill ergometer RAM 770, RAM 860, RAM 870, 880, 890	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *RAM*
Treadmill ergometer RAM 880, RAM 890	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *RAM*
H/p/cosmos treadmill ergometer	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *h/p/cosmos*
Treadmill Trackmaster	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *Trackmaster*
Treadmill Daum	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *Daum*
Treadmill Lode	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *Lode*
Treadmill T-2000 / T-2100	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *T-2000 / T-2100*
Treadmill Quinton	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *Quinton*

Treadmill ACT	*File* | *Settings...* | *12 Lead ECG* | *Treadmills* | *ACT*

☞ Change the settings of the exercise equipment.
For that, read section **Devices** in the **AMEDTEC *ECGpro* settings** instruction and follow the instruction manual of the exercise equipment.

2. Blood Pressure Metre

☞ Activate the blood pressure meter and make the necessary settings in the device driver.
For that, read section **Devices** in the **AMEDTEC *ECGpro* settings** instruction.

Device	Settings in AMEDTEC *ECGpro*
Tango blood pressure metre	*File* | *Settings...* | *12 Lead ECG* | *NIBP measurement devices* | *Suntech Tango*
Cycle blood pressure metre	*File* | *Settings...* | *12 Lead ECG* | *NIBP measurement devices* | *Suntech Tango*
Spengler blood pressure metre	*File* | *Settings...* | *12 Lead ECG* | *NIBP measurement devices* | *Spengler SCVL-2007*
Metronik BL-6 blood pressure metre	*File* | *Settings...* | *12 Lead ECG* | *NIBP measurement devices* | *Metronik BL-6*

☞ Change the settings of the blood pressure metre.
For that, read section **Devices** in the **AMEDTEC *ECGpro* settings** instruction and follow the instruction manual of the blood pressure metre.

If the Tango blood pressure metre is used, the QRS trigger outlet must be enabled.

Tango blood pressure metre and CardioPart 12 USB

☞ In "*File* | *Settings...* | *Devices* | *CardioPart 12 USB"*, make the necessary setting of the QRS trigger.
For that, read section **Devices / CardioPart 12 USB** in the **AMEDTEC *ECGpro* settings** instruction.

Tango blood pressure metre and CardioPart 12 Blue

☞ In "*File* | *Settings...* | *Devices* | *CardioPart 12 Blue*, enable the checkbox **Enable QRS trigger**.

☞ Enter the code of the **CardioPart 12 Blue → Tango-PC QRS trigger receiver module** in the field **Code of QRS trigger unit**.
For that, read section **Devices / CardioPart 12 Blue** in the **AMEDTEC *ECGpro* settings** instruction.

3. Stress Profile

By factory selection, every test procedure has one stress profile.

If you wish to use a different profile:

☞ In "*File* | *Settings …* | *12 Lead ECG* | *Test procedures*", select the test procedure which you want to select a different profile for.

☞ Click the **Exercise settings** tab.

☞ Set checkbox for available **stress test protocols**

☞ Select the default **stress test protocol**.

If you wish to modify a profile:

☞ Open "*File* | *Settings...* | *12 Lead ECG* | *Profiles*".

☞ Select the profile you wish to modify.

☞ Change the load, the length of the load stages, or the times for blood pressure measurement and for saving of ECG sections.
For that, read section **12 Lead ECG / Profiles** in the **AMEDTEC *ECGpro* settings** instruction.

Start of Program

Start

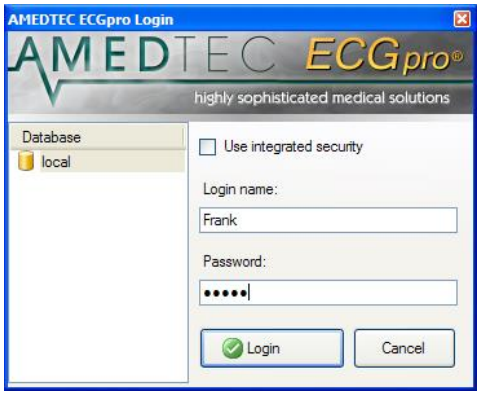
Start *ECGpro*.

- ☞ Double click on the desktop icon or
- ☞ Select in the Windows Start menu:
  Start | All Programs| AMEDTEC ECGpro | AMEDTEC ECG pro.

Alternatively, the program can also be started automatically by a link in AutoStart.

Logging in as User

AMEDTEC *ECGpro* requires the legitimation of the user who logs in to the program.
Before program start, the login dialogue is displayed.
AMEDTEC *ECGpro* automatically enters the user name into the field **User Name** which was used on Windows login if the logged Windows user is also an active user of AMEDTEC *ECGpro*.



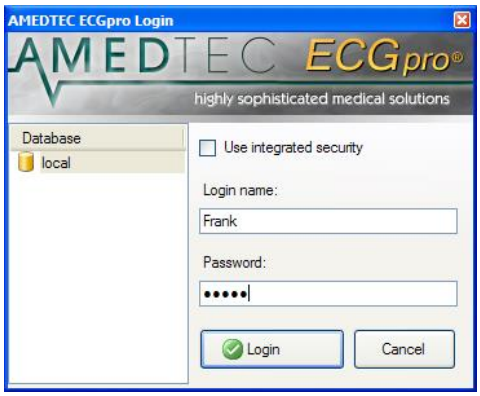
- ☞ Enter user name if it is not automatically displayed.
- ☞ Enter your password.
- ☞ Click on **Login** or press the **ENTER** key.
- ☞ Enable the option **Use integrated security** if you wish to abandon the login on future usage. In this case, *ECGpro* will take over your user data from the Windows registration.
  Through enabling this option, the input fields become inactive.
  Pay also attention to the notes hereunto in the instruction manual **AMEDTEC *ECGpro* Settings** in paragraph **User management**.

Logging in as Different User...

Use this function if

- ➢ you wish to log in to an AMEDTEC *ECGpro*, where an other user is already logged in or
- ➢ you wish to disable the option **Use Integrated Security**.

Proceed as follows:
Open the menu "*File* | *Login as another User…*"



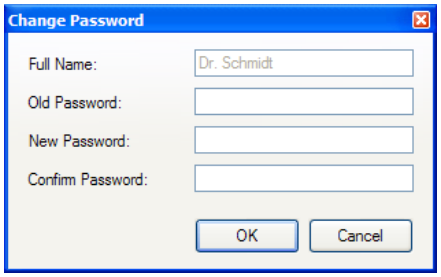
- ☞ Disable the option **Use Integrated Security** if it is enabled.
  The input fields become active.
- ☞ Enter user name and password.
- ☞ Click on **Login** or press the **ENTER** key.

Changing Password

If you wish to replace your previous password by a new one, proceed as follows:

☞ Open the menu "*File* | *Change Password…*"

This file entry will be only available if you are not logged in with **Integrated Security**.



☞ Enter previous and new password.
☞ Enter your new password again to confirm it.
☞ Click on **OK** or press the **ENTER** key.

Start Options

The program either starts

- in the module **Data Management**, see paragraph **Data Management** on Page **17**,
- in the module **Holter ECG** or in the modul **Holter RR**,
- with test procedure for resting ECG, see paragraph **Recording Resting ECG** on page **49** or
- with test procedure for rhythm ECG, see paragraph **Recording Rhythm ECG** on page **57** or
- with test procedure for stress test ECG, see paragraph **Acquiring Stress Test ECG** on page **67**.

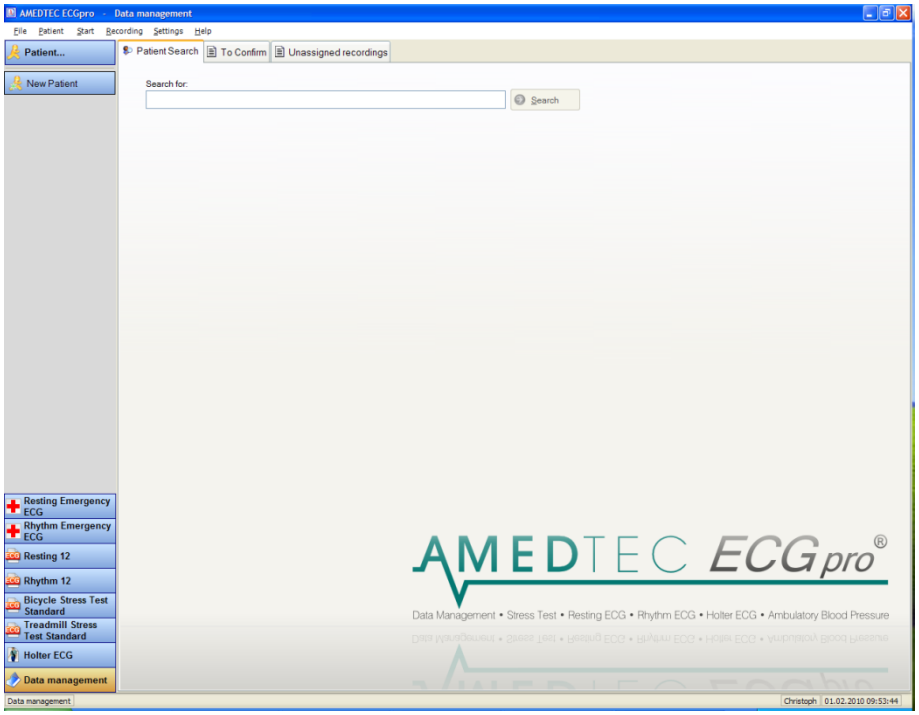
The selection of the start up option is described in the instruction manual **AMEDTEC *ECGpro* Settings** in paragraph **General, Environment**.

Data Management

File Card „Patient Search“

This review is shown after program start if the module **Data management** is set as starting option.

☞ Open the menu: “*File* | *Settings…* | *General* | *Environment*” to set the application start up.
Pay also attention to the notes hereunto in the instruction manual **AMEDTEC *ECGpro* Settings** in paragraph **General / Environment**.



The module **Data Management** is built on the principle of the file card.

- **Patient Search** is one of these file cards.
- The file card **Patient Search** can be switched off in the menu “*File* | *Settings…* | *Database* | *Data Management* | *Tab pages”*.

- Enter Patient number, patient’s last or first name completely or first characters of first / last name into the field **Search for:** You may also enter entries from the field Remarks. Complete inserted Date of Birth also is possible.
- Start your search with the button 

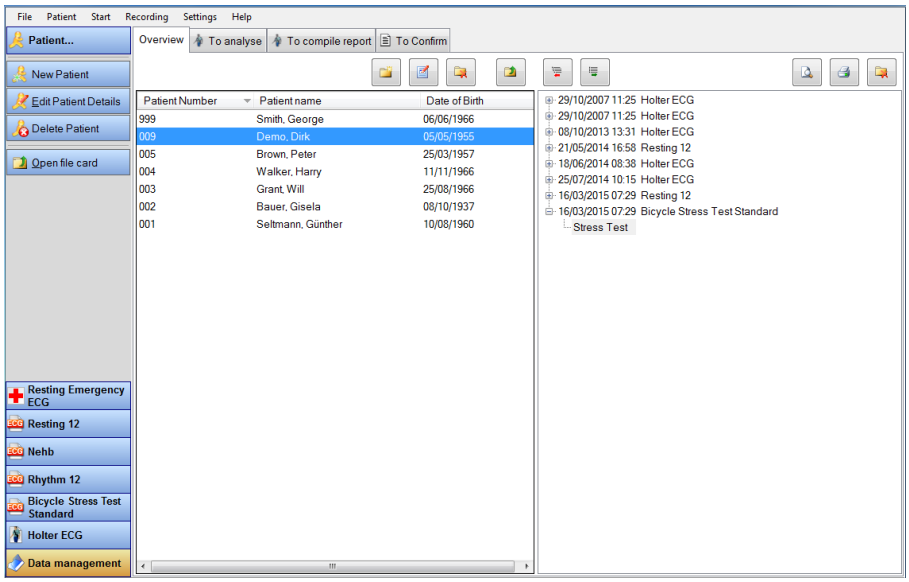
or press the **ENTER** key.

- For creating a new Patient record, use the button 

or use the manu “*Patient* | *New Patient*”.
For more information read section **Adding New Patient Data Record**.

File Card “Overview“

☞ The file card **Overview** can be switched on in the menu “*File* | *Settings…* | *Database* | *Data Management* | *Tab pages*.



The file card **Overview** displays a list of the patient data on the left and a list of acquisitions on the right.

➢ It is possible to open up to 10 (by default 5) more file cards which each contain a patient’s data.

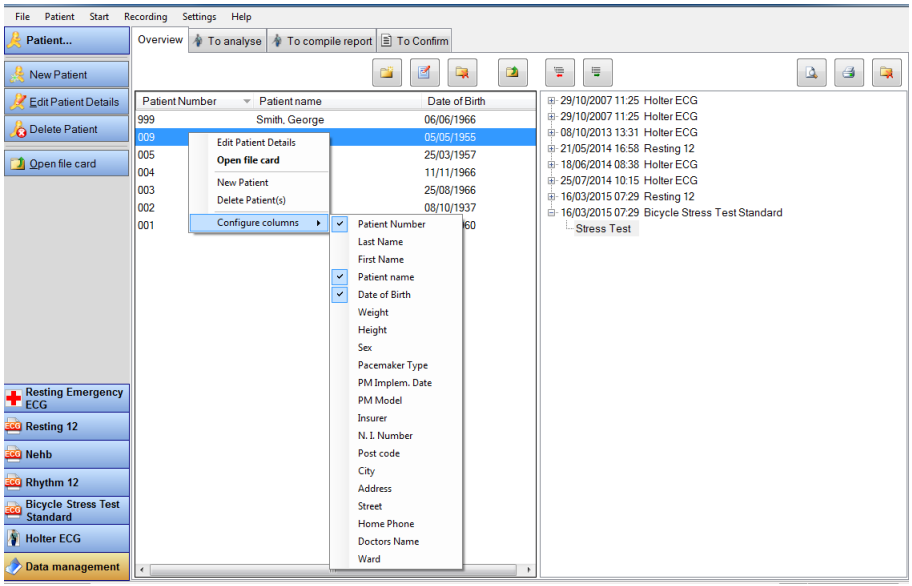
Patient Data List

The file card **Patient Data List** displays the list of patient data on the left.

➢ One patient is always marked.
➢ It is possible to configure the list. Columns can be deleted or added.

Proceed as follows:

☞ Open the context menu via right-click into the list.



- ☞ Select the entry **Configure Columns** in the context menu.
  For this purpose, move the mouse pointer over the entry
  or
  select the entry with the arrow keys ↑ or ↓ and then change to the submenu with the arrow key.
- ☞ Click on the requested column name with the left or right mouse button or
  select the column name with the arrow keys ↑ or ↓ and confirm with the **ENTER** key.
  The context menu closes.
- ☞ Repeat the whole procedure for each further column you wish to delete or to add.

Adding New Patient Data Record

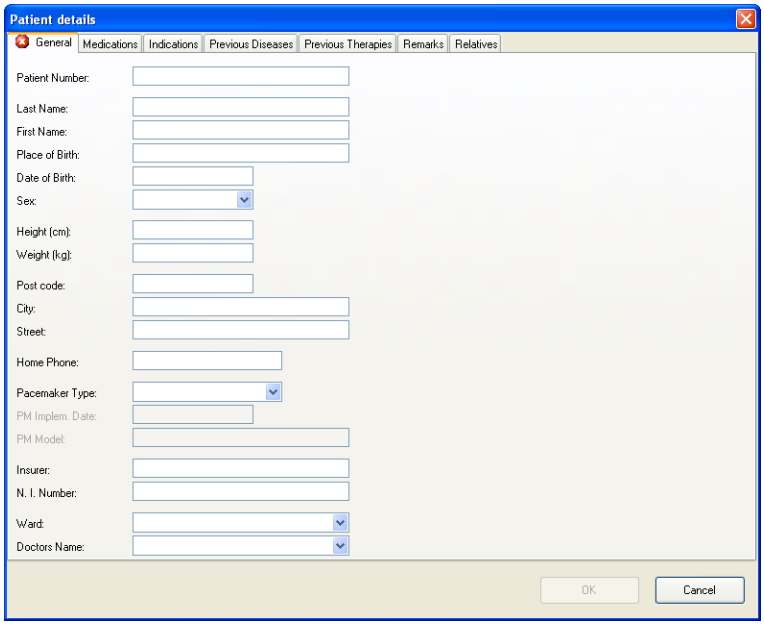
Use this function if you wish to add data for a new patient.

- ☞ Click on the icon
  or
  open the context menu in the patient data list and enable the entry
  New Patient
  or
  open the menu "*Patient* | *New Patient*"
  or
  use the button 

  on left side.
- ☞ Enter the data into the fields of the dialogue box **Patient details**.
  Fields marked with an exclamation sign must be filled.
  Data entry cannot be confirmed by **OK** or **ENTER** until all fields with an exclamation sign are filled.

The patient number is unambiguous. The patient number can only be assigned once.

- ☞ The date of birth may be entered with separator – 07.05.1988 – or as continuous sequence of digits – like 07051988.
- ☞ The system checks certain entries for plausibility. In case of blinking exclamation signs, the entry is not accepted. Check your entry for correctness.



In the menu "*File* | *Settings…* | *Database* | *Patient details*" *you* can define the fields you want to use and which of them have to be filled. Furthermore, it is possible to change the fields' names.

- ☞ Pay also attention to the notes hereunto in the instruction manual **AMEDTEC *ECGpro* Settings** in paragraph **Database / Patient details**.

The following fields are limited in their length:

➢ Postal code	30 characters
➢ Patient number	18 characters
➢ Place of residence, street, country, region, telephone numbers, email:	60 characters
➢ Last name, first name, place of birth, pacemaker type:	120 characters

Marking Patient Data Record

☞ Scroll the list with the slider and mark the data record via left-click
or
mark the list with **TAB** or respectively **Shift+TAB** and select the data record with the arrow keys ↑ or ↓.

You can mark multiple patient data records

☞ Press the key **Shift** respectively **Ctrl**. Keep the key pressed and click consecutively on all entries you wish to mark.

In case of long lists, search for the data record. The search is described in paragraph **Patient data** on page **30**. As a result of the search the located patient data are displayed in a file card.

☞ Change from this file card to the file card **Overview**. The searched data record is marked.

To change between the file cards, proceed as follows:

☞ Click on the field with the file card title
or
mark the file card title with the **TAB** key or respectively **Shift+TAB** and change to the next file card with **Ctrl+TAB** or respectively **Shift+Ctrl+TAB**.

Editing Patient Details

or

☞ Mark the data record for the patient that you wish to change and click on the icon
or
Mark the data record and open the menu "*Patient* | *Edit Patient Details"*
or
Open the context menu in the patient data list through right-click on the data record and click on the entry **Edit Patient Details**.

☞ Change the data in the dialogue box **Patient details** and confirm with **OK** or the **ENTER** key.

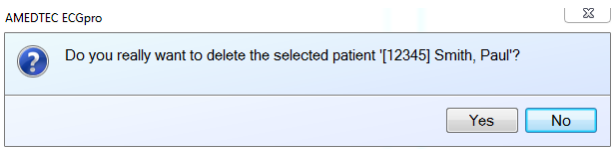
Deleting Patient Data Record

or

☞ Mark the data record that you wish to delete and click on the icon
or
click the button 

on the left side
or
Mark the data record and open the menu "*Patient* | *Delete Patient(s"* ,
or
Open the context menu in the patient data list through right-click on the data record and click on the entry **Delete Patient(s)**.

☞ You will see dialog with detailed patient data.

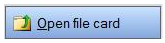


Confirm the request with **OK** or the **ENTER** key.

Opening File Card "Patient Data"

Use this function if you wish to display the patient data and recorded ECG's of the patient marked in the list in a file card or to bring an already opened file card to the foreground.

or



- ☞ Mark the data for the patient whose file card you wish to display and click on the icon
  or
  Double click on the data record in the patient data list
  or
  Open the menu "*Patient* | *Open File Card"*
  or
  Open the context menu in the patient data list through right-click on the data record and click on the entry **Open File Card**.

You can bring an already opened file card to the foreground as follows:

- ☞ Click on the field with the file card title

Recording List

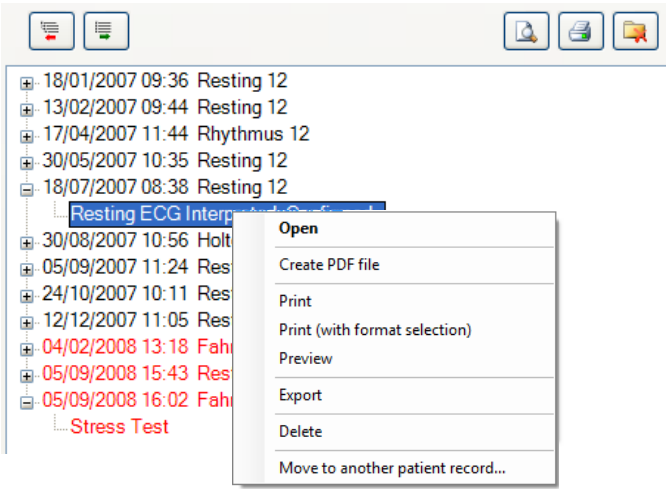
The file card **Overview** displays the list with the ECG tests and acquisitions on the right.

The entry of a ECG can consist of two lines forming part of a tree structure.
The first line displays date and time of the ECG test. The second line shows type of acquisition, status of interpretation and confirmation mark.
The entries can be displayed or removed by the tree symbols + or –.

Validated ECG acquisitions are displayed with the comment **Confirmed**. All acquisitions that have not yet been validated can be displayed in red writing. For this purpose, select the appropriate setting in the menu "*File* | *Settings…* | *Database* | *Data Management*".

Opening context menu

- ☞ Open the context menu through right-click on the component that you wish to open, print, export, import or delete.
- ☞ Enable the required function in the context menu. you can open, print, export or delete ECG acquisition.



Opening and closing entries

Proceed as follows if you wish to display or to close acquisition type, status of interpretation or confirmation mark:

- ☞ Click on the + symbol to display the components of the **marked** test
  or

use the **arrow key →**

☞ Click on the - symbol not to display the components of the **marked** test
or
use the **arrow key ←**

☞ Click on the icon to display the information of all ECG acquisitions.

☞ Click on the icon not to display the information of all ECG acquisitions.

Opening ECG acquisitions

☞ Double click on the entry
or
Mark the entry and open the menu "*Recording* | *Open"*
or
Mark the entry and press the **ENTER** key
or
Open the context menu through right-click on the component and click on the entry **Open.**

Printing preview

☞ Mark the recording and click on the icon
or
Mark the recording and open the menu "*File* | *Preview*"
or
Open the context menu through right-click on an recording and click on the entry **Preview**.

Printing acquisition

☞ Mark the Holter report and click on the icon
or
Mark the Holter report and open the menu "File | *Print*"
or
Open the context menu through right-click on the Holter report and click on the entry **Print**.

Printing / Preview with format selection

Use the format selection, if you wish another print format or other print parameters.

☞ Right-click in the recording list the desired acquisition. Click in the context to the entry **Print (with format selection)**.
or
mark the recording and open the menu "*File* | *Print with format selection...*"

☞ Select in dialogue **Print format** the desired formats.

☞ Click the button **Print parameters**, to change ECG speed, sensitivity or background grid.

☞ Click the button **Preview**, to see the format on screen.

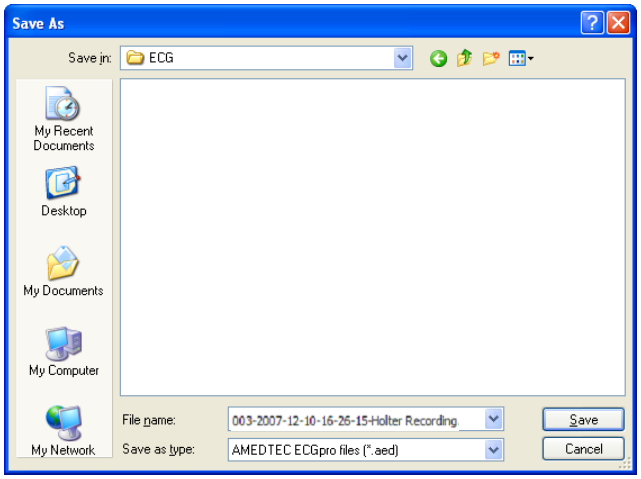
☞ Click the button **Print**, to print the selected formats.

☞ Click the button **Save as default**, to use the selected format as default.

Exporting acquisitions

You can export resting rhythm and stress test recordings to an external medium or any folder.

- ☞ Click in the recording list on the tree symbol ⊞ to display the additional information of the recording.
- ☞ Mark the line with additional information and open the menu "*Recording* | *Export*"
  or
  Open the context menu through right-click on the component and click on the entry **Export**.
- ☞ Select the medium or folder in the field **Save As** of the dialogue box, in which the acquisition shall be saved.



The **File name** gives information about the selected file and contains the following data:

- Patient number (003)
- Date of the acquisition (2007-12-10)
- Time of the acquisition (16-26-15)
- Component

The export location and the structure of the file name can be set in "*File* | *Settings…* | *General* | *Import* | *Export*".

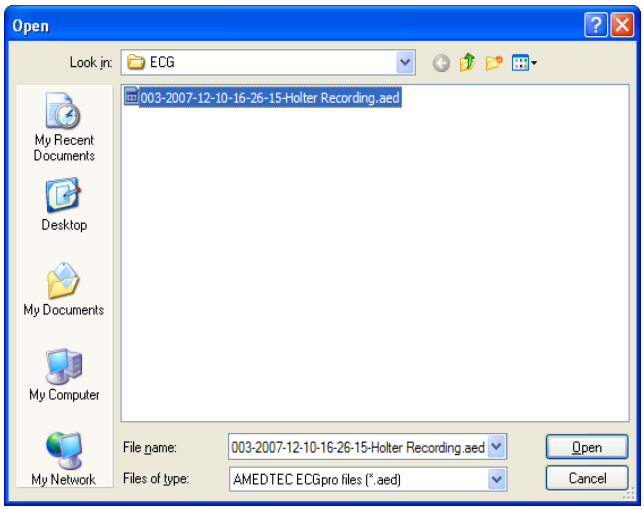
The extension ***.aed** indicates the proprietary file format generated by AMEDTEC ECGpro.

- ☞ Click on **Save** to export the Holter ECG.

Importing acquisitions

You can import resting, rhythm, stress test recordings, Holter-RR and Holter ECG from an external medium or any folder.

- ☞ Open the menu „*Recording* | *Import*".
- ☞ Select the medium or the folder in the field **Look in** of the dialogue box, from which the recording shall be imported.



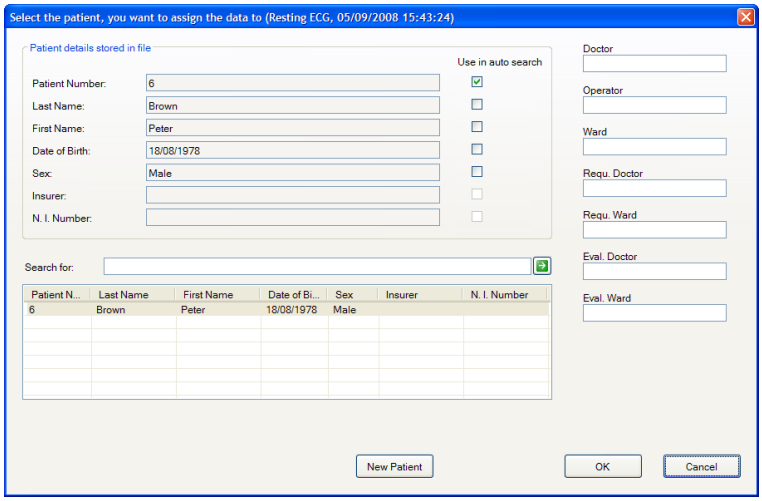
The **File name** gives information about the selected file and contains the following data:

- Patient number (003)
- Date of the acquisition (2007-12-10)
- Time of the acquisition (16-26-15)
- Component

The extension ***.aed** indicates the proprietary file format generated by AMEDTEC ECGpro.

- ☞ Mark recording
- ☞ Click on **Open** to import the recording.

ECGpro opens the assignment dialogue.



Patient data stored in file

If the imported acquisition contains patient number, name, first name, date of birth, weight, sex, insurance or insurance number, they will be displayed.
Which data are contained depends on the settings of the AMEDTEC *ECGpro* system where the acquisition has been exported.

AMEDTEC *ECGpro* makes an automatic test whether a patient data record with the patient data stored with the acquisition, is already existing in the database.

- ☞ Enable / Disable the Checkbox **Use in auto search** of the fields that you wish to include in or to exclude from the test.

If one ore more patient data records are identified matching the data in the acquisition, the result list will display these data sets.

- ☞ Select the right patient data from the list.
- ☞ Import the recording by **OK**.

Search for

If no data set appears on the list you can search for a patient data set.

- ☞ Enter patient number, last or first name completely or first characters of first / last name into this field. You may also enter entries from the field remarks.
- ☞ Click the button .

In case of one ore more patient data sets are identified matching the search, the result list will display these data sets.

- ☞ Select the right patient data from the list.
- ☞ Import the recording by **OK**.

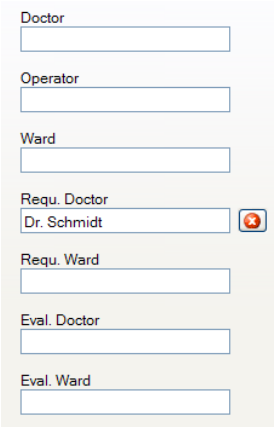
Button New Patient

If no patient data record is stored in the database neither matching the data from the acquisition nor the search, create a new patient data record.

- ☞ Click the button Neuer Patient
- ☞ Fill the Dialogue **Patient details**. For that, read section **New Patient** on page **31**.
- ☞ Import the acquisition by **OK**.

further information

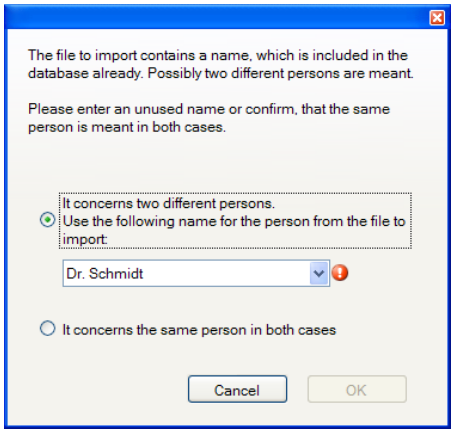
Pay attention to the information on right side of the dialogue:



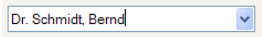
If there are information about doctor, operator or ward in the imported acquisition, they are displayed.

Persons or wards that are not in the database's list yet are added automatically.

Conflicts between acquisition and database data (i.e. same names) are indicated by the button.
(Example: A 'Dr. Schmidt' exists in the database's list of doctors, and a 'Dr. Schmidt' is the requesting doctor in the imported acquisition.)

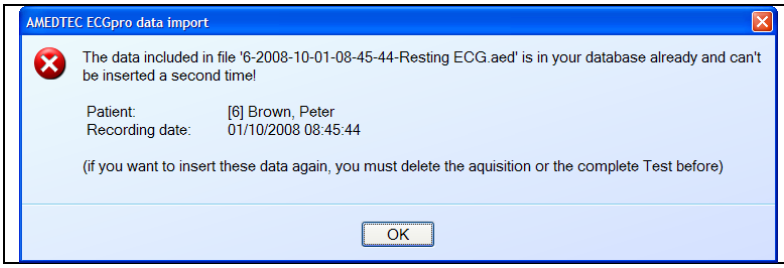


In case of a conflict:

- Press the button to solve the conflict between the two same names in the incoming acquisition and in the database.
- a) If the two names refer to two different persons, change the name within the incoming acquisition. Click the name field and (e.g.) add the first name. 

  The new name is added to the list of doctors in the database. (Read section **Doctors** in the **AMEDTEC *ECGpro* settings** instruction.)
- b) If the names refer to the one and the same person, click the lower radio button.
- Click the **OK** button.

If you have solved such a conflict, the system will solve all following conflicts with the same name automatically in this way.



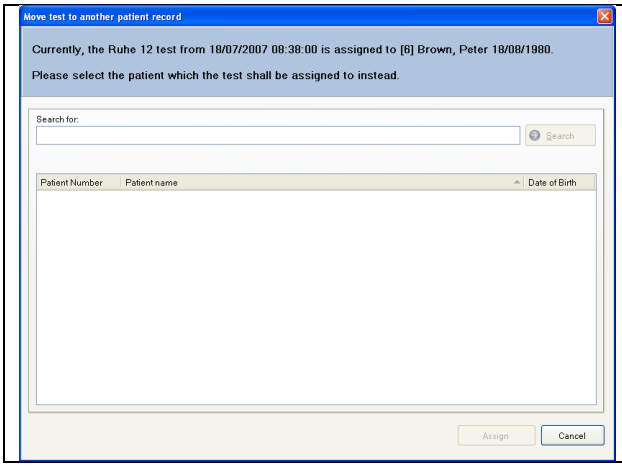
If the recording is already stored in the database, you cannot store it at a second time.

Deleting a acquisition

- Mark the recording and click on the icon
  or
  Mark the recording and open the menu "*Recording* | *Delete*"
  or
  Open the context menu through right-click on the recording and click on the entry **Delete**.

Move to another patient record …

- ☞ Select the wrong assigned recording in recording list.
- ☞ Click the right mouse button and select the line **Move to another patient record …**



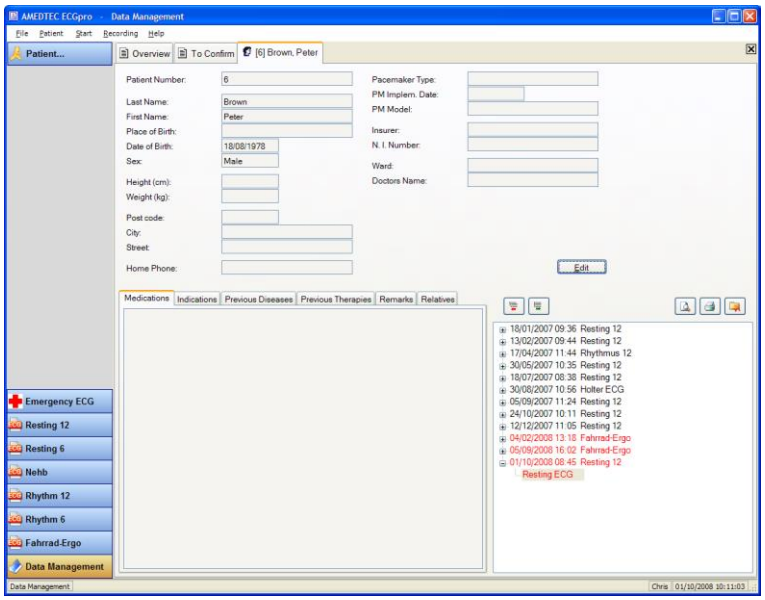
- ☞ Use the line **Search for:** for selecting the correct patient.
- ☞ For more information about searching a patient read in chapter **Search Patient Data** on page **30.**
- ☞ Press button Assign .for moving the recording to the correct patient. At wrong patient the recording is deleted.

File Card “Patient Data“

The file card shows patient data, tests, acquisitions and further information about a patient.
Further information is subdivided into the following categories:

- ➢ Medication
- ➢ Indication
- ➢ Symptoms
- ➢ Previous diseases
- ➢ Previous therapies
- ➢ Relatives
- ➢ Remarks

- ☞ To enter further information, use the Auto Replacement function.
  For that, read in the instruction manual **AMEDTEC *ECGpro* Settings** in paragraph **Auto Replacement**.



When several file cards are open it is possible to change between them. Within the file cards, there are further file cards for additional information between which it is also possible to change. A change to the file card **Overview** is possible as well.

How to change between file cards:

☞ Click on the field with the file card title
or
mark the file card title with **TAB** or **Shift+TAB** and change between the file cards with **Ctrl+TAB** or **Ctrl+Shift+TAB**.

You cannot edit the fields on the file card.

How to edit data:

☞ Open the dialogue box **Patient detail** with the **Edit** button
or
open the menu "*Patient* | *Edit Patient Details*".

Recording List

All recordings belonging to the patient are displayed.

☞ See section **Recording List** on page **21**.

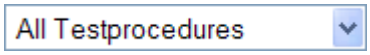
File Card "To confirm"

The file card displays a list of all Holter Reports which have not been confirmed.

The file card is switched of by default.
To display the file cart it must be enabled in menu "*File* | *Settings...* | *Database* | *Data Management"* by ticking the check box **Display tab page with unconfirmed tests**.
For modifications on file card open menu "*Settings* | *Configure this card".*

Selecting recording

Above the list two selection boxes are located in which you can set the kind of the report, in this case Holter ECG, and a time period.



☞ Select the type of test.

☞ Choose a time period from the list.
Only Holter reports derived from Holter Tests, which have been made in this time period, are displayed.

After closing and restart AMEDTEC *ECGpro* retains the selected time period.

Opening acquisitions

see Page **22**

Opening File card „Patient Data"

see page **21**

Preview

see page **22**

Print

see page **22**

Print with format selection

see page **22**

Export

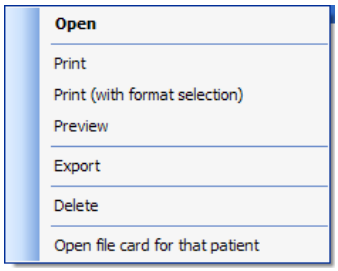
see page **23**

Delete

see page **25**

Opening the context menu

☞ Open the context menu through right-click on an acquisition that you wish to open, print, export or delete or for which you want to display the file card **Patient Data**.

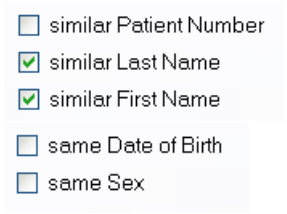


☞ Select the required function.

File Card “Patient record dublicates”

The file card displays a list of possible dublicate patient data.

The file card is switched of by default.
To display the file cart the entry **Patient record dublicates** must be moved to group box **Used tab pages** in menu “*File* | *Settings...* | *Database* | *Data Management*”.

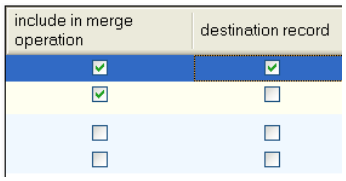


☞ Select criteria for searching possible dublicate patients.

☞ Choose a time period from the list.
Only Holter reports derived from Holter Tests, which have been made in this time period, are displayed.

After closing and restart AMEDTEC *ECGpro* retains the selected time period.

☞ Click head line of any column for sorting (ascending / descanding order) the results.



☞ Select the patients provided for merging.

☞ Select the destination record.

☞ Press the button 

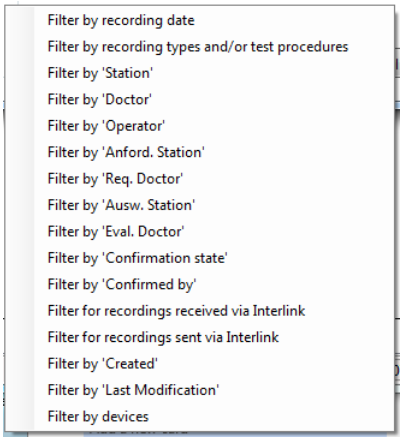
for deleting dublicate patient records. The ECG recordings from such patients are moved to destination record.

Add a new card

For using the filter features it is necessare to create a manually a new file card.

Open the dialog “*Settings* | *Add a new card*”.
For future changes open the dialog “*Settings* | *Configure this card*”.
F

- Enter a short name fort he new card. This name will be displayed on the tab.
- Select the columns for recording list by selecting entries in field **Available columns** and moving with help of the button > to field **Selected columns**.
- Add new filters with nhelp of button or remove existing filter with help of button .Available filters will be displayed in drop down box.
- By default the filters **Testbegin** and **Recording type** are used.
  Note the setting **All recording dates** for filter **Testbegin** may result in a very long list in new card.
  In filter **Recording Type** note the Checkbox **Show used types only**. In database not available recording types are suppressed in such a case.



- Unassigned recordings (Stat ECG or download from Fukuda-Writer) may be displayed or suppressed in the list.
- Select the activity by dopple click of selected line.
- Status line will display the number of recordings of actual filter selection.
- Save the filter configuration immediately after every change
  or
  open file card generally with filter configurated by creating the file card.
- Press button OK for creating the new file card.

In data management you will see the new file card.
Regarding your filter configuration you will see a list of recordings.

- In upper part of file card you see actual filter configuration. The filter configuration may be changed.
- Click the name of any recording for sorting the list ascending or descanding by this column.
- Mark one or more lines in the list.
- Open context menu for printing, deleting, exporting or moving the selected recordings.

Search Patient Data

Patient… is the central search function for patient data.
By using this function, AMEDTEC *ECGpro* searches the database for the requested patient data.

The following fields are examined:

- Patient number
- Last name
- First name
- Remarks

☞ Click on the button
or
press **Ctrl+E.**

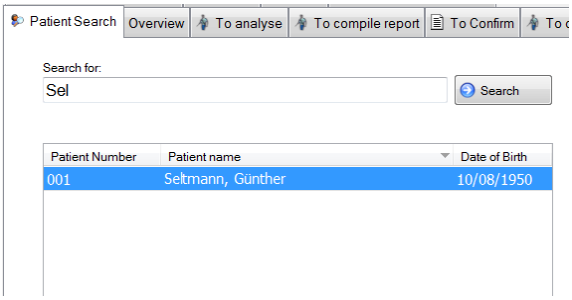
This button is only visible in ECG acquisition.

☞ Click on the button
or
press **F2.**

☞ Please read the next paragraph.

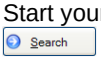
The Search screen is opened,

- if you are in the Data Management or
- prepare the memory card and patent data are not yet selected.



Search for:

☞ Enter Patient number, patient's last or first name completely or first characters of first / last name or date of birth completely into this field. You may also enter entries from the field Remarks.

☞ Start your search with the button 

or press the **ENTER** key.

A list of all patient data that contain the entered character string at beginning is displayed.
In the example above, **Sel** is found in the last name **Sel**tmann.

☞ Select the requested patient from the list and confirm with **OK** or press the **ENTER** key.

If the patient does not appear in the list, compile a new patient data set.

☞ Click on the button 

. The input dialogue **Patient details** opens.

☞ Enter the patient data as described in the next paragraph **New Patient** on page **31**.

As a result of the search, the file card of the found or newly added patient is displayed or the patient data are taken over to a new test.

New Patient

☞ Click on the button
or
press **Ctrl+E.**

This button is only visible in ECG acquisition.

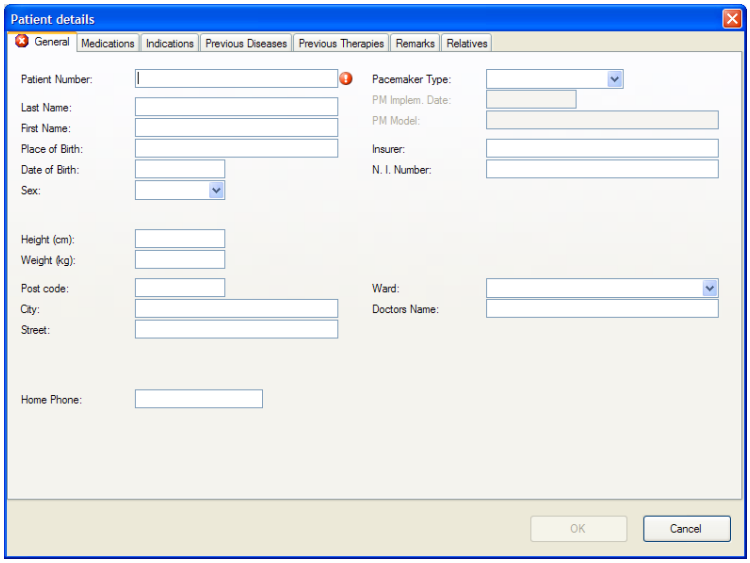
☞ Click on the button
or
press **F2**

☞ Please read the next paragraph.

The search screen appears.

☞ Click on the button 

The dialogue **Patient details** opens.



In the menu "*File* | *Settings...* | *Database* | *Patient details"* you can define the fields you want to use and which of them have to be filled. Furthermore, it is possible to change the fields' names.

☞ Enter the data into the fields of the dialogue box. Fields marked with an exclamation sign must be filled. Data entry cannot be confirmed by **OK** or **ENTER** until all fields with an exclamation sign are filled.

The patient number is unambiguous. The patient number can only be assigned once.

☞ The system checks certain entries for plausibility. In case of blinking exclamation signs, the entry is not accepted. Check your entry for correctness.

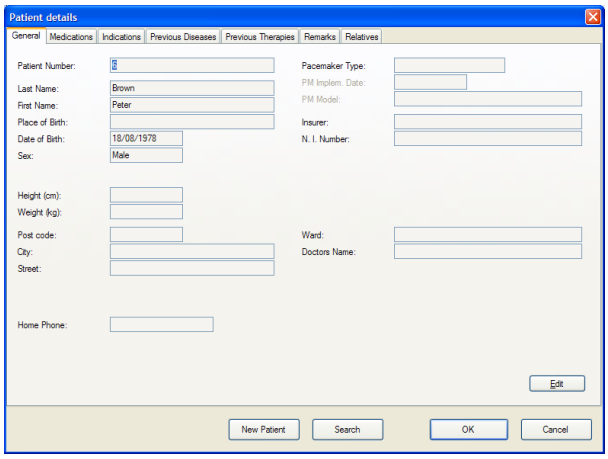
☞ Finish your entries by **OK** or **ENTER**.

The file card of the newly added patient is displayed.

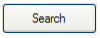
Display Patient Data

☞ Click on the button
or
press **Ctrl+E.**

If you have opened a ECG recording for review the patient data belonging to the ECG shall be displayed.
If you record a ECG and have the patient data already selected, they will be displayed.



☞ Click on the button  to create a new patient data record.

☞ Click on the button  to search patient date.

ECG Acquisition

Test Procedure Programs

During the installation of AMEDTEC *ECGpro*, the following test procedure programs are set up. You may modify these programs or create new ones.
For that, read section **12 Lead ECG / Test procedures** in the **AMEDTEC *ECGpro* settings** instruction.

You can carry out only those test procedures, whose type of acquisition was unlocked in the acquisition device. This also applies to the **Automatic ECG Interpretation** option and the **Arrhythmia Detection** option.

Observe the instructions for the type of acquisition and options, as listed below. Also refer to the CardioPart 12 USB and CardioPart 12 Blue instruction manuals.

For information on using the CardioPart 12 WLAN to acquire ECG, please refer to the **AMEDTEC *ECGpro* CardioPart 12 WLAN Instruction Manual**.

Type of acquisition:	Resting ECG
Leads:	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
Duration:	ECG acquisition until stopped manually.
Acquisition devices:	all *CardioPart 12 USB / Blue*
ECG interpretation:	only *CardioPart 12 USB / Blue* i, s, as

Type of acquisition:	Resting ECG
Leads:	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
Duration:	Automatic acquisition stop after 10 seconds.
Acquisition devices:	all *CardioPart 12 USB / Blue*
ECG interpretation:	only *CardioPart 12 USB / Blue* i, s, as

Type of acquisition:	Resting ECG
Leads:	I II III D A J
Duration:	Automatic acquisition stop after 10 seconds.
Acquisition devices:	all *CardioPart 12 USB / Blue*
ECG interpretation:	no interpretation if less than 12 standard leads

Type of acquisition:	Rhythm ECG.
Leads:	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
Duration:	ECG acquisition until stopped manually.
Acquisition devices:	*CardioPart 12 USB / Blue* mr, i, s, as
ECG interpretation:	only *CardioPart 12 USB / Blue* i, s, as

Type of acquisition:	Exercise ECG
Leads:	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
Duration:	The complete ECG is acquired.
Acquisition devices:	*CardioPart 12 USB / Blue* s, as
Arrhythmia monitoring:	only *CardioPart 12 USB / Blue* as
Stress Profile:	WHO: Load start with 25 Watts increase by 25 Watts stage duration 2 minutes storage of a 10-seconds ECG strip at the end of every stage blood pressure measurement at the end of every stage

The AMEDTEC *ECGpro* system includes further investigation programs which are not set. To be able to use the following test procedures, you have to enable the corresponding checkboxes in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures*".
For that, read section **12 Lead ECG / Test procedures** in the **AMEDTEC *ECGpro* settings** instruction.

Type of acquisition:	Rhythm ECG.
Leads:	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
Duration:	ECG acquisition until stopped manually.
Acquisition devices:	*CardioPart 12 USB* / *Blue* mr, i, s, as
ECG interpretation:	only *CardioPart 12 USB* / *Blue* i, s, as

Type of acquisition:	Resting ECG
Leads:	I II III aVR aVL aVF
Duration:	Automatic acquisition stop after 10 seconds.
Acquisition devices:	all *CardioPart 12 USB* / *Blue*
ECG interpretation:	no interpretation if less than 12 standard leads

Type of acquisition:	Rhythm ECG.
Leads:	I II III aVR aVL aVF
Duration:	ECG acquisition until stopped manually.
Acquisition devices:	*CardioPart 12 USB* / *Blue* mr, i, s, as
ECG interpretation:	no interpretation if less than 12 standard leads

Type of acquisition:	Resting ECG
Leads:	I II III Vx, Vy, Vz
Duration:	Automatic acquisition stop after 10 seconds.
Acquisition devices:	all *CardioPart 12 USB* / Blue
ECG interpretation:	no interpretation if less than 12 standard leads

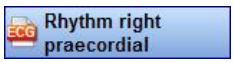
Type of acquisition:	Exercise ECG
Leads:	I II III aVR aVL aVF V1 V2 V3 V4 V5 V6
Duration:	The complete ECG is acquired.
Acquisition devices:	*CardioPart 12 USB* / *Blue* s, as
Arrhythmia monitoring:	only *CardioPart 12 USB* / *Blue* as
Stress Profile:	Bruce: Load start with 2.7 km/h, 10% increase by 1,4 km/h, 2% stage duration 3 minutes storage of a 10-seconds ECG strip at the end of every stage blood pressure measurement at the end of every stage

Type of acquisition:	Resting ECG
Leads:	I II III aVR aVL aVF V4 V5 V6 V7 V8 V9
Duration:	Automatic acquisition stop after 10 seconds.
Acquisition devices:	all *CardioPart 12 USB* / *Blue*
ECG interpretation:	no interpretation if less than 12 standard leads

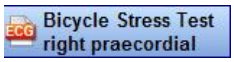
Type of acquisition:	Rhythm ECG.
Leads:	I II III aVR aVL aVF V4 V5 V6 V7 V8 V9
Duration:	ECG acquisition until stopped manually.
Acquisition devices:	*CardioPart 12 USB* / *Blue* mr, i, s, as
ECG interpretation:	no interpretation if less than 12 standard leads

Type of acquisition:	Exercise ECG
Leads:	I II III aVR aVL aVF V4 V5 V6 V7 V8 V9
Duration:	The complete ECG is acquired.
Acquisition devices:	*CardioPart 12 USB* / *Blue* s, as
Arrhythmia monitoring:	only *CardioPart 12 USB* / *Blue* as
Stress Profile:	WHO: Load start with 25 Watts increase by 25 Watts stage duration 2 minutes storage of a 10-seconds ECG strip at the end of every stage blood pressure measurement at the end of every stage

Type of acquisition:	Resting ECG
Leads:	I II III aVR aVL aVF V1 V2 V3r V4r V5r V6r
Duration:	Automatic acquisition stop after 10 seconds.
Acquisition devices:	all *CardioPart 12 USB* / *Blue*
ECG interpretation:	no interpretation if less than 12 standard leads



Type of acquisition:	Rhythm ECG.
Leads:	I II III aVR aVL aVF V1 V2 V3r V4r V5r V6r
Duration:	ECG acquisition until stopped manually.
Acquisition devices:	*CardioPart 12 USB* / *Blue* mr, i, s, as
ECG interpretation:	no interpretation if less than 12 standard leads



Type of acquisition:	Exercise ECG
Leads:	I II III aVR aVL aVF V1 V2 V3r V4r V5r V6r
Duration:	The complete ECG is acquired.
Acquisition devices:	*CardioPart 12 USB* / *Blue* s, as
Arrhythmia monitoring:	only *CardioPart 12 USB* / *Blue* as
Stress Profile:	WHO: Load start with 25 Watts increase by 25 Watts stage duration 2 minutes storage of a 10-seconds ECG strip at the end of every stage blood pressure measurement at the end of every stage

Launching the Test Procedure Program Automatically

At the program start and after a record was saved, AMEDTEC *ECGpro* automatically changes to the preset test procedure.

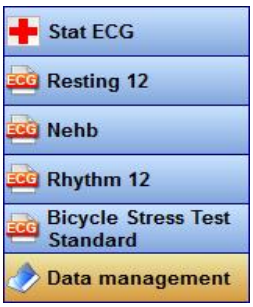
During the installation of AMEDTEC *ECGpro*, the test procedure programme **Resting 12** is preset for automatic launching.

You can preset another test procedure programme or deactivate the automatic program launch.

- ☞ For that, open "*File* | *Settings…*| *General* | *Environment"* , and in **Start with test procedure**, activate a different test procedure as start option.
  This test procedure is automatically launched from now on.
- ☞ In **Start with module**, select the **Data management module**, if you wish not to launch any test procedure program.
  At the program start and after a record was saved, AMEDTEC *ECGpro* automatically changes to tab of the patient, for whom the record shall be saved.

Selecting the Test Procedure Program Manually

- ☞ Click one of the following buttons
  or
  press **Ctrl + number of the button position**
  or
  open the menu: "***Start***" and click the desired test procedure programme



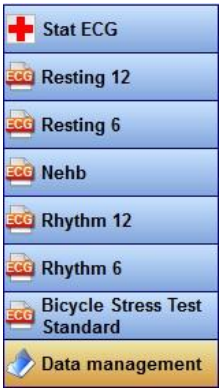
Ctrl+1
Ctrl+2
Ctrl+3
Ctrl+4
Ctrl+5
Ctrl+6

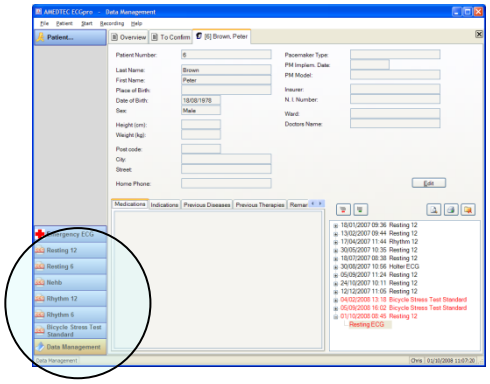
The test procedures and the sequence of buttons, and with that the keyboard shortcuts are set in "*File* | *Settings...* | *12 Lead-ECG* | *Test procedures*".

The top button has position **1**. Hence, you start the Stat ECG pressing **Ctrl+1**.

The following position are below.

Note that the positions, and with it the keyboard shortcuts change if you add buttons, remove or change the order of buttons.





Selecting the Test Procedure Program in the Data Management

A patient's tab is open

For selecting a patient read chapter **File Card „Patient Search"** on page **17** .

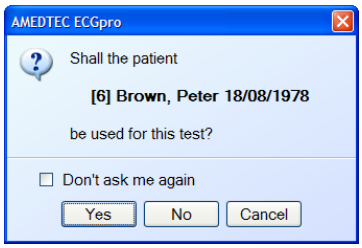
If no patient is selected, you are requested for selecting an patient after launching the recording.

The search tab is open

On launching the test procedure programme, the data marked in the patients list are taken over.
They are associated to the **active patient**.

The overview tab is open

On launching the test procedure programme, the data marked in the patients list are taken over.
They are associated to the **active patient**.
Before the change it is asked whether these data should really be used.



☞ Enable the checkbox if this message shall not be displayed again.

You can reactivate messages.

☞ In "*File* | *Settings …* | *General* | *Environment*", click **Show disabled message boxes again**.

If the record is saved after the acquisition of the ECG, AMEDTEC *ECGpro* associates the record to this patient.

After the change to ECG acquisition, the data of the active patient are displayed in the title bar of the program.

Active Patient

The patient, for whom the record is saved after the ECG acquisition and stored, is referred to as the active patient by AMEDTEC *ECGpro*.

If the test procedure is selected in the data management module, the patient's data selected there are automatically taken over for the active patient. For that, read the preceding section.

If the test procedure is automatically launched in the data management module, the active patient's data must be selected in the ECG acquisition. For that, read he following sections.

Selecting Patient's data before Starting the Acquisition

If possible, select the active patient's data before starting the acquisition.

Before starting the acquisition, the system assigns the **Select patient** function to the **orange button**.

- **Click** this button **or press** F2.
- Search for the patient's data as described under **Patient data** on page **30**.

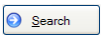
In the result of the search, the patient's data found are associated to the active patient, and they are used thus for the ECG acquisition.

- If the button does not show the function **Select patient**, open the menu "*File* | *Settings …* | *12 Lead-ECG* | *ECG"* and activate the checkbox the **First step of the „Green Arrow" button is opening the patient search**.

Selecting Patient's data during the Acquisition

You can select the patient's data also after the start of the acquisition.

After the start, the **Select patient** function is not longer assigned to the **orange button**.
Therefore, you must use the blue button.

- Left-click the **Button**
  or
  press **Ctrl+E.**
  To select a different patient, click 

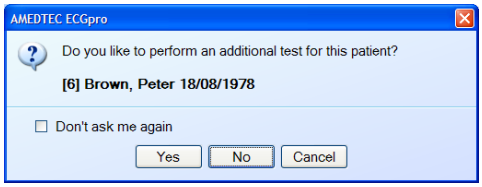
  .
- For the search of patient's data, use: „Patient | Select patient...**"**.

Opening the Search Dialogue automatically

The use of this function is recommended if you want to return always automatically to the preset test procedure after the saving of a record.

This is the case if under **Start with test procedure** in "*File* | *Settings...* | *General* | *Environment"* an ECG test procedure was set.

If no patient's data are selected, AMEDTEC *ECGpro* opens the search dialogue.
If a record was saved for the active patient, AMEDTEC *ECGpro* asks whether you want to carry out a further test procedure of this patient.



- If you wish to acquire another ECG, click 

- Click 

  to search another patient's file.

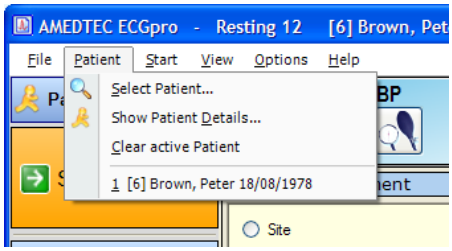
The function is always on for Exercise ECG type of acquisition.

For **Resting ECG** and **Rhythm ECG**, the function is off by factory-selection, and it must be activated separately for each of these test procedure programs.

☞ In "*File* | *Settings...* | *12 Lead ECG* | *Test procedures*", select the test procedure program of **Resting ECG** and / or **Rhythm ECG**, and activate on the **General** tab the check box **At acquisition start, automatically ask for a patient**.

Further Options

You can open the following options in menu *"Patient"* or in the context menu of the **Patient …** button:



☞ Right-click on the **Patient…** button to open a context menu**,**
or
open: „***Patient***".

Show Patient Details …

The data of the active patient can be displayed and edited.

☞ Click in the context menu of the button **Patient...**
or
in „Patient" on **Show Patient Details...**

Closing the Active Patient

If you do not want to use the data of the active patient for the ECG acquisition, you must close the active patient.

☞ Click in the **context menu** of **Patient...**
or
in „Patient" on **Close active patient**

Selecting Data of a Patient Select Whose Tab Is Open

In **Data management**, up to 5 tabs can be opened, and every tab contains the data of a patient. Each of these patients is listed in the context menu of the **Patient...** button and in the *"Patient"* menu.

☞ Click in the context menu of button **Patient...**
or
in „***Patient***" on the data of a patient if you wish to select him as active patient for ECG acquisition.

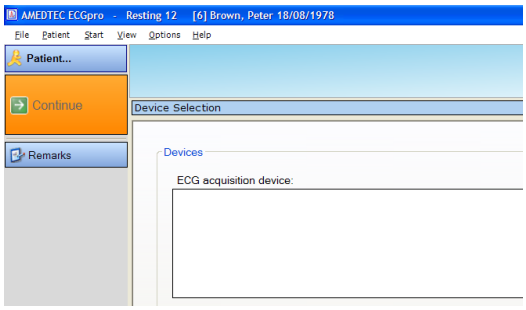
Showing the Patient Data of the Active Patient

The title bar of the program shows the data of the active patient in the form:
[Patient's number] name, given name date of birth.

Selecting the ECG Acquisition Device

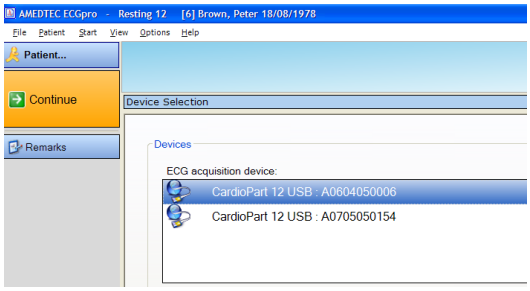
Using CardioPart12 USB

AMEDTEC *ECGpro* automatically searches for connected acquisition devices of the CardioPart 12 USB type. The device selection is displayed if AMEDTEC *ECGpro* finds no or several acquisition devices.



AMEDTEC ECGpro finds **no** acquisition device CardioPart 12 USB.
The device list is empty and the **Continue** button is inactive.

- ☞ Connect a CardioPart 12 USB to the PC.
- ☞ Open "*File* | *Settings...* | *Devices* | *CardioPart 12 USB*" and enable the **Enable CardioPart 12 USB** checkbox.



AMEDTEC ECGpro finds **several** acquisition devices CardioPart 12 USB.

- ☞ Click on the device that you want to use.
- ☞ Click **Continue**
  or
  press **F2**.

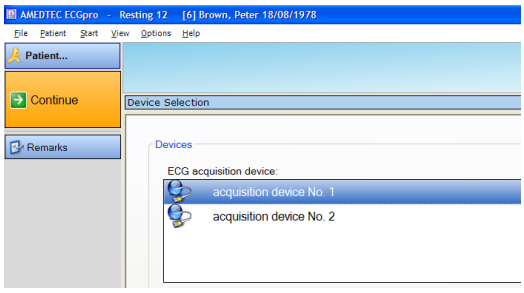
Using CardioPart12 Blue

AMEDTEC *ECGpro* does not search automatically for connected acquisition devices of the CardioPart 12 Blue type, but it shows in the device list all *CardioPart 12 Blue* devices which are activated in the Options. It is insignificant whether these devices are on or off.

The device selection is displayed if no or several acquisition devices were **activated**.

- ☞ Select the device which you want to use if the device list shows several devices.
- ☞ What you must do if the device list is empty, you find on page **10** in section **General Settings** under **CardioPart 12 Blue Acquisition Device**.

Assigning Device Names



You can give "names" to your devices.

- ☞ In "*File* | *Settings...* | *12 Lead-ECG* | *ECG-Devices* | *CardioPart12*", use the button **Label device**.
  For that, read section **Devices** in the **AMEDTEC *ECGpro* settings** instruction.

It is reasonable to fix a label with the name at the device.

Entering a Comment

- To open the comment box click the button
  or
  press **F3**.

AMEDTEC ECGpro automatically opens the tab **Comments**.

- Write your comment.
- Use the auto-type function for repeated terms.
  For that, read section **Auto replacement** in the **AMEDTEC *ECGpro* settings** instruction manual.
- When case number / order number is active in your system, open the tab page **Case / Order** for more information.
- If required, enter more info on the other tabs, or automatically display the information entered there.
  The Tab **Recording details** shows information about Start of recording, last modification and Software Version used for recording.
  Use the tabs **Request**, **Operation** and **Evaluation** for entering the Clinic, the Ward or the Doctor.
- The tab **Battery** shows state of battery voltage while recording for device Cardiopart 12 Blue.
- Deactivate the check box **Print comments** if the comments should not be printed.

Close the box with **OK**

Measuring and Entering Blood Pressure

Starting the Blood Pressure Metre

If a blood pressure metre is connected, you can start the measurement manually.

☞ Click on
or
press **Shift+F3**.

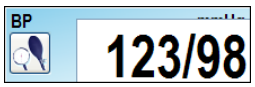
Entering Blood Pressure Values Using the Keyboard

If a blood pressure metre is not connected, you can enter the measured values manually.

☞ Click on ---/---
or
press **Shift+F3**.

If a blood pressure metre is connected, you can enter the measured values manually too.

☞ Click on ---/---
or
press **Shift+F3**.

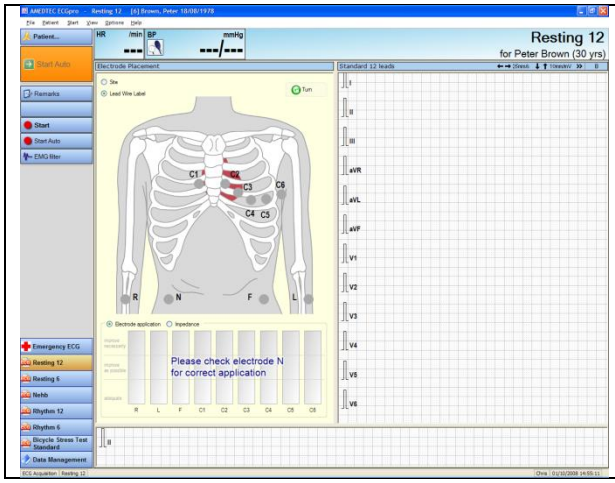


☞ Enter the systolic and the diastolic value **without separators**.
It is not necessary to enter a diastolic value.

Only systolic values under 350 are accepted.
The systolic value must be greater than the diastolic one.

☞ Close the input dialogue by pressing **ENTER**
or
click beyond the blood pressure field.

Applying Electrodes



The ECG acquisition always starts in the **Electrode Placement** scheme with disturbance level indication and ECG preview.

The electrode placement scheme shows the electrode positions. As lettering, you can select the name of the points of application or the marking on the electrode cables.

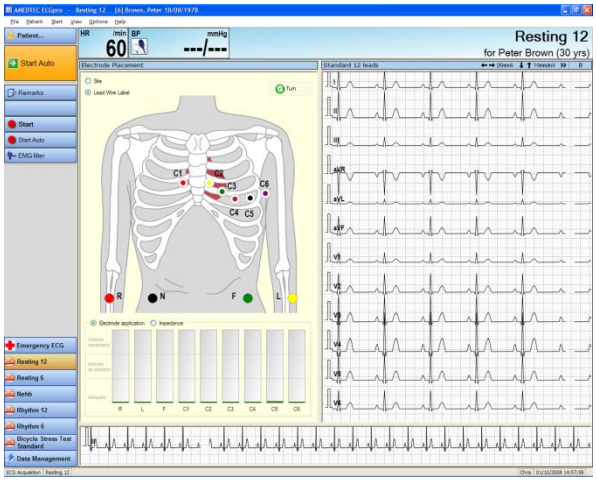
☞ Toggle the lettering by clicking **points of application** or **cable inscription**.

☞ Click Turn to see the electrode placement scheme from the side or from the back.

☞ Apply the electrodes. The position points for not applied electrodes blink.

Always start with the electrode N.

The electrode fault detection works only stably, when the electrode N and two further ones, for example, R and L, were applied!

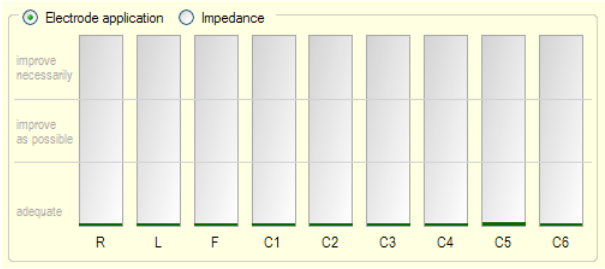


The representation of an ECG lead starts automatically, as soon as the electrodes are recognised as applied correctly.

Once all electrodes have been applied, you can use the orange button or F2 to start acquiring the ECG or the stress test.

The buttons Start Auto and Start can be used to start even if electrode faults are indicated..
In this case not all channels are displayed. Which channels are displayed depends on the electrodes recognised as faultless.

Apply at least N and two further limb electrodes.



☞ Try to improve the quality of the electrode application, until all electrodes are in the bottom **OK** range.

Turning on of a filter has no influence on the adjacent display.

☞ Press the **impedance** button to be able to assess the skin transition impedance. During the impedance measurement, no ECG is displayed.

Starting the acquisition is only possible in mode **Electrode application**.

ECG Filters

- The **Mains filter** inhibits disturbances coming from power supply lines, fluorescent lamps as well as energy-intensive consumers.
  These power supply lines cause electromagnetic fields which spread in the room and can disturb ECG acquisition.
  Therefore, one should consider with the selection of the location for the patient's couch this influence and search a place where the network disturbances are as low as possible.
  Poor contact between electrode and body has also disadvantageous effects. Therefore, the electrodes should be applied with the maximum care.

- The **EMG filter** acts against artefacts which are caused by muscle motions. In ECG at rest, such artefacts are caused, above all, by cramping on lying. The convulsive holds of the arms are typical. This can often be found with narrow patient's couches.
  Therefore, it must be taken care that the patient lies comfortably and completely calmly.

- The **baseline filter** prevents excessive excursion of the ECG curve. Nevertheless, strong motions of the patient can disadvantageously affect the stability of the ECG curve.

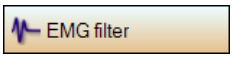
Filters can influence the ECG. Therefore, if possible, avoid the use of filters.

Enabling the Mains filter and the EMG filter.

Mains filter

☞ Open „***Settings***“ and click **Mains filter**.

EMG filter



☞ Click **EMG filter**
<u>or</u>
open: „*Settings*“ and click **EMG filter**.

Baseline filter

The baseline filter can only be manipulated in “*File* | *Settings…*| *12 Lead ECG* | *Test procedures* | *ECG*“.

Enabled filters are shown in the title bar of the ECG representation.

EMG filter	Mains filter	Baseline filter
E	**M**	**B**

With every new acquisition, the filters are reset to the state preset for the test procedure .

You can change the pre selected settings separately for every test procedure in “*File* | *Settings …* | *12 Lead ECG* | *Test procedures“* in the **ECG settings** tab.

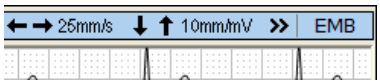
Factory-Selected Settings

Filter	**Resting ECG**	**Rhythm ECG**	**Exercise ECG**
Baseline filter	**On**	**On**	**On**
Mains filter	**On**	**On**	**On**
EMG filter	**Off**	**Off**	**On**

For that, read section **12 Lead ECG / Test procedures** in the **AMEDTEC *ECGpro* settings** instruction.

Changing the ECG Representation

Changing Speeds



- Click ← to decrease the speed.
- Click → to increase the speed.
- Alternatively, use the ← and → cursor keys.
- Alternatively, use the context menu.
  Right-click in the ECG and go to Speed submenu.
  Select the desired speed.

With every new acquisition, the speed is reset to the state preset for the test procedure. There is a separate presetting for every ECG window.

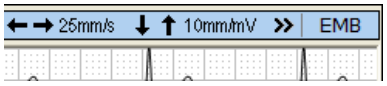
You can change the pre selected settings separately for every test procedure in "*File* | *Settings …* | *12 Lead ECG* | *Test procedures"* in the **Display** tab.

Factory-Selected Settings

	Setting range [mm/s]	Presetting [mm/s]
Multi-channel ECG	10, 25, 50, 100, 200	25
Rhythm line	10, 25	10

For that, read section **12 Lead ECG / Display** in the **AMEDTEC *ECGpro* settings** instruction.

Changing Sensitivity



- Click ↓ to decrease the sensitivity.
- Click ↑ to increase the sensitivity.
- Alternatively, use the ↓ and ↑ cursor keys.
- Alternatively, use the context menu.
  Right-click in the ECG and go to Sensitivity submenu.
  Select the desired sensitivity.

With every new acquisition, the sensitivity is reset to the state preset for the test procedure . There is a separate presetting for every ECG window.

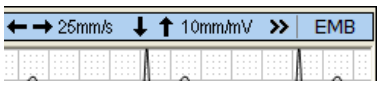
You can change the pre selected settings separately for every test procedure in "*File* | *Settings …* | *12 Lead ECG* | *Test procedures"* in the **Display** tab.

Factory-Selected Settings

	Setting range [mm/s]	Presetting [mm/s]
Multi-channel ECG	5, 10, 20	10
Rhythm line	5, 10	10

For that, read section **12 Lead-ECG / Representation** in the **AMEDTEC *ECGpro* settings** instruction.

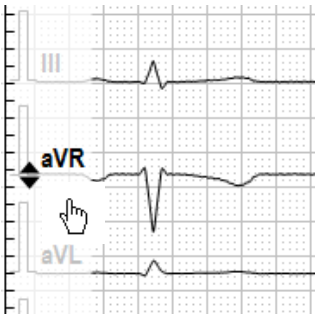
Resizing the Window



- Click » to enlarge the window.
- Click « to shrink the window.

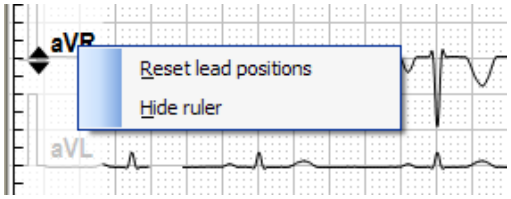
Moving the ECG Curve

You can move each of the ECG curves in vertical direction and prevent thus that the curves write into each other.



- ☞ Left-click the inscription of the ECG curve you want to move.
  A scale is displayed.
- ☞ With pressed mouse key, move the curve up or down to the desired position.
- ☞ Left-click beyond the ruler to hide it immediately, or use the context menu as shown in the following illustration.
  Otherwise the ruler is automatically hidden after a short time

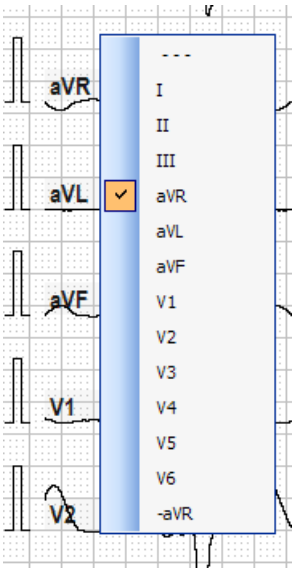
You can reset the original positions:



- ☞ With visible ruler, right-click on one of the curve inscriptions. A context menu is opened.
- ☞ Click on **Reset lead positions**

Changing a Lead

You can associate another lead to every ECG curve or hide it completely.



- ☞ Right-click on the inscription of the ECG curve to which you want to associate another lead or which you want to hide.
  A context menu in which the currently selected lead is marked, is opened.
- ☞ In the context menu, click on the lead you want to display from now on.
- ☞ Click  to hide the curve.
- ☞ If you have opened the context menu, but you do not want to change a lead, however, click on the already selected entry or beyond the context menu in the ECG.

Selecting a View

Different views are available to enable displaying the ECG curves in different arrangements. To define the views, they are divided into lines and columns.
The views are changed in a context menu.

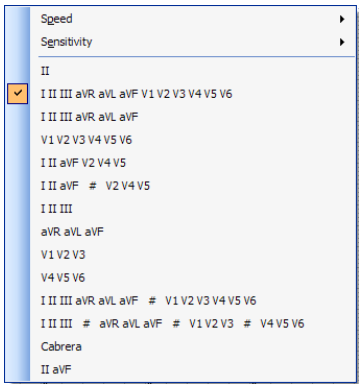
- ☞ Right-click in the ECG representation. The context menu is opened.
- ☞ Select the desired view.

By factory selection, the structure of the context menu items is as follows:

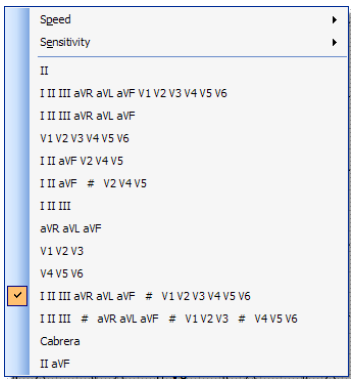
Column1 # column2 # column3 # column4

Column1 stands for all leads which is displayed in the **first** column one below the other.
Column2 stands for all leads which is displayed in the **second** column one below the other.
Column3 stands for all leads which is displayed in the **third** column one below the other.
Column4 stands for all leads which is displayed in the **fourth** column one below the other.

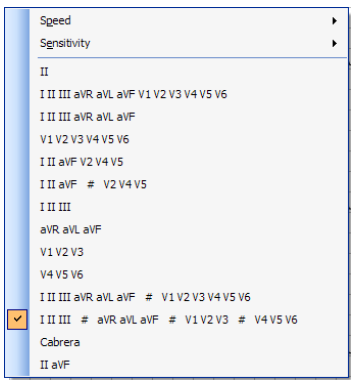
See the following examples.



1 column with 12 leads



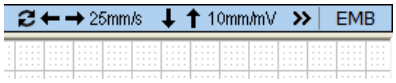
2 columns with 6 leads each



4 columns with 3 leads each

Toggling views

You can cycle through all views which consist of only one column.



☞ Click to toggle the views.

Changing the Mode of Representation

The mode of representation affects only multi-column representations.

Synchronous mode	The curves in the left column and the curves in the right column are written simultaneously.
Sequential mode	The curves in the left column and the curves in the right column are written consecutively. Advantage: The curve is overwritten only a half as often. This allows longer viewing of the ECG. Disadvantage: The ECG within a column is updated only a half as often.

Factory-selection is the synchronous mode. The sequential mode must be enabled separately for every test procedure and for every view.

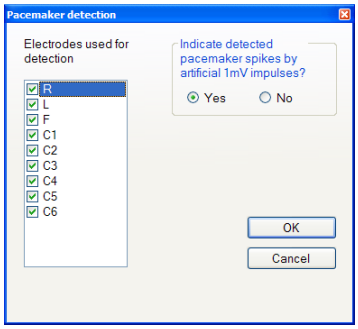
☞ Open "*File* | *Settings…* | *12 Lead ECG* | *Test procedures* | *Display*".
In all representations which are displaying **real-time ECG**, a multi-column view can be selected. Activate these views in the **Sequential mode** checkbox.

For that, read section **12 Lead ECG / Display** in the **AMEDTEC *ECGpro* settings** instruction.

Pacemaker Detection

The settings for pacemaker detection can be changed during the ECG acquisition.

☞ Open „*Settings* | *Pacemaker detection...*"



☞ Select the electrodes to be used for the detection.

☞ Select whether the pacemaker should be replaced with 1 mV impulse.

Demo ECG

An internal ECG is saved in the acquisition devices. You can enable this ECG as follows:

☞ Open "*File* | *Settings...* | *12 Lead ECG* | *ECG Devices* | *CardioPart 12 USB or CardioPart 12 Blue*".

☞ Enable the checkbox **Acquire Demo ECG!**

The demo ECG can only be saved for a patient by the name of **Demo**.

☞ Create a patient, and enter at least the following data.

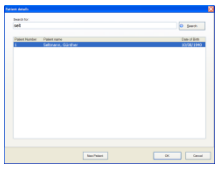
Name: Demo
Date of birth: e.g. 01.01.1980
Sex: male or female

Recording Resting ECG

Operating Steps - Overview

By default, AMEDTEC *ECGpro* is configured so that you only need the orange button to start and save an automatic 10 seconds 12 Lead ECG acquisition.

Use the functions under options only if you want to deviate from the standard.

		Standard	Options	
1	**Select the test procedure.**	Resting 12		
2	**Search the data of the active patient or enter new patient data.** 	Select patient...		F2
3	**Apply the electrodes.** **Incorrectly applied electrodes blink.** **Note the graphs indicating the hook-up quality.** **Check the ECG traces.**			
	Enable the filter only if no sufficient acquisition quality can be achieved.		EMG filter	
	Enter a remark.		Recording Info	F3
	Start a connected blood pressure measurement device or		 	
	enter a blood pressure value manually.		Click ---/---	Shift+F3
4	**Start the acquisition.** **The button becomes only active if all electrodes are applied correctly.**	Start Auto		F2
	You can start even if the electrodes are applied insufficiently.		Start Auto	Ctrl+A
	The system starts a timer which stops the record after 10 seconds. You can restart the timer within 10 seconds. Then, the acquisition starts from the beginning.		Reset	Ctrl+R
	You can start and stop the acquisition manually.		Start Stop	Ctrl+S Ctrl+T
5	**Check the acquisition.**			
	If necessary repeat the acquisition in manual or in automatic mode.		Repeat	Ctrl+S Ctrl+A
	Perform a confirmation of the diagnosis. Your username is added then together with data and time to the diagnosis.		Confirm	Ctrl+B
	View the standard formats in the preview on the monitor.		Preview	Ctrl+F
	Print the recording in the standard format.		Print	Ctrl+P
	Save PDF file		Create PDF file...	

6 Save the recording.

F2

Stop here if you do not wish to save the recording.

Ctrl+X

When using a *CardioPart 12 Blue* the **Start Auto** function is alternatively operable with power button on recording device. For this read section **CardioPart 12 Blue** in manual **Settings**.

Selecting the Test Procedure

Select the test procedure, before applying the electrodes.

- ☞ Click one of the following buttons
  or
  press **Ctrl + number of the button position**
  or
  open the menu: „*Start*“ and click the desired examination programme

Ctrl+1

Ctrl+2

Ctrl+3

Ctrl+4

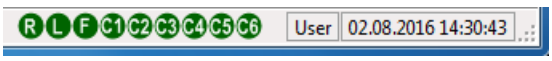
- ☞ To change to the data management, click
  or
  press **Ctrl+8**
  or
  open the menu: „*Start*“ and click **Data management**

Note, that numbers can differ, when you add or delete test procedures.

Preparing the Patient

Apply the electrodes as described on page **43**.

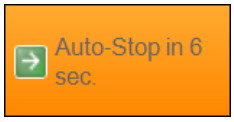
- ☞ Apply the patient's cable in such a way that the electrodes are not tensioned.
- ☞ For reusable electrodes, use a contact spray.
- ☞ Make sure that the patient lies comfortably and is relaxed. The arms should have enough space on the couch. Otherwise the patient will try to hold the arms in the body what leads to artefacts.
  It is recommended put a role under the hollows of the knees of the patient.
- ☞ If possible do not use and EMG filter and Mains filter.
- ☞ While recording phasis the quality of electrodes is displayed in status line in right bottom corner.
  The color of electrodes reflects the application quality. Pleas read on page **43**.



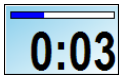
Recording Resting ECG Automatically

Automatic acquisition is preset by factory selection.

☞ Click this button or press **F2**.
The button is only active if no electrode errors are indicated.
Alternatively the power button of *CardioPart 12 Blue* is usable.



AMEDTEC *ECGpro* changes to ECG acquisition.
The acquisition is stopped automatically after 10 seconds.
The orange button indicates the remaining time.



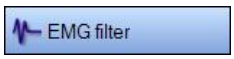
At the same time, the progress bar indicates the elapsed acquisition time.

If a disturbance occurs, the time is restarted.
The remaining time is set to 10 seconds, and the progress bar, to 0 seconds.

The heart rate is always averaged over 10 seconds.

If no active patient was selected, AMEDTEC *ECGpro* opens the search function automatically after the stop. Select the data as described on page 30 .

Options



☞ Read section **ECG Filters** on page **44** .

Change to manual acquisition if you do not wish to stop the acquisition automatically, but manually.
For that, read in following section **Recording Resting ECG Manually** .

You can start manual recording if electrode errors are indicated and the orange button is deactivated. For that, read on page **43** .

☞ Click this button or press **Ctrl+S**.

You can start automatic recording if electrode errors are indicated and the orange button is deactivated. For that, read on page **43** .

☞ Click this **button** or press **Ctrl+A**.

You can stop the automatic acquisition earlier than after 10 seconds. In this case, the ECG is not analysed.
Use this function if sudden disturbances occur.

☞ Click this **button** or press **Ctrl+T**.

Use this function if you see you a passage which should not be saved **during the acquisition**.
The acquisition is restarted. The remaining time is set to 10 seconds, and the progress bar, to 0%.

☞ Click this **button** or press **Ctrl+R**.

☞ Click
or
or ---/--- , or press **Shift+F3**.

☞ Also read in section **Measuring and Entering Blood Pressure** on page **42** .

☞ Also read in section **Entering a Comment** on page **41** about entering remarks and information on physician and operator.

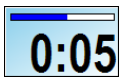
Recording Resting ECG Manually

Manual acquisition is deactivated by factory selection. You can select manual acquisition as standard.

☞ In "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *General*", deactivate the **„Green arrow" button stops acquisition automatically after 10 seconds** checkbox.

☞ Click this **button** or press **F2**.
The button is only active if no electrode errors are indicated.
Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable.

ECGpro changes to ECG acquisition.
The acquisition runs as long as it is stopped manually.



Instantly after the start, the progress bar is displayed.
As soon as the progress bar has reached the right margin, an ECG with 10-second of duration can be saved.

If a disturbance occurs, the time is restarted. The progress bar is set to 0 seconds.

The heart rate is always averaged over 10 seconds.

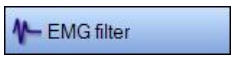
☞ Click this **button** or press **F2**.

☞ Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable.

After having stopped the acquisition, the **last 10 seconds** are saved, and with 12 Lead lead, also analysed. Requirement is that the progress bar has reached 10 seconds.

If no active patient was selected, AMEDTEC *ECGpro* opens the search function automatically. Select the data as described on page 30.

Options



☞ Read in section **ECG Filters** on page **44**.

You can start the acquisition if electrode errors are indicated and the orange button is deactivated. For that, read on page **43**.

☞ Click this **button** or press **Ctrl+S**.

You can change to automatic acquisition.
For that, read in following section **Recording rest ECG automatically**.

Also here, you can start the acquisition if electrode errors are indicated and the orange button is deactivated. For that, read on page **43**.

☞ Click this **button** or press **Ctrl+A**.

Use this function if see you a passage which should not be saved **during the acquisition**.
The start time of the last 10 seconds and the progress bars are reset.

☞ Click this **button** or press **Ctrl+R**.

☞ Click
or
or ---/--- , or press **Shift+F3**.

☞ Also read in section **Measuring and Entering Blood Pressure** on page **42**.

☞ Also read in section **Entering a Comment** on page **41** about entering remarks and information on physician and operator.

Checking the Record

After completion of the acquisition the record is displayed for checking.

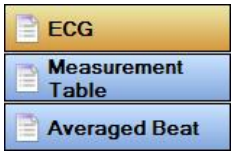
In case of automatically analysed records, the main measurement values, the results of analysis, the averaged beat and the beat classification are displayed.
When measurements excide a typically value this is marked by "*" and displayed in red color. For this read **Measurement Program and Diagnostics Program** on page **149**.

Records are analysed only under following conditions:

- Test procedure Resting 12 (analysis and diagnosis)
- Test procedure Resting 6 (only analysis)
- Acquisition duration at least 10 seconds
- Date of birth and sex of the active patient were entered

As long as the electrodes are connected to the patient, the running ECG is displayed in the rhythm line.

For more details, you have more representations.
Click the following **buttons**
or
Open the menu: „*View*" and select the desired one.



Representation as shown above

Measurement value table, results of analysis and averaged beat

Averaged beat, results of analysis and ECG

☞ Also read in section **Resting ECG - View** on page **94**.

During checking the record, you can execute the following functions.

- Click this **button** or press **F3**.
- For that, read on page **41**.

If you want to confirm the correctness of the diagnosis or the comment ,

- Click this **button** or press **Ctrl+B**.
- Note that the acquisition cannot be changed any more after having been confirmed.
  Also read in section **Confirming Tests** on page **140**.

If you want to repeat an acquisition manually or automatic mode,

- click this **button** or press **Ctrl+S**.

If you want to enter, measure or correct the blood pressure,

- Click
  or
  or ---/--- , or press **Shift+F3**.
- Also read in section **Measuring and Entering Blood Pressure** on page **42**.

Printing the Record

Standard format

If you want to print the record in the standard format,

- ☞ Click the **button**
  or
  press **Ctrl+P**
  or
  open the menu: "*File* | *Print*".

If you want to display the printing preview,

- ☞ Click the button
  or
  press **Ctrl+F**
  or
  open the menu: "*File* | *Printing Preview...*".

If you want to create a PDf file,

- ☞ Click the button
  and
  select folder and file name.

You can change the selection of the standard formats as follows:

- ☞ Open "*File* | *Settings …* | *12 Lead ECG* | *Printing*" and select **Resting ECG**.
- ☞ Move the desired print formats to **Used printing formats**.
- ☞ Activate the check box of the print formats which you want to print as standard.
- ☞ Note, that data for selected printformat must be available in acquisition. That means, Averaged beats can't be printed without successful analysis.
- ☞ For the respective test procedure, enter varying print formats or printing parameters in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures"* on the Printing tab.
- ☞ For that, read section **Printing** in the **AMEDTEC *ECGpro* Settings** instruction.

Format Selection

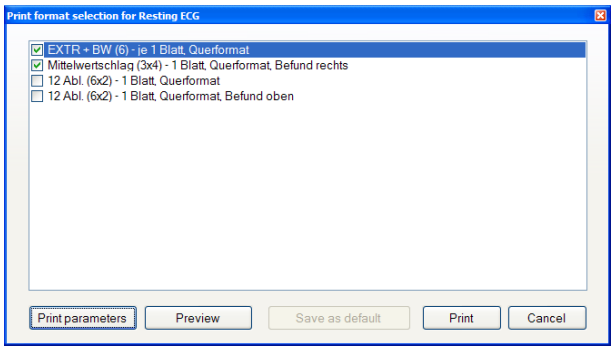
Use **Format selection** if you want to use other print formats or to set other printing parameters.

- ☞ Right-click on 

or 

- ☞ Click on 

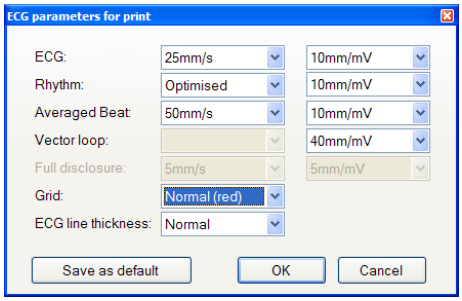
or 



You find information on the print formats in the **Resting ECG** section of the **AMEDTEC *ECGpro* print formats** instruction.

- ☞ Select the desired print formats.
- ☞ Deactivate the checkbox if the format should be neither printed, nor be displayed.
- ☞ Activate the checkbox if the format should be printed or be displayed.
- ☞ Click on **Print parameters** to set speed, resolution and grid
- ☞ Click on **preview** display the selected formats on the screen.
- ☞ Click on **Print** to print the selected formats. (If no format selected the Button is grey.)
- ☞ Click on **Save as a default** to use the selected formats as standard formats from now on.

Setting Printing Parameters



ECG: multi-channel ECG representation

Rhythm: single-channel rhythm representation below the multi-channel ECG

☞ Make the required settings

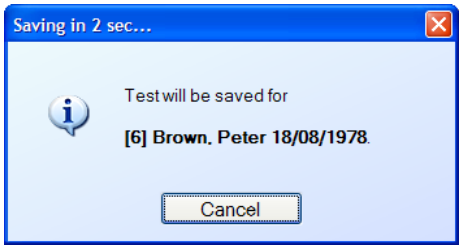
☞ Click on **Save as default,** if you want to use the changed parameters always from now on.

Saving the Record

After completion, the saving function is always assigned to orange button.

☞ Click this **button** or press **F2**.

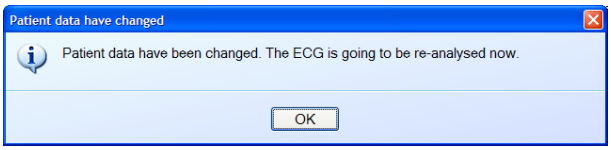
If no active patient was selected, *ECGpro* opens the search function automatically. Select the data as described on page 30.



Before the saving, AMEDTEC *ECGpro* displays a message with the data of the active patient.
If the indicated data do not correspond with the real data, you have 3 seconds time to cancel the saving process.

☞ Click **Cancel**.

If you find out that a wrong patient was selected, you can select a different patient as active patients. If the age or the sex changed due to the selection of another patient, the ECG is analysed again.



☞ Confirm the repeated analysis of the EKG.

Alternatively to the orange button, you can use also this button.

☞ Click this **button** or press **Shift+F12**.

If you do not want to save the record,

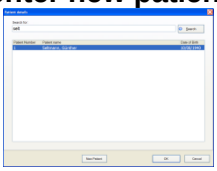
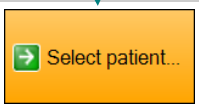
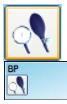
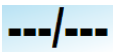
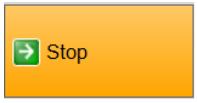
☞ click this **button** or press **Ctrl+X**.

Recording Rhythm ECG

Operating Steps - Overview

By factory selection, AMEDTEC ECGpro is set so that you have only to select the test procedure and to follow **the orange button with the green arrow** to record automatically, check and save a rhythm ECG.

Use the functions under options only if you want to deviate from the routine.

		Routine	Options	
1	**Select the test procedure.**			**Ctrl+5**
2	**Search the data of the active patient or enter new patient data.** 			**F2**
3	**Apply the electrodes.** **Incorrect applied electrodes blink.** **Note the graphs indicating the hook up quality.** **Check the ECG traces.**			
	Enable the filter only if no sufficient acquisition quality can be achieved.			
	Enter a remark.			**F3**
	Start a connected blood pressure measurement device or			
	enter a blood pressure value manually.		Click 	**Shift F3**
4	**Start the recording** **The button becomes only active if all electrodes are applied correctly.**		button on *CardioPart 12 Blue*	**F2**
	You can start even if the electrodes are applied insufficiently.			**Ctrl+S**
	Recording stops after a time of 30 seconds automatically.			**Ctrl+A**
	Place a label and letter it.			**F4**
	Stop the multi-channel ECG and turn back to see events again and to print.			**F6**
	Save the last 10 seconds as an ECG strip.			**F5**
	Save the continuous ECG as an ECG strip. Click once more to stop saving.			

5 Check the recording

Check the ECG.

Use the **Rhythm a**nd / or **ECG** views.

If necessary repeat the recording in manual or in automatic mode.

Perform a confirmation of the diagnosis. Your username is added then together with datum and time to the diagnosis or to the remark.

View at the standard formats in the preview on the monitor.

Print the recording in the standard format.

Save a PDF file

Ctrl+S
Ctrl+A
Ctrl+B
Ctrl+F
Ctrl+P

6 Save the recording

F2

Stop here if you do not wish to save the record.

Ctrl+X

Selecting the Test Procedure

Select the test procedure, before applying the electrodes.

☞ Click one of the following buttons
or
press **Ctrl + number of the button position**
or
open the menu: „Start“ and click the desired test procedure

Ctrl+5

Ctrl+6

☞ To change to the data management,
click
or
press **Ctrl+8** (**CTrl+9** with Holter ECG)
or
open the menu: „*Start*“ and click **Data management**.

Preparing the Patient

Apply the electrodes as described in section **Applying Electrodes** on page **43**.

☞ Apply the patient's cable in such a way that the electrodes are not tensioned.

☞ For reusable electrodes, use a contact spray.

☞ Make sure that the patient lies comfortably and is relaxed. The arms should have enough space on the couch. Otherwise the patient will try to hold the arms in the body what leads to artefacts.
It is recommended put a role under the hollows of the knees of the patient.

☞ If possible do not use and EMG filter and Mains Filter.

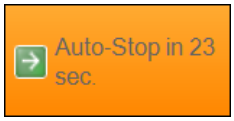
☞ While recording phasis the quality of electrodes is displayed in status line in right bottom corner.
The color of electrodes reflects the application quality. Please read on page **43**.

Rhythm ECG Automatically

Automatic acquisition is deactivated by factory default.
You can select automatic acquisition as standard.

☞ In "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *General*" deactivate the **„Green arrow" button stops acquisition automatically after 30 seconds** checkbox.

☞ Click this **button** or press **F2**.
The button is only active if no electrode errors are indicated.
Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable.



AMEDTEC *ECGpro* changes to ECG acquisition.
The acquisition is stopped automatically after 30 seconds.

☞ Change this time in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *General*".

The orange button indicates the remaining time.

At the same time, the time which was already recorded is indicated.
If a disturbance occurs, the time is restarted.
The remaining time is set to 30 seconds.

The heart rate is always averaged over 10 seconds.

If no active patient was selected, AMEDTEC *ECGpro* opens the search function automatically after the stop. Select the data as described in section Search Patient Data on page 30.

Options

Change to the manual fashion if you want to acquire longer than 30 seconds. In this case, stop the manual acquisition.
For that, read in following section **Acquiring rhythm ECG manually**.

You can start manual recording if electrode errors are indicated and the orange button is deactivated.
Also read in section **Applying Electrodes** on page **43**.

☞ Click this **button** or press **Ctrl+S**.

You can start automatic recording if electrode errors are indicated and the orange button is deactivated.
Also read in section **Applying Electrodes** on page **43**.

☞ Click this **button** or press **Ctrl+A**.

You can stop the automatic acquisition earlier than after 30 seconds.

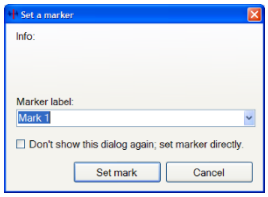
☞ Click this **button** or press **Ctrl+T**.

Use this function if you wish to extend the acquisition by another 30 seconds.

☞ Click this **button** or press **Ctrl+R**.

Use the marker function to mark a place in the ECG for easier finding at a later time.

☞ **Click** this button or **press F4**.



The **Marker** dialogue opens.

Under **Info,** you get information on the heart rate.

The marks get sequential numbers which is entered in the **Marker label** field.

☞ Overwrite this entry if you wish to give a mark name, or select one of the predefined labels.
To change the basic settings, open: "*File* | *Settings…* | *12 Lead ECG* | *Marker Labels*".

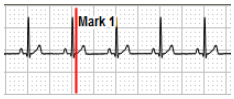
☞ For using variable parameters read in document **Settings** chapter **Test Procedures**.

☞ Activate **Don't show this dialogue again; set marker directly** if this dialogue shall not be displayed anymore. The marks will receive the label **Mark** and a sequential number.

☞ Save the mark with **OK**.

Decisively for the point of time of the mark is the pressing of the button 

or of the F4 key, but not the closing of the dialogue.



The mark is shown in the rhythm strip and in the multi-channel ECG.

With this function, the multi-channel ECG is stopped, whereas the rhythm channel and all measurement functions go on.

☞ Click this **button** or press **F6**.

You can turn back the standing ECG and save ECG strips, mark and print as well as measure RR distances.

☞ Also read in section **ECG** on page **113**. .

☞ Click once more to let the ECG go on
or
press **F6** again.

With this function, you save the last 10 seconds of an ECG strip. The main measurement values for the strip are indicated.

☞ Click this **button** or press **F5**.

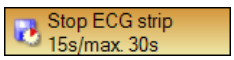
AMEDTEC *ECGpro* saves retrospectively the ECG strips which ends immediately with the mouse click. The ECG strip can be marked.

☞ Also read section **Editing strips** in chapter **Rhythm** on page **115**.

An ECG strip of maximum 30 seconds can be saved. The ECG strip can be marked later or be deleted.

☞ Click this **button**

AMEDTEC *ECGpro* starts saving the continuous ECG as an ECG strip.



☞ During the saving click the button to stop the strip prematurely.

The main measurement values for the last 10 seconds of the strip are indicated.

☞ Press the **button** to print the ECG continuously.

One, two or three channels are printed as a rhythm queue.
Depending on the printing parameters, it can take several minutes until a page is given out.

☞ Change the **print format**, **speed**, **sensitivity** and the **channels** to be printed for the running test procedure in : „*Settings* | *Print...*“ in the group of **Parameters for continuous print**.

☞ You can change the standard parameters for continuous printing in “*File* | *Option…* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Print during acquisition“*.

☞ Click once more to stop printing.

☞ Click the button to print the last 10 seconds of ECG in multi-channel mode.

☞ Change the print format, speed, sensitivity for the running test procedure in: „*Settings* | *Print...*“ in the group of **Parameters for printing of 10s ECG**.

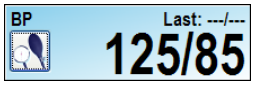
☞ You can change the standard **parameters for printing 10-seconds ECG** in “*File* | *Settings …* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Print during acquisition“*.

During the ECG acquisition, you can measure the blood pressure values several times one after the other automatically, or enter them manually.

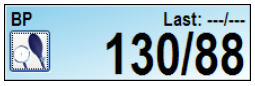
To be able to start the automatic measurement once more, the preceding measurement must be finished.

☞ Click
or
or ---/--- , or press **Shift+F3**.

☞ For that, proceed as described in section **Measuring and Entering Blood Pressure** on page **42**.



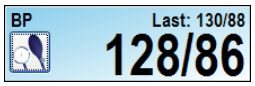
As soon as the blood pressure was automatically measured
or
was entered manually, the value is displayed in the lower line for 1 minute.



Within this time, the actual value can be corrected. No new value is added.

☞ Correct the blood pressure values as long as they are displayed in the input box.

After that, the value in the lower line is deleted and shown as last measured value in the field Letzter: 130/88 of the upper line.



☞ Now, add a new blood pressure value by clicking
or
the input box ---/--- , or by pressing **Shift+F3.**

Acquiring Rhythm ECG Manually

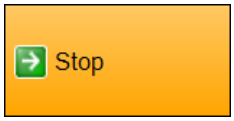
Manual acquisition is activated by factory selection.

☞ Click this **button** or press **F2**.
The button is only active if no electrode errors are indicated.
Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable.

AMEDTEC *ECGpro* changes to ECG acquisition.
The acquisition runs as long as it is stopped manually.

On starting, the acquisition time is indicated.
In case of 12-kanaliger lead, the acquisition can be analysed if more than 10 seconds were acquired.

The heart rate is always averaged over 10 seconds.



☞ Click this **button** or press **F2**.
☞ Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable

After having stopped the acquisition, the **last 10 seconds** are saved as ECG strip, and with more then 3 leads, also analysed. Requirement is that the acquisition time has reached 10 seconds.

If no active patient was selected, *ECGpro* opens the search function automatically. Select the data as described in section Search Patient Data on page 30.

Options

You can start the acquisition if electrode errors are indicated and the orange button is deactivated.
Also read in section **Applying Electrodes** on page **43**.
☞ Click this **button** or press **Ctrl+S**.

You can change to automatic acquisition. For that, read in following section **Recording rhythm ECG automatically**.
Also here, you can start the acquisition if electrode errors are indicated and the orange button is deactivated.
Also read in section **Applying Electrodes** on page **43**.
☞ Click this **button** or press **Ctrl+A**.

The options as of automatic acquisition are available.
☞ For that, read the preceding section.

Checking the Record

After completion of the acquisition the record is displayed for checking.

In case of automatically analysed records, the main measurement values, the results of analysis, the averaged beat and the beat classification are displayed.

Records are automatically measured and analysed only under the following conditions:

- Rhythm 12 test procedure
- Acquisition duration at least 10 seconds
- Date of birth and sex of the active patient were entered

As long as the electrodes are connected to the patient, the running ECG is displayed in the rhythm line.

For more details, you have more representations.

☞ Click the following **buttons**
or
Open the menu: „*View*“ and select the desired one.

Rhythm	2-channel view of the whole ECG as "a rhythm queue"
ECG	Representation as shown above
ECG Strip	Multi-channel EKG, results of analysis and averaged beat of a strip
Measurement Table	Measurement value table, results of analysis and averaged beat of a strip
Averaged Beat	Averaged beat, results of analysis and ECG of a strip
Lorenz Plot	Lorenz Plot from whole ECG

☞ Also read in section **Rhythm ECG - View** on page **108**.

During checking the record, you can execute the following functions.

- Click this **button** or press **F3**.
- Also read in section **Entering a Comment** on page **41**.

If you want to confirm the correctness of the diagnosis or the comment ,

- Click this **button** or press **Ctrl+B**.
- Note that the record cannot be changed any more after having been confirmed.
  Also read in section **Confirming Tests** on page **140**.

If you want to repeat the acquisition manually or in automatic mode,

- click this **button** or press **Ctrl+S**.

If you want to enter or correct the blood pressure,

- Click ---/--- , or press **Shift+F3**.
- Also read in section **Measuring and Entering Blood Pressure** on page **42**.

Measuring RR Distances

- Click **ECG measurement tool** in the title bar of the ECG window. The marking lines are made visible.
- Left-click on the place in the ECG at which you want to determine the RR distance, and you keep the button pressed. Drag the marking line over the R spike of a beat.
- Click on one of the other lines and move it this on another R spike.
- Right-Click in the ECG to open the context menu. They can add further lines or delete lines.
- Also read in section **ECG** on page **113**.

Marking and Editing a 10-Seconds ECG Strip

- Click **Select 10-seconds ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the selected range to the desired position.
- Click **Edit** and select the desired function in the dialogue box.
- Also read in section **ECG** on page **113**.

Marking and Editing an ECG Strip of Any Length

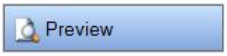
- Click **Select variable length ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the mouse and select a strip. As soon as the selected strip is longer than 10 seconds, a further mark appears and splits the selected strip. The right-sided part marks 10 seconds which are automatically measured and interpreted.
- If necessary, correct the beginning and the end of the selected strip by positioning the mouse pointer on the left or right margin, pressing the left mouse button and moving the margin with pressed button.
- Click **Edit** and select the desired function in the dialogue box.
- Also read in section **ECG** on page **113**.

Printing the Record

Standard format

If you want to print the record in the standard format,

- ☞ Click the button
  or
  press **Ctrl+P**
  or
  open the menu: “File | Print“.



If you want to display the printing preview,

- ☞ Click the button
  or
  press **Ctrl+F**
  or
  open the menu: “File | Printing Preview...“.

If you want to save a PDF file,

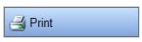
- ☞ Click the button
  and
  select folder and file name.

You can change the selection of the standard formats as follows:

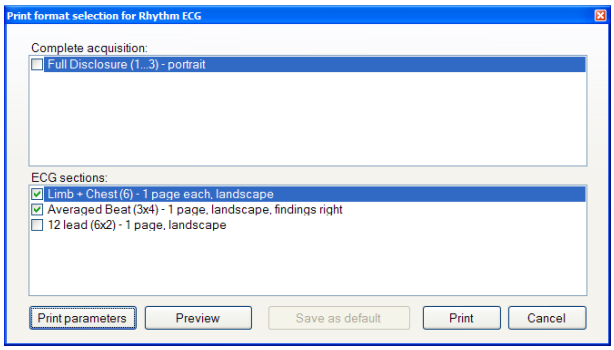
- ☞ Open “*File* | *Settings …* | *12 Lead ECG* | *Printing*“ and select **Rhythm ECG**.
- ☞ Move the desired print formats to **Used printing formats**.
- ☞ Activate the check box of the print formats which you want to print as standard.
- ☞ Note, that data for selected printformat must be available in acquisition. That means, Averaged beats can’t be printed without successful analysis.
- ☞ For the respective test procedure, enter varying print formats or printing parameters in “*File* | *Settings...* | *12 Lead ECG* | *Test procedures“* on the Printing tab.
- ☞ For that, read section **Printing** in the **AMEDTEC *ECGpro* settings** instruction.

Format Selection

Use **Format selection** if you want to use other print formats or to set other printing parameters.

- ☞ Right-click on  or 

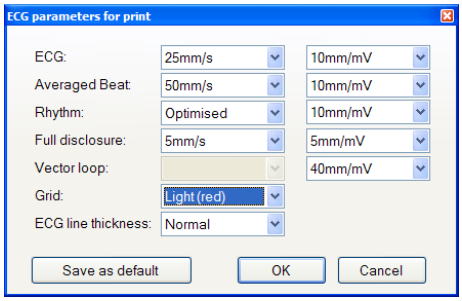
- ☞ Click on  or 



You find information on the print formats in the **Rhythm ECG** strip of the **AMEDTEC *ECGpro* print formats** instruction.

- ☞ Select the desired print formats.
- ☞ Deactivate the checkbox if the format should be neither printed, nor be displayed.
- ☞ Activate the checkbox if the format should be printed or be displayed.
- ☞ Click on **Print parameters** to set speed, resolution and grid.
- ☞ Click on **Preview** display the selected formats on the screen.
- ☞ Click on **Print** to print the selected formats. (If no format selected the Button is grey.)
- ☞ Click on **Save as a default** to use the selected formats as standard formats from now on.

Setting Printing Parameters



ECG:	multi-channel ECG representation
Rhythm:	single-channel rhythm representation below the multi-channel ECG
Full disclosure:	„Rhythm queue“ in rhythm ECG

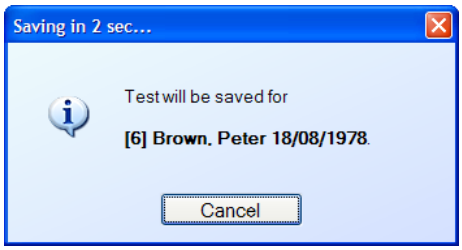
- ☞ Make the required settings
- ☞ Click on **Save as default,** if you want to use the changed parameters always from now on.

Saving the Record

After completion, the saving function is assigned to orange button.

☞ Click this **button** or press **F2**.

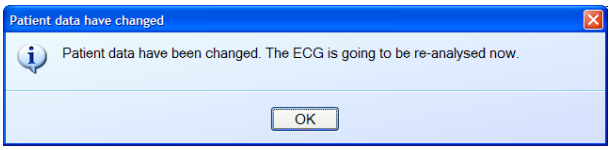
If no active patient was selected, *ECGpro* opens the search function automatically. Select the data as described in section **Search Patient Data** on page **30**.



Before the saving, AMEDTEC *ECGpro* displays a message with the data of the active patient.
If the indicated data do not correspond with the real data, you have 3 seconds time to cancel the saving process.

☞ Click **Cancel**.

If you find out that a wrong patient was selected, you can select a different patient as active patients. If the age or the sex change due to the selection of another patient, the ECG is analysed again.



☞ Confirm the repeated analysis of the EKG.

Alternatively to the orange button, you can use also this button.

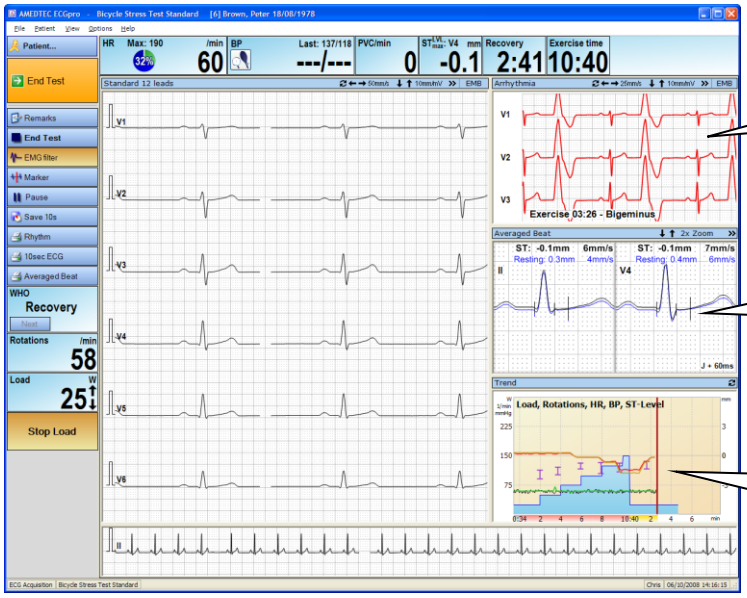
☞ Click this **button**
or
press **Shift+F12**.

If you do not want to save the record

☞ click this **button**
or
press **Ctrl+X**.

Acquiring Stress Test ECG

Stress Test Screen

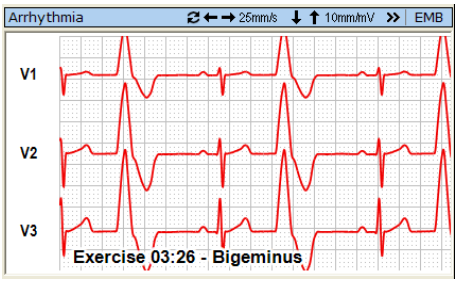


Representation of 12 Lead ECG

The window **Standard 12 Leads** provides several possibilities to change the representation of the ECG curves.

- ☞ For that, read section **Changing the ECG Representation** on page **45**.
- ☞ To change the basic settings of this window, open: "*File* | *Settings …* | *12 Lead ECG* | *Test procedures*". Select the test procedure (Bicycle Stress Test Standard) from the list and open the **Display** tab. Click on **Online ECG** and make your changes.
- ☞ For that, read section **12 Lead ECG / Display** in the **AMEDTEC *ECGpro* settings** instruction.

Arrhythmia Window



For the event are displayed:

- Phase, in which the event started
- Starting time of the event
- Name of the event

The ECG in the **Arrhythmia** window is updated every 2.5 seconds.

- ☞ Change speed, sensibility, channel position or elevation of the ECG curves as described in section **Changing the ECG Representation** on the page **45**.
- ☞ Right-click to open the context menu and select **Previous event** or **Next event** to change between events.

Note that the **beginning** of the event is displayed. In case of a long uninterrupted event, e.g., a bigeminal pulse, the displayed phase and beginning time will not change, as long as the bigeminal pulse continues.

Hence, it can happen that the bigeminal pulse is still marked for resting phase, although you have already come to the end of the test procedure.

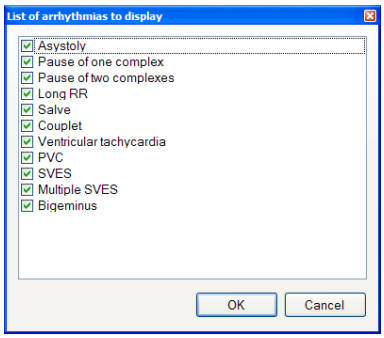
- ☞ To change the basic settings for ECG representation in the arrhythmia window, open: "*File* | *Settings …* | *12 Lead ECG* | *Test procedures*". Select the test procedure (Bicycle Stress Test Standard) from the list and open the **Display** tab. Click on **Arrhythmia** and make your changes.

Precondition for monitoring arrhythmia events is the **as** option in your ***CardioPart 12 USB*** or ***CardioPart 12 Blue***. Moreover, the measurement program must run.
If at start of the exercise the dialogue Ohne Vermessung arbeiten was selected, arrhythmia analysis is not performed.

The following arrhythmia events are displayed:

- Asystole
- 1 beat pause
- 2 beat pause
- Long RR
- Run
- Couplet
- Ventricular tachycardia
- VES
- SVES
- Several SVES
- Bigeminal pulse

- ☞ To change the basic settings, open: "*File* | *Settings …* | *12 Lead ECG* | *Test procedures*". Select the test procedure **Bicycle Stress Test Standard** from the list and open the **Arrhythmia events** tab. Disable the events not to be displayed.

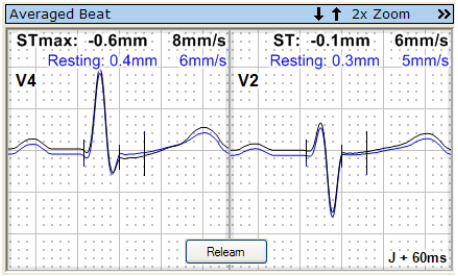


During the exercise ECG, you can exclude events from being displayed, or re-include them.

- ☞ Open the dialogue shown at the left in: "*Settings* | *Arrhythmia detection...*".

On starting the next exercise acquisition, these settings are reset to their original state.

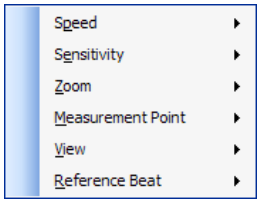
Averaged Beat



The averaged beat (calculated from 10 seconds ECG) is updated every 10 seconds.

The measured ST rate and the ST raise are shown in blue for the reference beat, and in black for the actual beat.
The **STmax** lead corresponds with that of the STmax display element on page **75**.

☞ Read there about ST settings.



☞ Left-click in the lead name to jump to the next lead.

☞ Right-Click on the lead inscription to open a context menu for the selection of another lead.

☞ Right-Click on the averaged beat.
A context menu in which you can carry out the settings as shown on the left, opens.

ST measuring point ▸

You can measure ST fixed at J+20ms, J+60ms, J+80ms or variable at J+1/8T and J+2/8T.
The variable ST measuring points adapt themselves to the length of the T wave.

☞ Point with the mouse to line **ST measuring point** ▸ and click on the desired ST measuring point.

The ST measuring point can be toggled at any time during the test procedure. Also during later opening and viewing of the record, another ST measuring point can be selected once more.
All analyses, summaries and printouts use the currently selected ST measuring point.

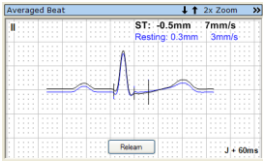
☞ Read on page **78** how to change the basic setting.

View ▸

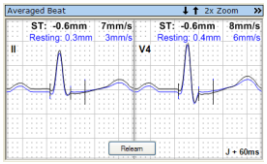
You can select from the views.

☞ Point with the mouse to line **View** ▸ and click on the desired representation.

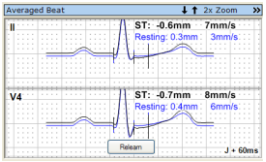
1*1



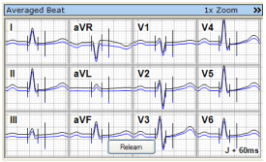
1*2



2*1



3*4



☞ To change the basic settings of the **Averaged Beat** representation, open: "*File* | *Settings …* | *12 Lead ECG* | *Test procedures*". Select the test procedure **Bicycle Stress Test Standard** from the list and open the **Display** tab. Click on **Small preview of the Averaged Beat** and make your changes.

The ST values can be displayed in mm, mV or µV.

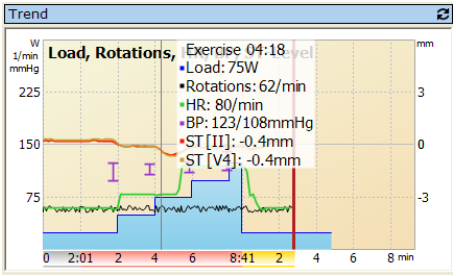
☞ Open "*File* | *Settings …* | *12 Lead ECG* | *ECG*" and change the measuring units of the **ECG Amplitude**.

Reference Beat ▸

The reference beat can be hidden. If both the reference beat and the actual beat are displayed, these can be shown congruently or with small or great distance to each other.

☞ In the context menu, point with the mouse to line **Reference Beat** ▸ and click on the desired representation.

Trend



The trend representation is updated every 10 seconds.

☞ To display the characteristics, place the mouse pointer on any point of time in the chart.

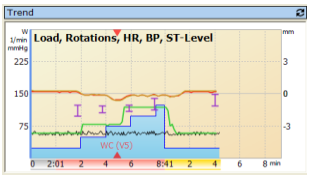
The following measurement values are displayed:

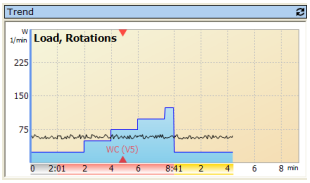
- Load and number of rotations
- Speed and slope
- Heart rate
- Blood pressure
- ST measured values of the two leads shown in the **Averaged Beat** window.
  If in the **Averaged Beat** window it is changed to **3*4 view**, the ST measurement values of both leads, which were selected before, continue to be displayed.

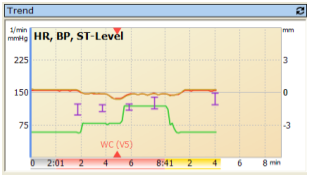
The coloured time scale shows the times of the load phases, in each case beginning with zero . The grey resting phase of followed by the red exercise phase and than by the yellow recovery phase.

You can show the window with all parameters or windows with a limited number of parameters.

☞ Use  to toggle the following windows.





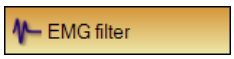


Functions

Remarks

☞ Read section **Entering a Comment** on page **41** for entering remarks and information on physician and user.

Filters

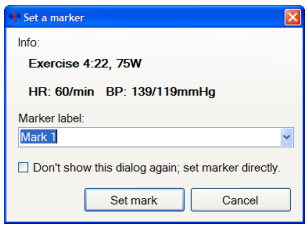


☞ Read on page **44** about ECG filters.

Marker

Use the marker function to mark a place in the ECG for easier finding at a later time.

☞ **Click** this button **or press** F4.



The **Marker** dialogue opens.

Under **Info**, you receive information on point of time, load stage and heart rate.

The marks get sequential numbers which is entered in the **Marker label** field.

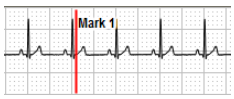
☞ Overwrite this entry if you wish to give a mark name, or select one of the predefined labels.
To change the basic settings, open: "*File* | *Settings …* | *12 Lead ECG* | *Marker Labels*".

☞ Activate **Don't show this dialogue again; set marker directly** if this dialogue shall not be displayed anymore. The marks will receive the label **Mark** and a sequential number.

☞ Save the mark with **OK**.

Decisively for the point of time of the mark is the pressing of the button 

or of the F4 key, but not the closing of the dialogue.



The mark is shown in the rhythm strip and in the multi-channel ECG.

Pause

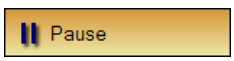
This function stops the multi-channel ECG, while the rhythm channel, all measurement and monitoring functions as well as the load control go on.

☞ **Click** this button
or
press F6.

The indications of **vital parameters and load parameters** and the contents of the **arrhythmia**, **averaged beat** and **results** windows continue to be updated. The actual ECG can be monitored in the rhythm channel.

You can turn back the standing ECG and save ECG strip, mark and print as well as measure RR distances.

☞ For that, read section **ECG** on page **123**.



☞ Click once more to let the ECG go on
or
press **F6** again.

Measuring RR Distances

- With standing ECG click **ECG measurement tool** in the title bar of the ECG window. The marking lines are made visible.
- Left-click on the place in the ECG at which you want to determine the RR distance, and you keep the button pressed. Drag the marking line over the R spike of a beat.
- Click on one of the other lines and move it this on another R spike.
- Right-Click in the ECG to open the context menu. You can add further lines or delete lines.
- Also see section **ECG** on page **123**.

Marking and Editing a 10-Seconds ECG Strip

- With standing ECG click **Select 10-seconds ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the selected range to the desired position.
- Click **Edit** and select the desired function in the dialogue box.
- Also see section **ECG** on page **123**.

Marking and Editing an ECG Strip of Any Length

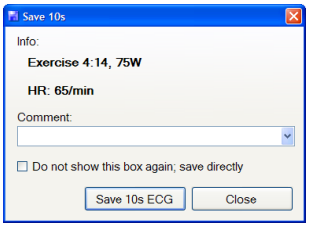
- With standing ECG click **Select variable length ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the mouse and select a strip. As soon as the selected strip is longer than 10 seconds, a further mark appears and splits the selected strip. The right-sided part marks 10 seconds which are automatically measured and interpreted.
- If necessary, correct the beginning and the end of the selected strip by positioning the mouse pointer on the left or right margin, pressing the left mouse button and moving the margin with pressed button.
- Click **Edit** and select the desired function in the dialogue box.
- Also see section **ECG** on page **123**.

Saving the ECG Strip

With this function, you save the last 10 seconds of an ECG strip.

☞ **Click** this button
or
press F5.

AMEDTEC *ECGpro* saves retrospectively the ECG strip which ends immediately with the mouse click.



The dialogue **Save 10s** opens.

Under **Info**, you receive information on point of time, load stage and heart rate.

☞ In the field **Comment,** enter a text or select one from a list of predefined texts.
To change the basic settings, open: "*File* | *Settings …* | *12 Lead ECG* | *Marker Labels*".

☞ Activate **Do not show this dialogue again, save directly** if this dialogue shall not be displayed anymore.

☞ Press **Save 10s ECG** to save the ECG strip.

The ECG strip is shown in colour in the rhythm strip and in the multi-channel ECG.

The ECG strip can be marked later or be deleted.

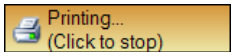
Continuous Printing

☞ Press the **button** to print the ECG continuously.

One, two or three channels are printed as a rhythm queue.
Depending on the printing parameters, it can take several minutes until a page is given out.

☞ Change the **print format**, **speed**, **sensitivity** and the **channels** to be printed for the running test procedure in : „*Settings* | *Print...*" in the group of **Parameters for continuous print**.

☞ You can change the standard parameters for continuous printing in "*File* | *Option…* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Print during acquisition"*.



☞ Click once more to stop printing.

Printing 10-Seconds ECG and Averaged Beat

☞ Click the button to print the last 10 seconds of ECG in multi-channel mode.

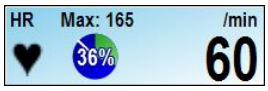
☞ Click the button to print the averaged beat computed from the last 10 seconds in 3x4 representation.

☞ Change the print format, speed, sensitivity for the running test procedure in: „*Settings* | *Print...*" in the group of **Parameters for printing of 10s ECG**.

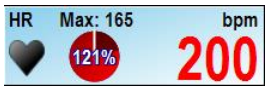
☞ You can change the standard **parameters for printing 10-seconds ECG** in "*File* | *Settings …* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Print during acquisition"*.

Display Elements

Heart Rate

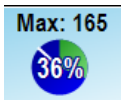


The value averaged for 10 seconds is indicated. This value is refreshed every 2 seconds.



On reaching the target / limit, the heart rate is indicated in red.
In diagrame values more then 100% are shown in brown colour.

As soon as the electrodes were applied, the symbol ♥ starts to blink with every beat.



The limit value (maximum permissible heart rate) and its percentage reached are displayed.

You can adjust a fixed limit value or allow to compute the value as a function of the patient's age.

During the display of the **Stress Test Parameters**, the limit value can be changed before the beginning of the test procedure.

- ☞ For that, read on the page **84**.
- ☞ Read on page **78** how to change the basic setting.

Blood Pressure

As soon as the blood pressure was automatically measured or was entered manually, the value is displayed in the lower line for 1 minute. Within this time, the value can be corrected. A new value can be entered only afterwards.

- ☞ Correct blood pressure values as long as they are displayed in the lower line.

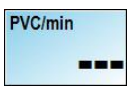
At the end of this minute, the value in the lower line is deleted and shown as last measured value in the upper line.

During the ECG acquisition, you can measure the blood pressure values several times automatically one after the other (considering the time shown on top), or enter them manually. The automatic measurement can be started only after completion of the preceding measuring process.

- ☞ Click
  or
  ---/--- , or press **Shift+F3**.
- ☞ Proceed as described on page **42** in section **Measuring and Entering Blood Pressure**.

On reaching the pre selected systolic or diastolic limit values, the values are indicated in red.

Number of Ventricular Extrasystoles



The number of **premature ventricular contractions** which have occurred in the last 60 seconds is indicated. The updating of the values takes place after every 10 seconds.

Measure of the Perceived Exertion

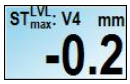
The input box for RPE values (rate of perceived exertion) can be used optionally.

- ☞ Left-click in the box and enter a value between 6 and 20. Complete the input with the **Enter key**.

By factory selection, the input box is disabled.

- ☞ To enable the input box, open: "*File* | *Settings …* | *12 Lead ECG*", Tab sheet **Stress Test**. In the **Stress Settings** group, enable **Use RPE**.

Maximum ST Value



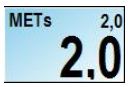
In all leads selected for that, it is searched for the maximum ST value, and it is indicated this together with this lead.

You can allow to display the maximum ST depression, the maximum ST elevation or the maximum amount of ST.
By factory selection, the maximum ST depression is enabled.

- ☞ Make you changes for the running test procedure in: „*Settings* | *ST...*".
- ☞ To change basic settings, open: "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *ST Settings*".

On reaching the limit value, it is indicated in red.

Metabolic Index



The indication of mead METs values can be used optionally. By factory selection, it is disabled.

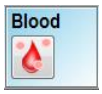
- ☞ Open "*File* | *Settings …* | *12 Lead ECG* | *ECG*". In the **Stress settings** group , enable **Use METs**.
- ☞ Set the button **Use actual load** or **Use target load** in the same group.

METs with bicycle stress test needs body weight, but with treadmill it doesn't.

Blood gases

The input of blood gas values can be used optionally. By factory selection, it is disabled.

- ☞ Open "*File* | *Settings …* | *12 Lead ECG* | *ECG*". In the **Stress settings** group , enable **Use Blood gases**.



- ☞ Press button for marking the blood withdrawal. In table a new line with actual time point is created.

- ☞ For opening the table press small button on right side. Enter the measurement value to line with correct time point.

- ☞ If tome point of measurement is not marked you can add a new line in table. For this press button in dialog **Blood Gases**.

- ☞ Delete unnecessary lines in the Blood gases dialog with this butto.

Time in Stage

The upper indicates the name of the stage and the time still remaining in it. The **Stop Load** and **Hold** functions stop this indication of time.

The lower line shows the time already elapsed in the stage.

Time in Phase

The time elapsed in the phase is indicated.

Stages in Resting Phase with Treadmill Ergometer

By factory selection, the resting phase with treadmill ergometer stress test consists of the stages **Laying**, **Sitting**, **Standing** and **Hyperventilating**.

Warnings

During the exercise, the heart rate, the blood pressure values, the ST values and the load values are monitored. For that, the corresponding checkboxes must be activated in the **test procedure data**.

☞ For that, read section **Stress Test Parameters** on page **84**.

On reaching the maximum ratings and destination values, warning messages are indicated and repeated from this time on every 2 minutes.

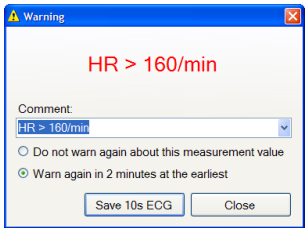
☞ Click on **Do not warn again** if the message should not longer be indicated.

The text of the message is entered in the **Remarks** box .

☞ Overwrite this entry if you wish to change a remark, or select one of the predefined texts.
To change the basic settings, open: "*File* | *Settings …* | *12 Lead ECG* | *Marker Labels*".

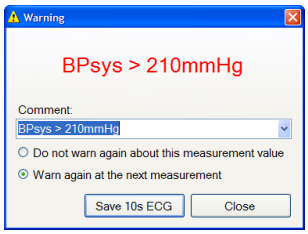
Click the button Save 10s ECG if you wish to save the last 10-seconds ECG strip before the warning appeared, or click Close if you wish not to save anything.

Heart Rate Too High



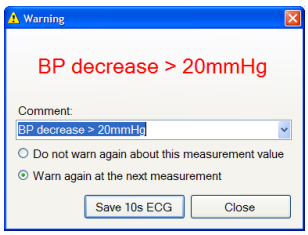
The value of the heart rate has exceeded the limit value shown.

Systolic Blood Pressure Value Too High



The value of the systolic blood pressure has exceeded the limit value shown. An corresponding warning is displayed for the diastolic blood pressure.

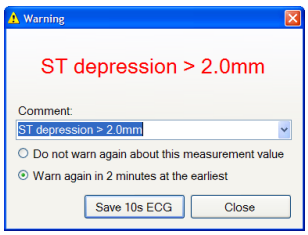
Systolic Pressure Drop Too High



Compared with the preceding measurement, the value of the systolic blood pressure decreased by more than 20 mmHg.

This warning is displayed only in the exercise phase.

ST Depression Too High

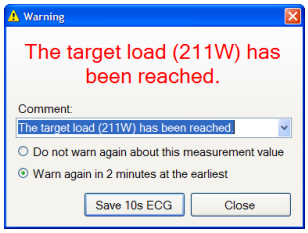


The value of the maximum ST depression has exceeded the limit value in one of the leads selected for monitoring.

You can allow to display the warnings for the maximum ST depression, the maximum ST elevation or the maximum amount of ST.
By factory selection, the maximum ST depression is enabled.

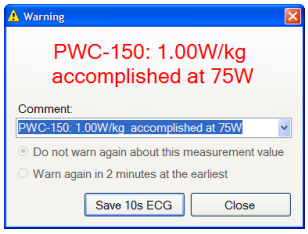
☞ Make you changes for the running test procedure in: „*Settings* | *ST...*".

Target Load Reached



The target load was reached.

PWC Reached



The PWC value was reached.

Basic Settings for Limit and Target Values

The basic settings for messages can be changed for every test procedure.

☞ Open "*File* | *Settings …* | *12 Lead ECG* | *ECG* | *Test procedures*" and select the test procedure, the pre selected values of which you wish to change.

☞ Set on the following tabs:

Heart Rate

- ➢ the absolute value, or
- ➢ the maximum or the proportional extent of capacity utilisation with geriatric-dependent and sex-dependent calculation.
- ➢ whether the limit value should be used. If the checkbox is not enabled, no warning is displayed. The setting also has an effect on the **Heart rate** display element on the page **74**.

Blood Pressure

- ➢ the systolic and the diastolic limit value. If no value is selected, no warning is displayed. This applies also to the **Blood pressure** display element described on page 68.
- ➢ the value for the warning at drop of the systolic blood pressure value. If no value is selected, no warning is displayed.

ST settings

- ➢ the value of the ST elevation and the ST depression. If no value is selected, no warning is displayed. This applies also to the **Maximum ST value** display element described on page **74**.
- ➢ whether the warning should be displayed at ST depression, ST elevation or with the amount of ST.
- ➢ on which channels should be searched for the maximum
- ➢ which ST measuring point should be used.

Load Settings

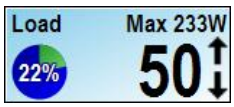
- ➢ the calculation method for the target load as a standard, after Jones (with and without consideration of the weight), or after Wasserman
- ➢ whether a message should be displayed on achieving the destination value. If the checkbox is not enabled, no warning is displayed. This applies also to the **Load** display element described on page **79**.
- ➢ whether a message should be displayed on achieving PWC150 or PWC170 .

Load Control

Load Control in the Bicycle Stress Test

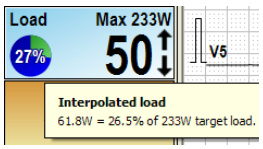
The upper line shows the target value of the load.
Below it, the load available at the bicycle ergometer is indicated.

- ☞ Click ↑ to increase the load.
- ☞ Click ↓ to decrease the load.

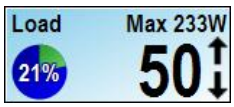


The load values in the stage profile of a bicycle stress test can be displayed as interpolated values. This function must be enabled.

- ☞ Open "*File* | *Settings...* | *12 Lead ECG* | *Test procedures*". Select the **Bicycle Stress Test** procedure. Open the **Exercise Settings** tab, and there enable the checkbox **Interpolation of reached load**. (Do not use this function, if the setting **Always complete current stage on end of exercise** is active.)



- ☞ To see the interpolated load value, hold the mouse over the percentage pie chart.
- ☞ To change the indication from percentage to wattage, click into the circle.

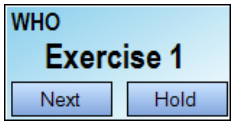


The profile and the stage in the resting phase are indicated.

Click Next to change to the next stage of the resting phase.
It is only active if the protocol intends the second stage in the resting phase.

This button opens a selection box with all stages which are defined in the profile for the resting phase.

- ☞ Click the button to select a different label of the stage.



The profile and the stage in the exercise phase are indicated.

- ☞ Click Next if you wish to finish this load stage and to change to the next one.
- ☞ Click on Hold if you wish to prolong the load stage. This state is indicated be a colour change of the Hold button.
  The indication box **Time in stage** indicates the remaining time. Refer to page **76**.
- ☞ Terminate holding of a load stage by clicking Hold or Next again.

- ☞ Click the **button** switch off the load.

- ☞ Click the **button** switch on the load.

- ☞ Click one of this **buittons** for moving saddle position, if bycicle with such feature is connected (like medical bike).

- ☞ Click this button to quit the stress test prematurely.

Load Control in the Treadmill Stress Test

The digits are grey, because the treadmill does not run.

The start value of the **speed** is indicated.

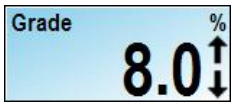
- ☞ Click ↑ to increase the value.
- ☞ Click ↓ to decrease the value.

The start value of the **grade** is indicated.

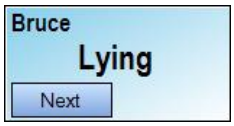
- ☞ Click ↑ to increase the value.
- ☞ Click ↓ to decrease the value.

- ☞ Click the **button** start the treadmill ergometer.

- ☞ Click ↑ to increase the **speed**.
- ☞ Click ↓ to decrease the **speed**.



- ☞ Click ↑ to increase the **grade**.
- ☞ Click ↓ to decrease the **grade**.

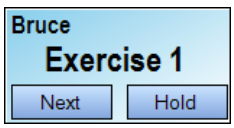


The profile and the stage in the resting phase are indicated.

- ☞ Click Nächste if you wish to finish this load stage and to change to the next one.
- ☞ Click Nächste to change to the next stage of the resting phase.

This button opens a selection box with all stages which are defined in the profile for the resting phase.

- ☞ Click the button to select a different label of the stage.



The profile and the stage in the exercise phase are indicated.

- ☞ Click Next if you wish to finish this load stage and to change to the next one.
- ☞ Click on Hold if you wish to prolong the load stage. This state is indicated be a colour change of the Hold button.
  The indication box **Time in stage** indicates the remaining time. Refer to page **76**.
- ☞ Terminate holding of a load stage by clicking Hold or Next again.

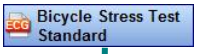
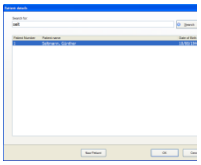
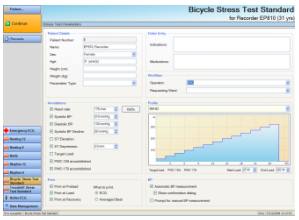
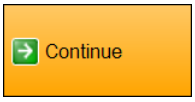
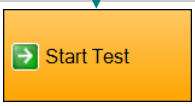
- ☞ Click the **button** switch off the treadmill ergometer.

- ☞ Click this button to quit the stress test prematurely.

Operating Steps - Overview

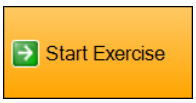
By factory selection, AMEDTEC *ECGpro* is set so that you can carry out a bicycle stress test with the WHO exercise protocol without having to carry out further settings. The **orange button** guides you through the program.

Use the functions under options only if you want to deviate from the routine.

		Routine	Options	
1	**Select the test procedure.**			**Ctrl+7**
2	**Search the data of the active patient or enter new patient data.**			
	Here you get an overview of all test procedure data. Check the patient's data. Check the limit for the annotations. Select another profile or customise the selected profile. Check the options for printing and blood pressure measurement.			
3	**Go to the hook up scheme and apply the electrodes.** **Incorrectly applied electrodes blink.** **Note the graphs indicating the hook up quality.** **Check the ECG traces.**			**F2**
	Enable the filter only if no sufficient acquisition quality can be achieved. Enter a remark.			**F3**
4	**Start the Stress Test.** **The button becomes only active if all electrodes are applied correctly.**		button of *CardioPart 12 Blue*	**F2**
	Repeat the calculation of the average beat if the quality is insufficient. Place a label and letter it. Stop the multi-channel ECG and turn back to see events again and to print. Save the last 10 seconds as an ECG strip. Print the continuous ECG. Click once more to stop printing. Print the last 10 seconds as an ECG strip. Print the averaged beat of the last 10 seconds Start the blood pressure measurement for the resting phase or enter a blood pressure value manually.			**F4** **F6** **F5** **Ctrl+F3**

g

5 **Start the Exercise Phase.**



F2

Click ↑ to increase the load and ↓ to decrease it.

Ctrl+↑
Ctrl+↓

At any time, you can switch to the next load stage or maintain the actual load stage as long as you like.

Next

Hold

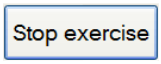
6 **Start the Recovery Phase.**

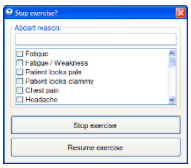
Otherwise the Recovery Phase will be started automatically by the protocol.

F2

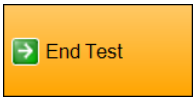
7 Enter a reason for the abort of the Exercise Phase.

Alternatively, resume the exercise.





8 **End the Stress Test.**



button of *CardioPart 12 Blue*

Check the ECG. Use the views as shown on the right.

In the "Summary" view , enter your findings.

Perform a confirmation of the diagnosis. Your username is added then together with datum and time to the diagnosis or to the remark.

Ctrl+B

View at the standard formats in the preview on the monitor.

Ctrl+F

Print the recording in the standard format.

Ctrl+P

Save a PDF file

9 **Save the record**

F2

Stop here if you do not wish to save the record.

Ctrl+X

Selecting the Test Procedure

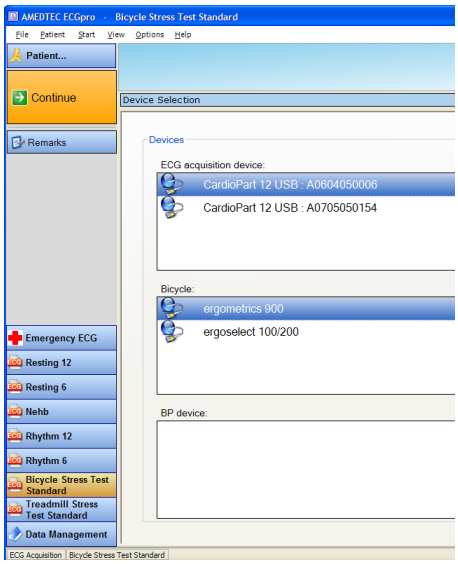
Select the test procedure, before applying the electrodes.

☞ Click the button
or
press **Ctrl+7**
or
open the menu: „*Start*“ and click **Bicycle Stress Test Standard**.

☞ To change to the data management, click
or
press **Ctrl+8**
or
open the menu: „*Start*“ and click **Data management**

Device Selection

The device selection window is displayed if either no or several acquisition devices or exercise equipment are set.



ECG Acquisition device

☞ Click on the device that you want to use.

☞ For selection of the ECG acquisition devices, read section **Selecting the ECG Acquisition Device** on page **40**.

Bicycle

☞ Click on the bicycle that you want to use.

☞ If the list is empty, set one or several exercise equipment.

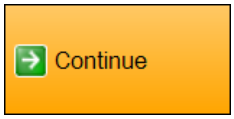
☞ On connection and setting of exercise equipment, read section **Connecting Devices** under **Putting into Operation** on page **7** as well as section **General Settings** under **Putting into Operation** on page **10**.
Also refer to the section **Devices** in the **AMEDTEC *ECGpro* settings** instruction.

Blood Pressure Metre

You can carry out the stress test if no blood pressure metre is set. Then the automatic blood pressure measurement is disabled.

At the times set in the profile, a request for manual blood pressure measurement is displayed.

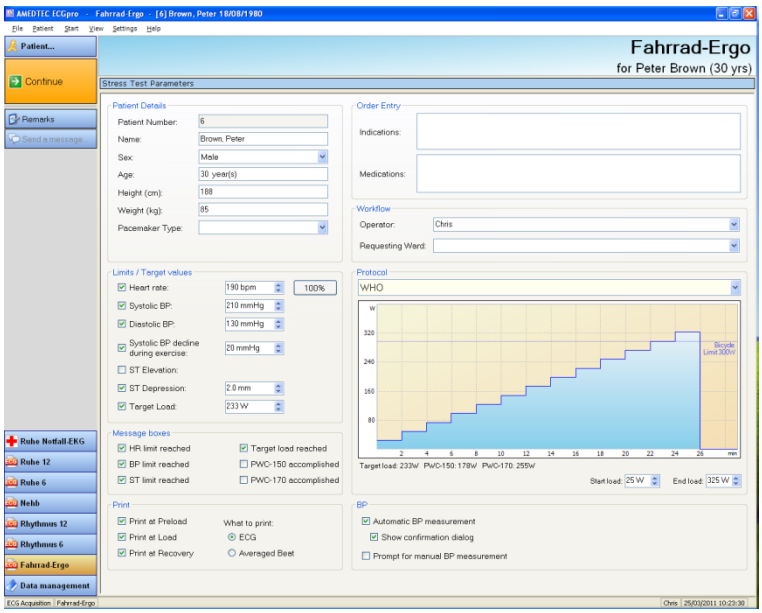
☞ On connection and setting of pressure metres, read section **Connecting Devices** under **Putting into Operation** on page **7**.
Also refer to the section **Devices** in the **AMEDTEC *ECGpro* settings** instruction.



☞ Finish the device selection.
Click this button or press **F2**.
You can go on only if an ECG acquisition device and an exercise equipment were set.

Stress Test Parameters

Before the start of a stress test acquisition, the **Stress Test Parameters** are indicated.



Patient's Data

Corrections of the patient's data are taken over to the patient's administration.

- ☞ It is not possible to edit the patients name.
- ☞ Make sure that size, weight and age are indicated.
- ☞ Age and Sex may be entered but fields are not edit able.

For changing the patient, press button Patient… and on this dialog use button Search.

Request

In the boxes **Indication** and **Medication,** the entries from the **patient's data** tab are indicated.

- ☞ Correct them if necessary.

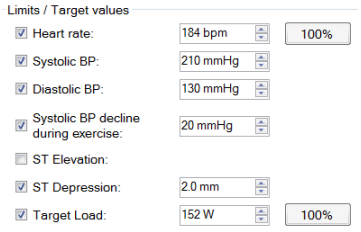
Text modifications are taken over to the **patient's data** tab.

Matters of Organisation

The user logged in is indicated as an operator.

- ☞ Open the list box and select a different operator from the list.
  Edit the operators list in: "*File* | *Settings*… | *General* | *Operators*".
- ☞ Select the **Requesting Ward** from the list of the wards.
  Edit the stations list in: "*File* | *Settings*... | *General* | *Wards*".

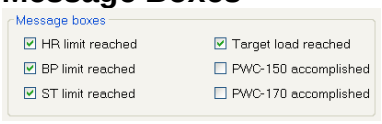
Limits / Target values



- ☞ Click to activate or to deactivate the calculation of Limits / Target values.
- ☞ Change the values behind an enabled check box to shift the maximum rating for the warning message.
  The changes are used only for the forthcoming test procedure. For the next test procedure, the basic settings are indicated again.
- ☞ To change a value, click in the field and enter the new ones using the number keys
  or
  click on ▲ or ▼ .

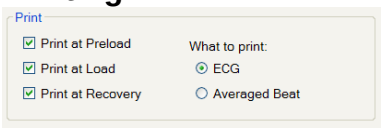
To change the heart frequency percentage or the Target Load percentage, click 100%. This will toggle the fields of absolute value and percentage. Change the percentage as described above.

Message Boxes



- ☞ Deactivate the checkbox to suppress the Message Box.
- ☞ If the respective checkbox was enabled, a warning message is displayed in case of exceeding a limit value during the test procedure.

Printing



- ☞ Deactivate the checkbox to disable printing.
- ☞ Select the **Averaged Beat** radio button, if the averaged beat should be printed instead of 10-seconds ECG.

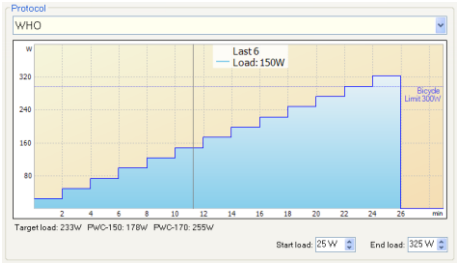
The changes are used only for the forthcoming test procedure. For the next test procedure, the basic settings are indicated again. The basic settings depend on the load profile set.

Profile

On starting a bicycle stress test, all bicycle profiles, and on starting a treadmill stress test, all treadmill ergometer profiles are indicated in the list box for selection.

- ☞ If max Load of Bycicle (Treatmill) is lower than load in profile, the profile is limited by blue line “Bicycle Limit xyz W”.
- ☞ If you want to use another profile, select it from the list.

If the list contains no suitable profile, you can change the shown profile.

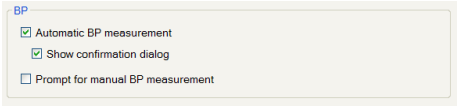


- ☞ Move the whole load profile up or down by changing the **start load**.
- ☞ Increase or decrease the slope by changing the **end load**.
- ☞ With the cursor, point to any place in the profile to read the exact load value.

The changes are used only for the forthcoming test procedure. For the next test procedure, the basic settings are indicated again.

The load profiles can be changed in: “*File* | *Settings…* | *12 Lead ECG* | *Profiles*“.
A load profile is assigned to a test procedure in: “*File* | *Settings…* | *12 Lead ECG* | *Test procedures* | *Stress test* | *Exercise Settings*“.

Blood Pressure Measurement



Both the upper check boxes are only active if you use an automatic blood pressure metre.

☞ Deactivate the checkbox **Automatic BP measurement** if you do not wish to use the blood pressure metre in the actual load.

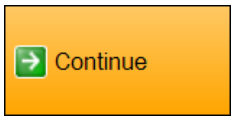
As soon as an automatic blood pressure measurement is completed, a confirmation dialogue with the measured values is displayed.

☞ Deactivate the checkbox **Show confirmation dialogue** if you do not wish to display this dialogue again.

If the automatic blood pressure measurement is off, an input dialogue which requests manual measurement can be displayed instead of the automatic measurement at the times set in the profile.

☞ Use the checkbox **Prompt for manual BP measurement** to activate this function.
If no blood pressure measurement is set in the profile, this function is not available.

☞ The start of manually or automatic Blood Pressure measurement may be signalized by playing an sound file. Please read the document **Settings**, Tab page **"Stress Test"**.



☞ Confirm the **test procedure data.**
Click this button or press **F2**.

Preparing the Patient

Apply the electrodes as described on page 43.

- ☞ Apply the arm electrodes on the back position above the scapula and the bone electrodes above the waist-line.
- ☞ Fix the electrode cables with an adhesive tape immediately near the electrode.
- ☞ For suction electrode equipment and for all reusable electrodes, use a contact spray.
- ☞ If using suction electrode systems make sure that the flexible tubes hang freely and that the electrodes are not tensioned.
- ☞ If possible do not use EMG filter and Mains filter.
- ☞ While recording phasis the quality of electrodes is displayed in status line in right bottom corner. The color of electrodes reflects the application quality. Please read on page **43**.

Familiarize patient with the process before you start the Stress Test.

Bicycle

The start load for the resting phase is automatically set.

- ☞ Adjust the saddle height and the position of the handle bar.
- ☞ Explain to the patient that he should pay attention to the indication for the speed range .
- ☞ Let patient pedal for a short time.
- ☞ If necessary Increase or decrease the load to accustom the patient to it.

Treadmill

The start load and the slope for the resting phase are automatically set. The treadmill is stopped.

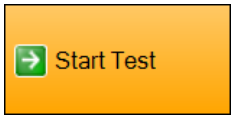
- ☞ Show the patient how the treadmill ergometer works.
- ☞ Start the treadmill and vary speed and slope for a short time.
- ☞ Stop the treadmill again.
- ☞ Explain the function of the emergency stop switch.
- ☞ Show how the patient should enter later the treadmill.

Security Instructions for Treadmill Stress Test

The patient is to step onto the slowly running treadmill.
At this, the patient stands with his feet right and left of the cord.
While he holds the handles, he steps first with a foot onto the treadmill and then moves the other foot onto it.

Never start the treadmill if the patient stands already on it. There is acute danger of falling and physical hazard.

Starting Stress Test



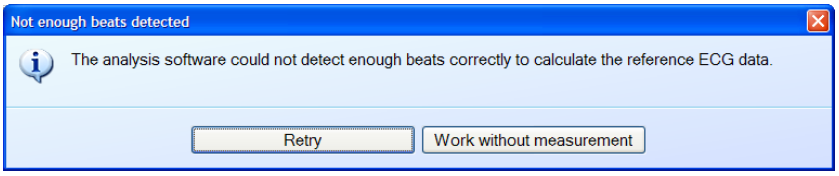
☞ Click this button or press **F2**.
Exit the electrode application scheme and change to the resting phase of stress test.
The button is only active if no electrode errors are indicated.
Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable.

From the start of the stress test, the ECG is saved up to the end.

You can start the test if electrode errors are indicated and the orange button is deactivated.
For that, read section **Applying Electrodes** on page **43**.

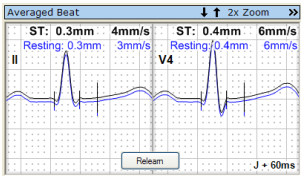
☞ Click this button or press **Ctrl+S**.

In this case, the analysis program is not available. The following message appears.

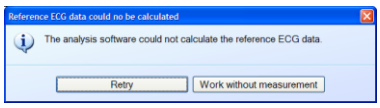


☞ Click on **Work without measurement**.

Wait until an averaged beat is indicated.



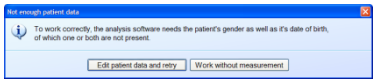
☞ Use the button Releam to repeat the averaged beat calculation if the quality of the indicated averaged beat is insufficient.



With a very disturbed signal or with incorrect electrodes, the massage on the left appears.

☞ Improve the signal quality. At this, check all 12 lead channels.
Click on Retry to restart the averaged beat calculation.

☞ Alternatively, your can start the whole exercise without measurement program. In this case, no ST calculations are carried out. There is no arrhythmia analysis and no beat classification. The **Arrhythmia** and **Averaged beat** windows remain empty.



The sex and the age of the patient was not entered yet.

☞ Click Edit patient data and retry.

Bicycle

The start load for the resting phase is automatically set.

Treadmill

The start values for the resting phase are automatically set. Since the treadmill is not running yet, the digits for speed and slope are grey.

If the patient should warm up himself in the resting phase,

☞ ask him now to start pedalling.

☞ Change the load, if necessary.

☞ start the treadmill. Ask the patient to enter the treadmill.

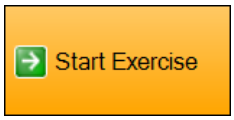
☞ If necessary, change speed and slope.

Measure the blood pressure in the resting phase

- ☞ Start the blood pressure metre or enter a blood pressure value through the keyboard
- ☞ Read also section **Display Elements** on page **74**.

Start the exercise phase after the blood pressure value is indicated.

Starting the Exercise



☞ Click this button or press **F2**.
You are now changing to the exercise phase of the Stress Test.

When entering the exercise phase, the load profile starts to be executed automatically.

Bicycle

The start load for the first stage is automatically set.

Treadmill

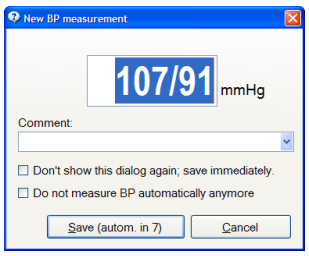
The treadmill ergometer is automatically accelerated until the speed of the first stage is reached.

☞ Inform the patient about the start of the treadmill ergometer.

At the times specified in the protocol, ECG strips of 10 seconds are saved.

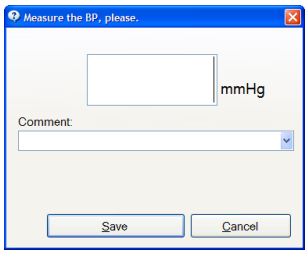
At the times specified in the protocol, the blood pressure is measured.

The start of the automatic blood pressure measurement is indicated by the rotating progress indication on the left of the BP field.



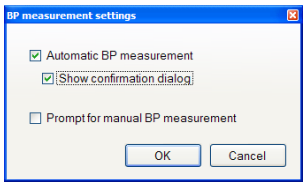
As soon as an automatically measured blood pressure value is given, this **blood pressure** is indicated in the **New BP measurement** dialogue box and saved automatically after 10 seconds.

- ☞ Click Save (autom. in 7), to take over the indicated value and to close the dialogue immediately.
- ☞ If necessary, click in the measured value within in the time indicated on the button Save (autom. in 7) and correct them.
- ☞ Enter a remark or select one from a list of predefined texts.
  To enter remark or to edit them, open: "*File* | *Settings…* | *12 Lead ECG* | *Marker Labels*".
- ☞ Enable the checkbox **Don't show this dialogue again, save immediately** if you do not wish to display the dialogue box any more.
- ☞ Enable the checkbox **Do not measure BP automatically anymore** if no further automatic blood pressure measurement should be carried out; then you receive the request for manual measurement.



The request **Measure the BP, please** appears if no automatic blood pressure metre is connected or the automatic measurement is deactivated.
Then the dialogue is displayed 45 seconds before the time set in the profile.

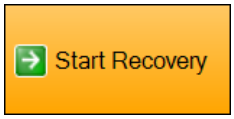
- ☞ Enter the manually measured blood pressure values in the bigger box.
- ☞ Enter a remark or select one from a list of predefined texts.
  To enter remark or to edit them, open: "*File* | *Settings…* | *12 Lead ECG* | *Marker Labels*".
- ☞ Accept the input by clicking Speichern .



You can also change the settings for the automatic blood pressure measurement during the exercise:

- ☞ Open the dialogue shown on the left in: „*Settings* | *BP...*".
- ☞ Deactivate the **Show confirmation dialogue** checkbox if the **New blood pressure** dialogue should not be displayed any more.
- ☞ Activate the **Prompt for manual BP measurement** checkbox if the automatic blood pressure metre was disabled. The **Measure the BP, please** dialogue requests to measure manually at the times specified in the profile.

Stopping the Exercise



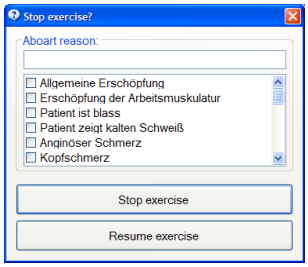
☞ Click this button or press **F2**.
You are now changing to the recovery phase of the Stress Test.

Bicycle

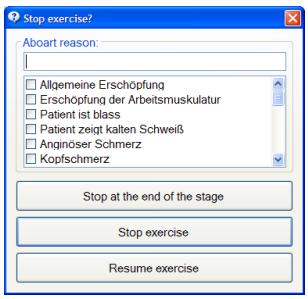
The load is set to the value selected for recovery.

Treadmill

The speed and the slope are set to the values selected for recovery.



- ☞ Select one or several abort reasons from the list or enter your own text.
- ☞ Click Stop exercise to enter the recovery phase finally.
- ☞ Click Resume exercise to go back into the exercise stage.
- ☞ To add new entries to the list of abort reasons, open: "*File* | *Settings…* | *12 Lead ECG* | *Abort Reasons*".



You can stop the exercise phase in defined way at the end of a load stage even in case of premature stoppage.

- ☞ Click Stop at the end of the stage to execute the started load stage up to its end. Only after that, it is switched to the recovery phase.

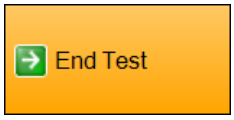
This function must be enabled.

- ☞ Open "*File* | *Settings …* | *12 Lead ECG* | *Test procedures*". Select the Bicycle Stress Test procedure. Open the **Exercise Settings** tab and activate the **Always complete current stage on end of exercise** checkbox under **Profile** .

- ☞ Click the button to add new abort reasons or to delete already selected abort reasons.

If the load is not stopped prematurely, an automatic change to the recovery phase takes place.

Finishing Stress Test



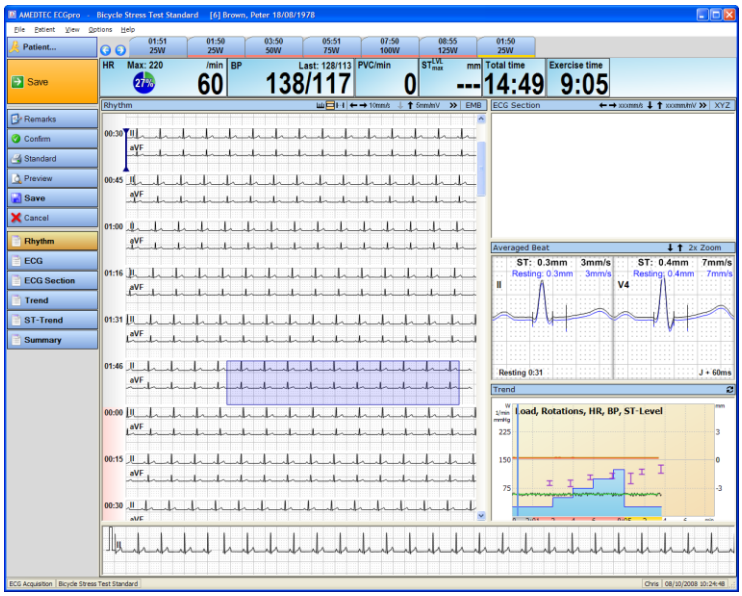
☞ Click this button or press **F2**.

☞ Alternatively the power button ⊙ of *CardioPart 12 Blue* is usable.

The ECG acquisition is finished. The ECG is displayed for checking.

Checking the Record

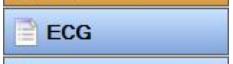
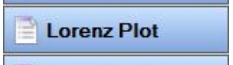
After completion of the acquisition the record is displayed for checking.



As long as the electrodes are connected to the patient, the running ECG is displayed in the rhythm line.

For more details, you have more representations.

☞ Click the following **buttons**
or
Open the menu: „*View*“ and select the desired one.

	Representation as shown above
	Complete ECG, multi-channel, averaged beat and trend
	ECG strip, averaged beat and trend
	Trend charts and complete multi-channel ECG
	Trend charts, averaged beat and complete multi-channel ECG
	Lorenz Plot from whole ECG
	Result table, strip, averaged beat and trend

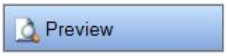
☞ For that, read section **Exercise ECG - View** from page **120**.

Printing the Record

Standard format

If you want to print the record in the standard format,

☞ Click the button
or
press **Ctrl+P**
or
open the menu: "*File* | *Print*".



If you want to display the printing preview,

☞ Click the button
or
press **Ctrl+F**
or
open the menu: "*File* | *Print Preview...*".

If you want to save aPDF file,

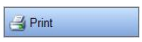
☞ Click the button
and
select folder and file name.

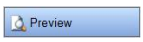
You can change the selection of the standard formats as follows:

- ☞ Open "*File* | *Settings…* | *12 Lead ECG* | *Printing*" and select **Stress Test**.
- ☞ Move the desired print formats to **Used printing formats**.
- ☞ Activate the check box of the print formats which you want to print as standard.
- ☞ Note, that data for selected printformat must be available in acquisition. That means, diagrames can't be printed without successful analysis.
- ☞ For the respective test procedure, enter varying print formats or printing parameters in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures*" on the **Printing** tab.
- ☞ For that, read section **Printing** in the **AMEDTEC *ECGpro* settings** instruction.

Format Selection

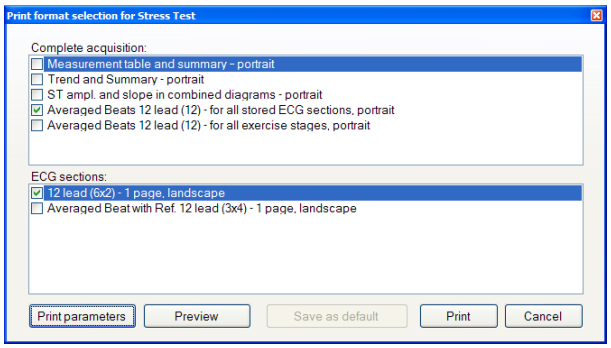
Use **Format selection** if you want to use other print formats or to set other printing parameters.

☞ Right click on 

or 

☞ Click on 

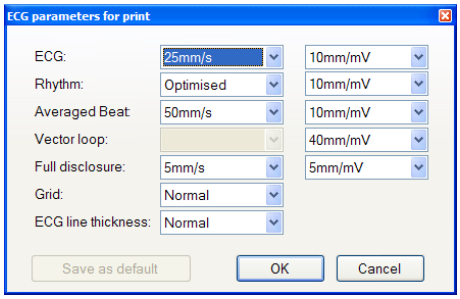
or 



You find information on the print formats in the **Exercise ECG Offline** section of the **AMEDTEC *ECGpro* print formats** instruction.

- ☞ Select the desired print formats.
- ☞ Deactivate the checkbox if the format should be neither printed, nor be displayed. (If no format selected, the **Print** and **Preview** button are grey.)
- ☞ Activate the checkbox if the format should be printed or be displayed.
- ☞ Click on **Print parameters** to set speed, resolution and grid
- ☞ Click on **Preview** display the selected formats on the screen.
- ☞ Click on **Print** to print the selected formats. (If no format selected the Button is grey.)
- ☞ Click on **Save as a default** to use the selected formats as standard formats from now on.

Setting Printing Parameters



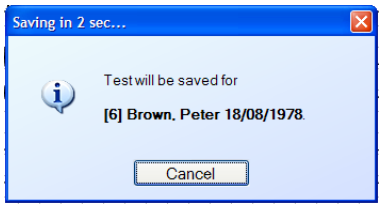
ECG:	multi-channel ECG representation
Rhythm:	single-channel rhythm representation below the multi-channel ECG
Full disclosure:	‚Rhythm queue' in the rhythm ECG and in the exercise ECG

- ☞ Make the required settings
- ☞ Click on **Save as default,** if you want to use the changed parameters always from now on.

Saving the Record

After completion of the stress test, the saving function is always assigned to orange button.

☞ Click this **button** or press **F2**.



Before the saving, *ECGpro* displays a message with the data of the active patient.
If the indicated data do not correspond with the real data, you have 3 seconds time to cancel the saving process.

- ☞ Click **Cancel**.

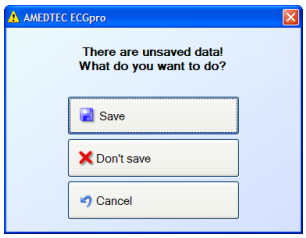
If you find out that a wrong patient was selected, you can select a different patient as active patients (menu: „*Patient* | *Select patient...* “).
The target load is not computed anew.

Alternatively to the orange button, you can use also this button.

- ☞ Click this **button** or press **Shift+F12**.

If you do not want to save the record

- ☞ Click this **button** or press **Ctrl+X**.



Again you receive a dialogue for allows following actions:

- ☞ Save the record for the active patient.
- ☞ Discard the record. No data are saved. The program is continued in the **Stress Test Parameters** screen.
- ☞ Cancel the process to continue checking the record.

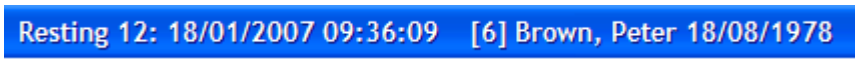
Resting ECG - View

ECG

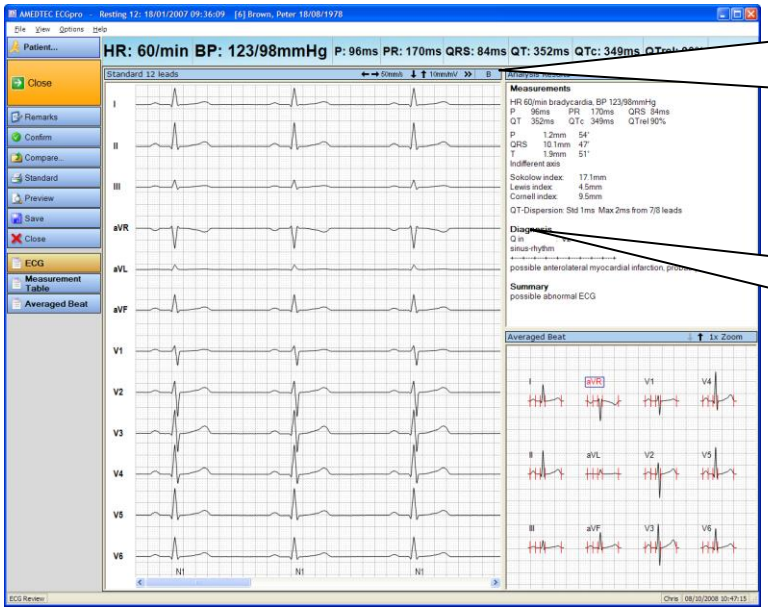
Open the tests and acquisitions as described in section
Opening ECG acquisitions on page **22**.

Title Bar of the Program

The title bar of the program shows the test procedure, the recording date and time as well as the patient's data.



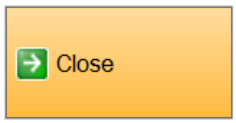
Analysed records are shown in the display divided into three parts. For records which are not analysed the ECG is displayed as full image.
The views shown on page **97** can be set.



Buttons for toggling of speed and sensitivity, button for enlarging the multi-channel ECG surface and for indication of the enabled filters

Button for correction of the diagnosis results
(for that, read section **Results of analysis**)

Button Bar



If you have done any changes, a dialog will ask you for **Saving** the changes, **Ignore** the changes or **Cancel** the closing process.

- ☞ Click this **button**
  or
  press F2.

Open the Record Info dialogue if to you want to enter a comment or to edit it.

- ☞ Click this **button**
  or
  press F3.
- ☞ Enter the text.
- ☞ Click **OK**.

If you want to confirm the correctness of the diagnosis or the comment ,

- ☞ Click this **button** or press **Ctrl+B**.

Note that the record cannot be changed any more after having been confirmed.

To confirm tests, you must be logged in as a user with the appropriate rights or on confirming log in as a user with appropriate rights.
Also read in section **Confirming Tests** on page **140**.

If you want to compare the opened record with an former record of the patient,

- ☞ Click the following **buttons**
  or
  Open the menu: "*View* | *Compare...*".
- ☞ For that, read on the page **99**.

Refer to section **Printing the Record** on page **107**.

Refer to section **Printing the Record** on page **107**.

Refer to section **Printing the Record** on page **107**.

If you want to save changes,

- ☞ Click this **button**
  or
  press **Shift+F12**.

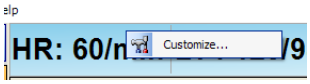
The record is closed. The changes you have carried out are saved.

If you have done any changes, a dialog will ask you for **Saving** the changes, **Ignore** the changes or **Cancel** the closing process.

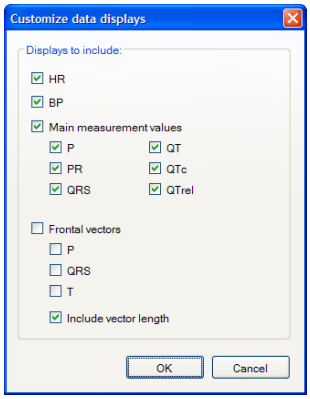
- ☞ Click this **button**
  or
  press **Ctrl+X**.

Indication Bar

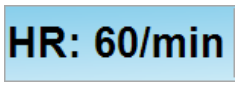
The indication of main measurement values and frontal vectors in the header can be set. The settings are saved and are preserved while opening other records.



- Position the mouse pointer over the indication bar and press the **right** mouse button.
- Click the **Customize** button.

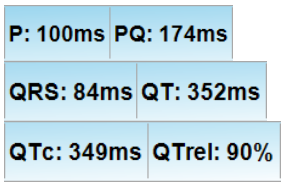


- Click on a checkbox to indicate the belonging value in the header or to hide it.
- Click on the **Main measurement values** checkbox to activate or to deactivate the indication of all main measurement values in the header with a click.
- Click on the **Frontal vectors** checkbox to activate or to deactivate the indication of all main measurement values in the header with a click.
- You switch individual measurement values by clicking on the checkbox of the this value.
- Enable the **Include vector length** checkbox to specify the length of the individual frontal vectors (in mm, µV or mV) additionally. This checkbox has an effect only if at least one of three vectors was selected.
  For the setting of the unit, read the **AMEDTEC *ECGpro* settings** instruction, **ECG, units** section.



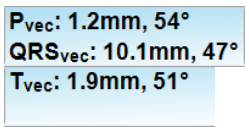
For analysed records, the heart rate is always averaged over 10 seconds.

The blood pressure value is indicated in the operating bar. The same values are also indicated in the **Results of analysis** window.



The a larger view of the main measurement values of averaged beat is displayed in the operating bar.

The same values are also used in the **Analysis Results** window (on the upper right of the previous page) and in connection with the indication of the enlarged averaged beat.
When measurements excide a typically value this is marked by “*” and displayed in red color. For this read **Measurement Program and Diagnostics Program** on page **149**.
For customizing the limits for QTc read the document **Settings** in chapter **ECG Analysis**.



The frontal vectors of the P wave, the QRS complex and the T wave are also taken from the **Analysis Results**.

Changing the View

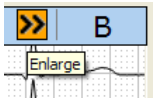
Open the **Measurement Table** if you want to see the values of the averaged beat in every lead.

- ☞ Click the **button**
  or
  Open the menu: „View | Measurement table“.
- ☞ Lesen Sie im Abschnitt **Measurement Value Table** auf Seite **101**.

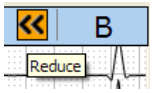
Open this representation if you want view the enlarged averaged beat in every lead, to measure it and to correct the wave margins.

- ☞ Click the **button**
  or
  Open the menu: „*View* | *Averaged beat*“.
- ☞ For that, read section **Averaged Beat** on page **103**.

Maximized Viewing of the ECG



- ☞ Click on the arrow button to change from the representation divided into three parts to the maximized view.



- ☞ Click on the arrow button to return to the representation divided into three parts.

Results of Analysis

Requirement for the indication of interpreted results of analysis is a lead program in which at least the leads I, II and V1 to V6 are included. For the output of the measurement values, at least the leads I and II are necessary . Usually, the **Resting 12** test procedure fulfils the conditions for interpretation.
10 seconds of disturbance-free ECG must have been acquired. Age and sex of the patient must have been entered, or defaults for age and sex must be set (Read section **ECG analysis** of the **AMEDTEC *ECGpro* settings** instruction).

If no analysis was carried out, only the **Summary** section is displayed.

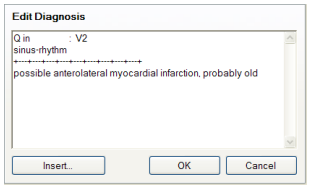
Using *CardioPart12 m*, you receive the measurement following values:
- Heart Rate
- Main measurement values (QTc by Bazzett, QTrel by Holzmann)
- Angle and amplitude of the waves as well as position type
- Indexes
- QT dispersion
- Rhythm line

With an *CardioPart 12 i* (or *s*) acquisition device, the **Diagnosis** section is displayed, in addition. This section contains the rhythm line and statements to the diagnosis. A summarising diagnosis is entered in the **Summary** section.

Read the section **ECG analysis** of the **AMEDTEC *ECGpro* settings** instruction to carry out following changes, or to display or hide parameters:
- Indication of the results of analysis in a different language,
- Indication of the position types,
- an simple or detailed indication of the rhythm line,
- Indication of the indexes,
- Indication of the interference voltage,
- Indication of the QT dispersion for all leads or for chest wall leads, and
- Indication of the table with pediatric ECG.

☞ Left-click on **Diagnosis** to modify the automatically generated text.

During the comparison of records and in confirmed records, this function is not available.



☞ Change the text by left-clicking in the text field

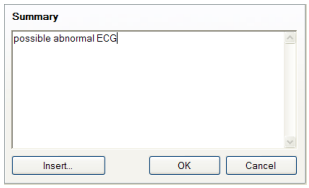
☞ Press Insert... , to insert the acquisition remark (if existing) or boilerplates. According to factory setup, you find terms to the **Rhythm**, **Atrial**, **Ventricular** and **Others** categories.

☞ Change or add this list of terms in "*File* | *Settings...* | *12 Lead ECG* | *Diagnosis statements*".

☞ Complete the input by clicking OK .

☞ Left-click on **Summary** to enter text.

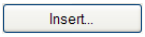
During the comparison of records and in confirmed records, this function is not available.



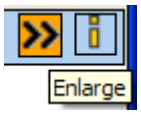
☞ Enter the desired text directly
or
press Insert... , to insert the acquisition remark (if existing) or boilerplates. According to factory setup, you find terms to the **Rhythm**, **Atrial**, **Ventricular** and **Others** categories.

☞ Change or add this list of terms in "*File* | *Settings...* | *12 Lead ECG* | *Diagnoses statements*".

☞ Complete the input by clicking OK .

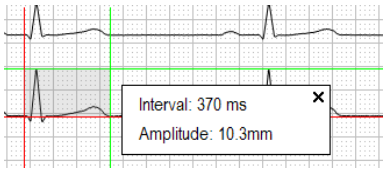


Enlarging the Window of Results of Analysis



The window in which the results of analysis are displayed can be enlarged from half to full display height. For that, you find the same arrow buttons in this window, as in the ECG window.

Measuring the ECG



- ☞ Click and position the red cursor.
- ☞ Click once more and position the green cursor.
  The indication with the measurement values is shown.

The time interval is always a positive value.

The amplitude is given with algebraic sign:

Calculation:

Amplitude = green horizontal cursor – red horizontal cursor

If the green line is below the red line, the amplitude get s negative value.

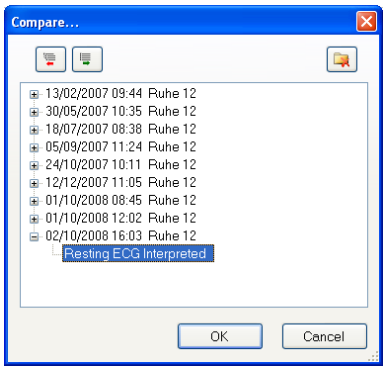
Simultaneous moving of both vertical cursors

- ☞ Move the mouse pointer in the middle between both vertical cursors. The mouse pointer changes into a double arrow.
- ☞ Keep the mouse button pressed and drag both cursors to the desired position.

Hiding the cursors

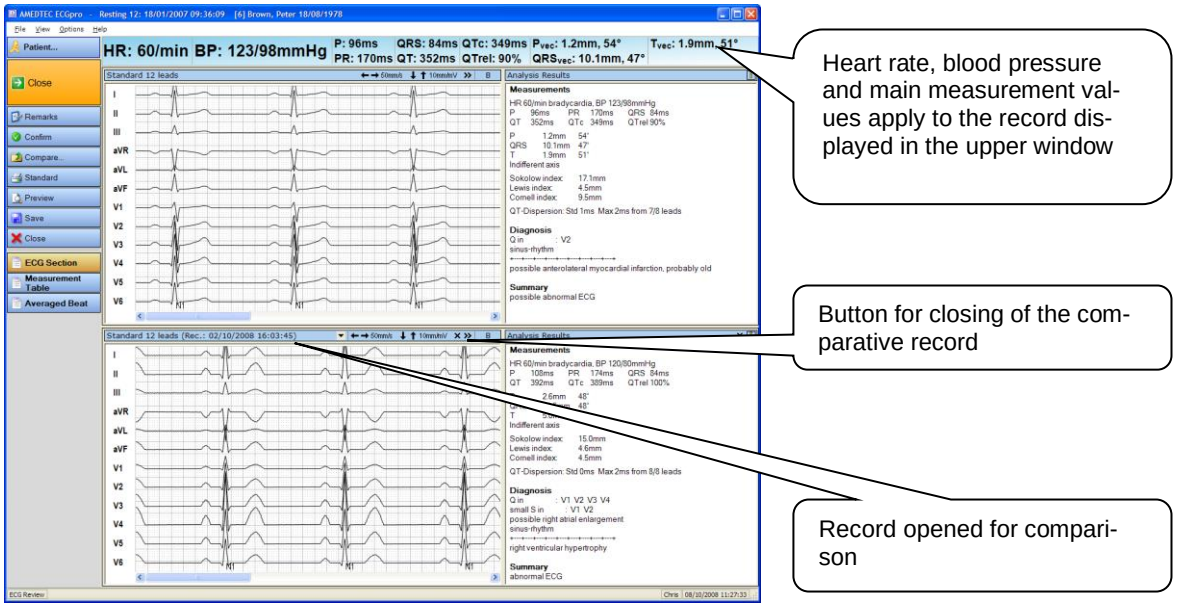
- ☞ Click on X within the display field. The box and the measuring cursors are hidden.

Opening a Record for Comparison

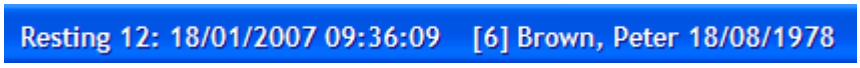


- ☞ Click the **button**
  or
  open the menu: „*View* | *Compare*…“.
- ☞ From the list, select the record which want to open for comparison.
- ☞ Confirm clicking **OK**.
- ☞ Press the button for deliting needless recordings.

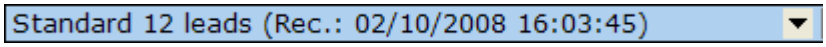
The record opened for comparison is displayed below the already opened one.



- The title bar of the program shows the unchanged data of the first opened record as well as the patient's data

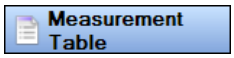


- Date and time of the **comparative record** are indicated in the title bar of the comparative record.



- The functions of commenting, confirming, printing and blood pressure always apply to the **record opened first**.
  Records opened for comparison cannot be commented or be printed. No blood pressure can be entered or be changed either.
- Using the button **Compare...**, further comparative records which are always displayed below the already opened records can be opened.
- Click  to open the list of the available comparative records. Select a record which replaces the actual record (i.e., which is not displayed additionally).
- Open menu “View | ECG” and select the representation on right side between **Analysis Results** and **Averaged Beats and Analysis Results**.

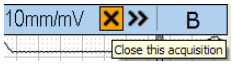
Beside the ECG, you can also show a comparison of the measurement value tables and the averaged beats.



☞ Click the **button**
or
Open the menu: ”*View* | *Measurement Table*“.

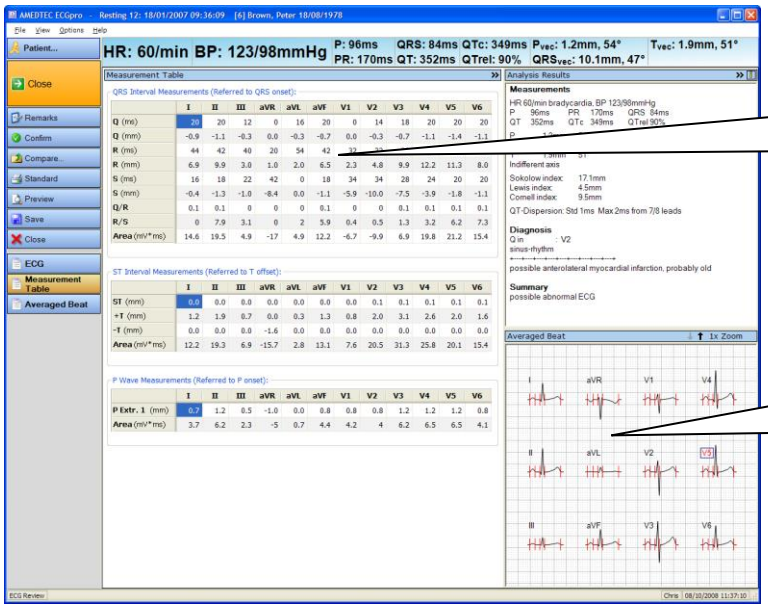
☞ Click the **button**
or
Open the menu: ”*View* | *Averaged Beat*“.

Closing the Comparative Record



☞ Click on **X** to close the comparative record.

Measurement Value Table



Same as the ECG view, the measurement value table can be also displayed as maximized view.
The change is performed in the same way as already described in section **Maximized Viewing of the ECG** on page **97**.

For each of 12 leads, the measurement value table contains the following measurement values:

QRS range	➢ Amplitude and duration of the Q, R and S waves ➢ Amplitude ratio between Q and R ➢ Amplitude ratio between R and S
ST and T range	➢ ST value ➢ positive amplitude value of T ➢ negative amplitude value of T ➢ area of the ST and T range
P range	➢ the first extreme value of the P amplitude (if another extreme value is found, this is indicated, in addition) ➢ area of the P wave

You can change to other views.

Open the ECG representation if you want to see the curves .

☞ Click the **button**
<u>or</u>
Open the menu: „*View* | *ECG*“.

☞ For that, read section **ECG** on page **94**.

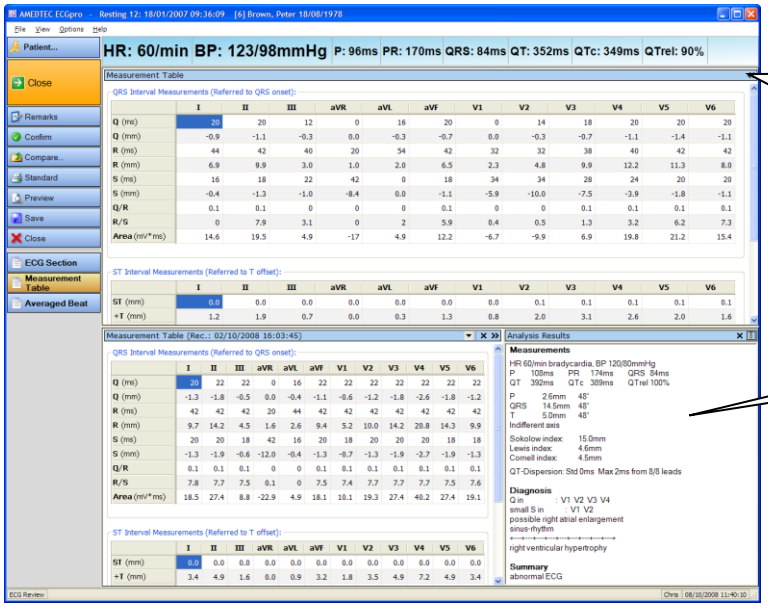
Open representation of the averaged beat if you want view the enlarged averaged beat in every lead, to measure it and to correct the wave margins.

☞ Click the **button**
<u>or</u>
Open the menu: „View | Averaged beat“.

☞ For that, read section **Averaged Beat** on page **103**.

Measurement Value Table in Comparison

If a comparative record is open, the measurement value tables of both records can be compared.

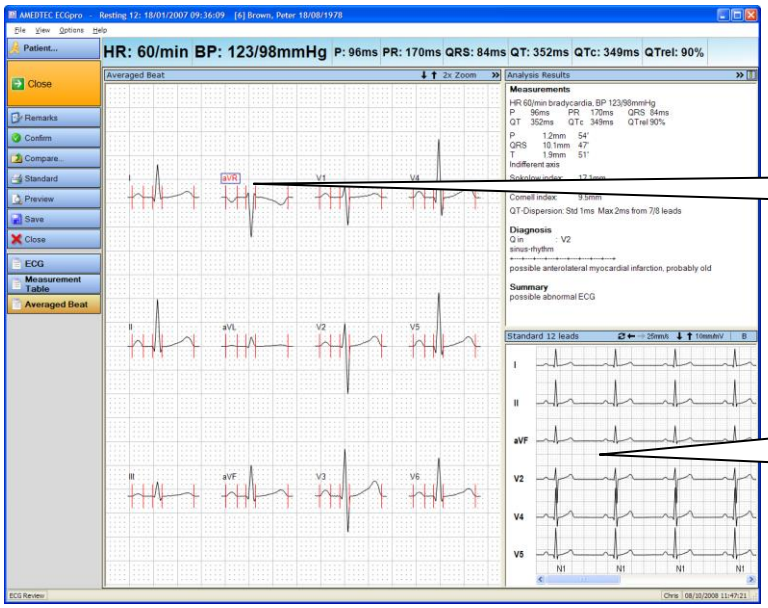


Beside the measurement value table, you can also show the ECG and the and the averaged beat in comparison.

☞ Click the **button**
<u>or</u>
Open the menu: „*View* | *ECG*“.

☞ Click the **button**
<u>or</u>
Open the menu: „*View* | *Averaged Beat*“.

Averaged Beat

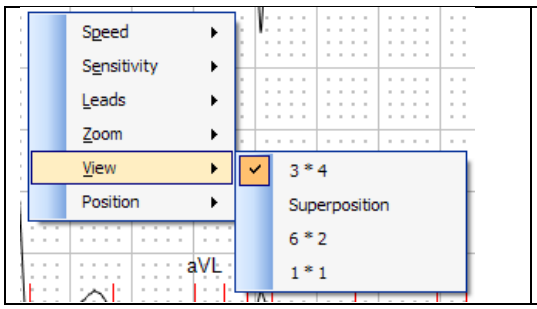


Enlarge the respective beat by double click

Multi-channel ECG from which the average beat rate was computed

Same as the ECG view, the averaged beat can be also displayed as maximized view.
The change is performed in the same way as already described in section **Maximized Viewing of the ECG** on page **97**.

The leads view can be toggled.



- Right-Click on one of the complexes and open the context menu.
- Select the parameter you wish to modify.
- In the submenu, click on the desired entry.
- You can also change the zoom factor, by clicking ↑ or ↓ in the title bar.

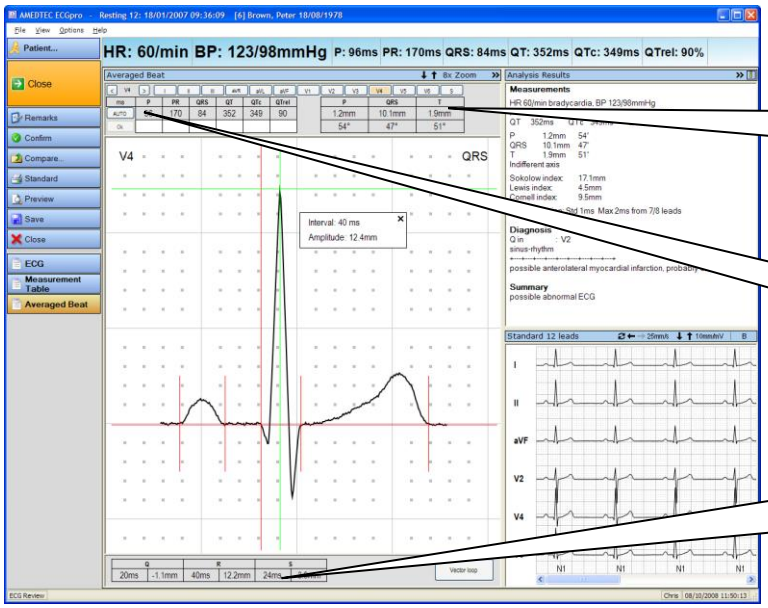
Changing to the Individual View

- Click twice on a lead to show only this one,
  or
  in the context menu shown above, select view **1*1** to display only the **marked** lead.

Changing to the Superposition View

- in the context menu shown above, select the **Superposition** view to show **all** leads cascaded.

Individual View

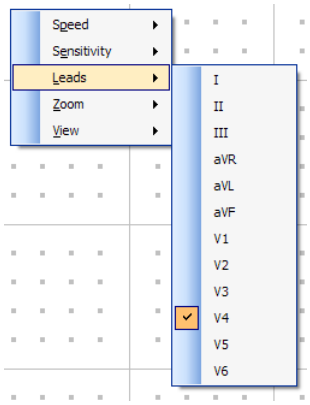


Changing the Lead

- Click one of the **buttons**

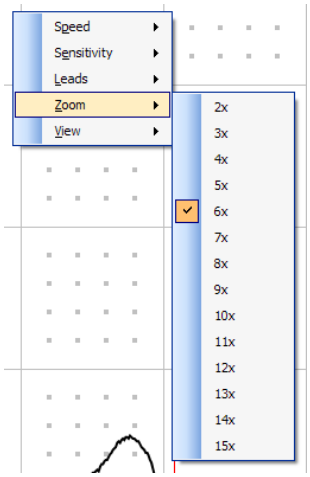
The button S. toggles the **superposition** view.

- Alternatively, use the context menu.



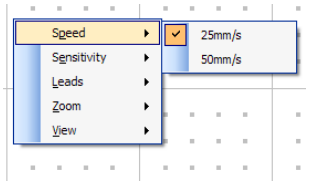
Changing the Zoom Factor

- Click ↑ or ↓ in the title bar.
- Alternatively, use the context menu.

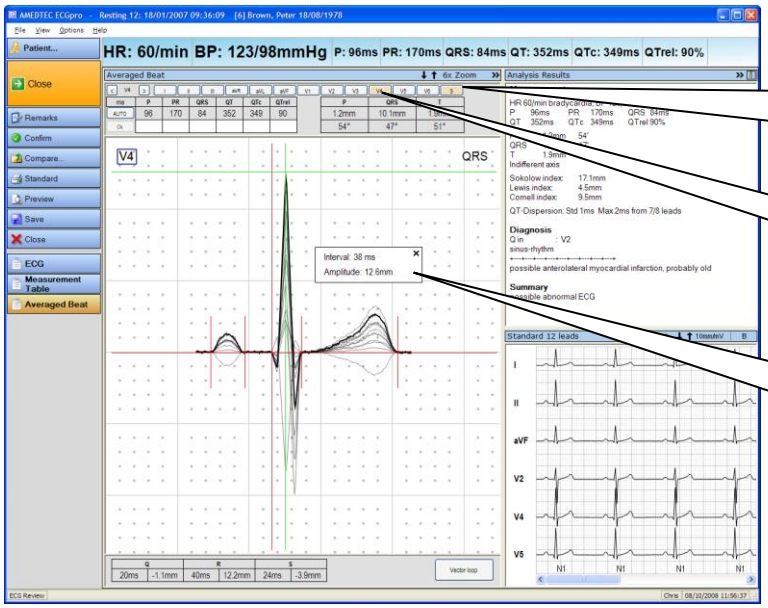


Changing speed or sensitivity

- Use the context menu.



Superposition



In the **Superposition** representation, an especially exact correction of the wave points is possible

The selected lead is highlighted with a fat line in the average beat rate

Temporal distance and amplitude difference between both red and green measuring lines

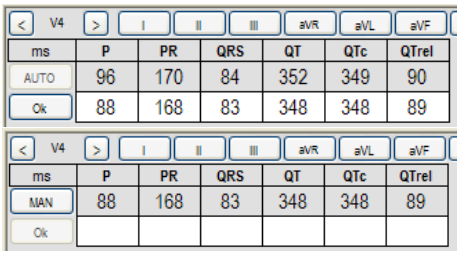
Measuring the Complex

You can measure the complex. For that, read section **Measuring the ECG** on page **99**.

Changing Wave Margins

The wave margins ascertained by *ECGpro* are marked by red marks. From the difference between these marks, the main measurement values P, PQ, QRS and QT as well as the values of QTc and QTrel derived from them are determined.
You can correct the wave margins by moving the marks.

- ☞ Click on the mark and drag the it to the desired position.



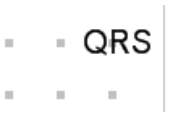
As soon as you have moved a mark, the new values from the changed wave margins are entered on the bottom line.

- ☞ Click **OK** to accept the new values.

The manually ascertained values are taken over in the upper line and marked with **MAN**. From now on, the system uses only these values.

- ☞ The **Auto / MAN** button is a changeover switch. Click on **MAN** if you want blank to the manual values and display the automatically ascertained values again.
- ☞ You can toggle between the manually and the automatically ascertained values.

QRS Configuration



You find the QRS configuration to the displayed lead in the individual display on the upper right.
The recognised waves are given in their order:

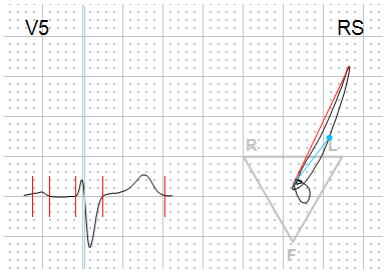
In the example on the left, the Q wave, the R wave and the S wave were recognised.

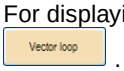
Q		R		S	
20ms	-0,12mV	40ms	1,2mV	22ms	-0,37mV

The measurement values to the waves are given in the table at the lower edge of the individual display. It is an extract from the measurement value table on page **101**.

The unit used here is set in: "*File* | *Settings…* | *12 Lead ECG* | *ECG* | *Units*".

Vector Loop



For displaying the **Vector loop** press the button 

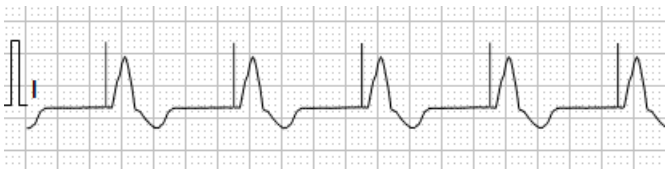
.

Click left into the ECG kurve and move mouse position (with furthermore pressed mouse button). In Vector loop you will see the appropriate vector (blue line).

Pacemaker Impulses

Impulses delivered by pacemakers can be so narrow that, notwithstanding the high sampling frequency of 8000 hertz, it is not possible to display them in the original.

Therefore, *ECGpro* shows a synthetic impulse exactly at the point of the ECG where the original impulse was detected.
The synthetic impulse is displayed on all channels and always with positive polarity.



The level of the synthetic impulse is 1 mV.

By factory selection, the width of the synthetic impulse is set to 8 ms. You can change this value as follows.

- ☞ In "*File* | *Settings...* | *Devices* ", *open your* **CardioPart 12 USB** *or* **CardioPart 12 Blue**.
- ☞ Enter the desired width in the **Pacemaker Impulse Width (ms)** input box. The value must be between 2 ms and 16 ms.
- ☞ In "*File* | *Settings...* | *12 lead ECG* | *Test procedures* ", open the Tabsheet **ECG**. For patients who have no implanted PM device you can supress wrong positive PM spikes.

Printing the Record

If you want to print the record in the standard format,

- ☞ Click the button
  or
  press **Ctrl+P**
  or
  open the menu: "*File* | *Print*".

If you want to print the record with format selection,

- ☞ right-click the **button** and select **Dialog**
  or
  open the menu: "*File* | *Print with format selection...*".

If you want to display the printing preview,

- ☞ Click the button
  or
  press **Ctrl+F**
  or
  open the menu: "*File* | *Printing Preview...*".

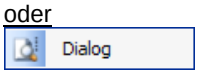
If you want to display the printing preview with format selection,

- ☞ right-click the **button** and select **Dialog**
  or
  open the menu: "*File* | *Print with format selection...*".

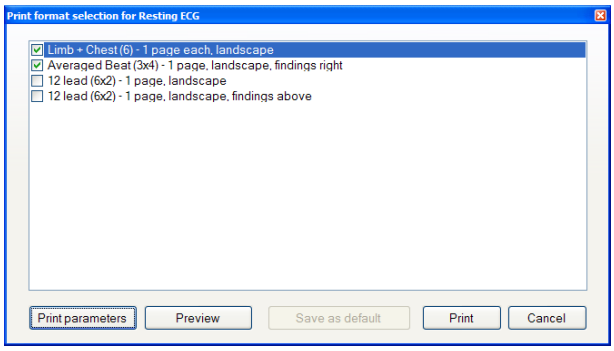
If you want to save a PDF file,

- ☞ Click the button
  and
  select folder and file name.

oder



- ☞ After you have clicked one of both format selection **buttons** shown on the upper right, confirm the **Dialog** button.



You see a box with the selectable print formats.

- ☞ Disable the checkbox if this format should not be printed or be indicated. (If no format selected, the **Print** and **Preview** button are grey.)
- ☞ Select the format or the formats which should be printed or be indicated.
- ☞ Use the **Print parameter** button to change sensitivity, speed, thickness of the ECG curve or intensity and colour of the grid.
- ☞ No matter whether you selected **Print** or **Preview** with format selection, you can start printing or the previewing in this box.

If you want to use these settings for all records in future,

- ☞ press **Save as default**.

The standard print format and the selectable print formats are set in "*File* | *Settings...* | *12 Lead ECG* | *Printing*" separately for every type of record . Read also the manual **Print formats** in the **Printing** section.

Rhythm ECG - View

Open the tests and records as described in section
Opening ECG acquisitions on page **22**.

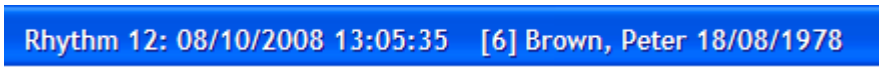
The **ECG** and **Rhythm** views give an overview of the whole record.
The **ECG Strip**, **Measurement Table** and **Averaged Beat** views apply to a strip in each case.

- ☞ Change the view in: „*View* | *ECG*“.
- ☞ Save your setting in : „*View*“ by enabling **Use current view as default**.

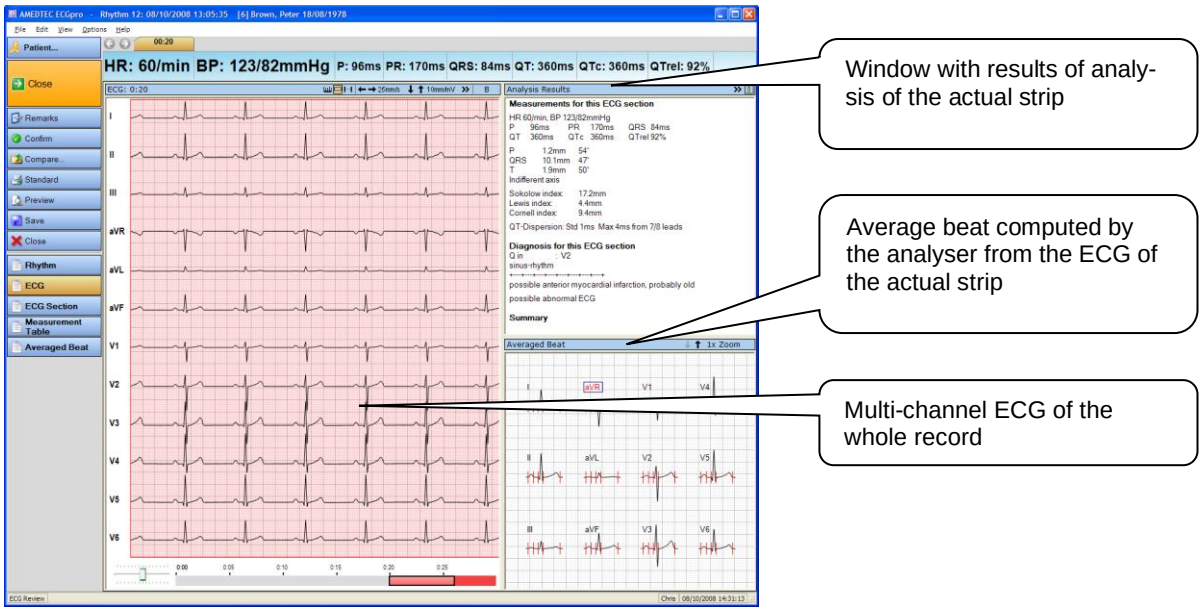
From now on, the saved view is used as opening screen on opening a rhythm record.

Title Bar of the Program

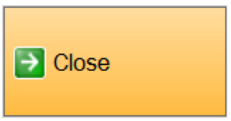
The title bar of the program shows the test procedure, the recording date and time as well as the patient's data.



The records are displayed in a multi split screen:



Button Bar



If you have done any changes, a dialog will ask you for **Saving** the changes, **Ignore** the changes or **Cancel** the closing process.

- ☞ Click this **button**
  or
  press F2.

Open the Record Info dialogue if to you want to enter a remark or to edit it.

- ☞ Click this **button**
  or
  press F3.
- ☞ Enter the text.
- ☞ Click **OK**.

If you want to confirm the correctness of the diagnosis or the comment ,

- ☞ Click this **button**
  or
  press **Ctrl+B**.
- ☞ **Note that the record cannot be changed any more after having been confirmed.**

To confirm records, must be logged in as a user with the appropriate rights or on confirming log in as a user with appropriate rights.
Also read in section **Confirming Tests** on page **140**.

If you want to compare the opened record with an former record of the patient,

- ☞ Click the following **buttons**
  or
  open the menu: „*View* | *Compare*…“.
- ☞ For that, read on the page **99**.

See section **Printing the Record** on page **119**.

See section **Printing the Record** on page **119**.

See section **Printing the Record** on page **119**.

If you want to save changes,

- ☞ **Click** this button **or press Shift+F12**.

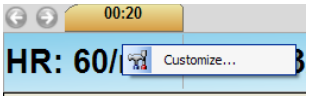
The record is closed. The changes you have carried out are saved.

If you have done any changes, a dialog will ask you for **Saving** the changes, **Ignore** the changes or **Cancel** the closing process.

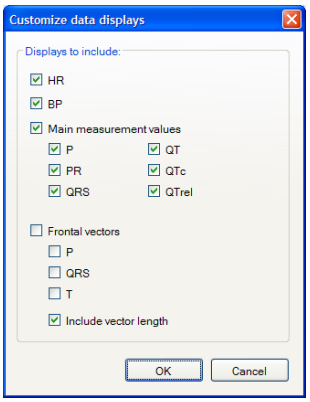
- ☞ Click this **button**
  or
  press **Ctrl+X**.

Indication Bar

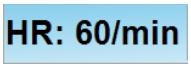
The indication of main measurement values and frontal vectors in the header can be customized. The settings are saved and preserved. The indication of heart rate, blood pressure values, main measurement values and frontal vectors apply in each case to a (analysed) strip.



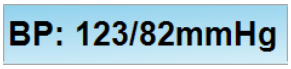
- Position the mouse pointer over the indication bar and press the **right** mouse button.
- Click the **Customize...** button.



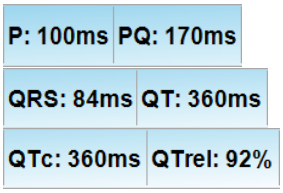
- Click on a checkbox to indicate the belonging value in the header or to hide it.
- Click on the **Main measurement values** checkbox to activate or to deactivate the indication of all main measurement values in the header with a click.
- Click on the **Frontal vectors** checkbox to activate or to deactivate the indication of all main measurement values in the header with a click.
- You switch individual measurement values by clicking on the checkbox of the this value.
- Enable the **Include vector length** checkbox to specify the length of the individual frontal vectors (in mm, µ V or mV) additionally. This checkbox has an effect only if at least one of three vectors was selected.
  For the setting of the unit, read the **AMEDTEC *ECGpro* settings** instruction, **ECG, units** section.



The heart rate indicated refers always to the actual strip.
The time of the actual strip is indicated on the selected tab.
For analysed records, the heart rate is always averaged over 10 seconds.

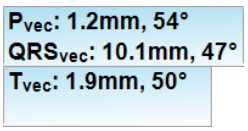


The blood pressure value indicated applies to the actual time. The time of the measurement can be a maximum of 1 minute before the actual time.



The main measurement values (in case of analysed ECG sections) of the averaged beat is displayed.

The same values are also used in the **Analysis Results** window (on the upper right of the previous page) and in connection with the indication of the enlarged averaged beat.
When measurements excide a typically value this is marked by "*" and displayed in red color. For this read **Measurement Program and Diagnostics Program** on page **149**.
For customizing the limits for QTc read the document **Settings** in chapter **ECG Analysis**.



The frontal vectors of the P wave, the QRS complex and the T wave are also taken from the **Analysis Results**.

Results of Analysis

Requirement for the indication of interpreted results of analysis is a lead program in which at least the leads I, II and V1 to V6 are included. For a measurement, the leads I and II must be contained. Usually, the **Rhythm 12** test procedure fulfils the conditions for interpretation.
At least 10 seconds of disturbance-free ECG must have been acquired. Age and sex of the patient must have been entered, or defaults for age and sex must be set (Read section **ECG analysis** of the **AMEDTEC *ECGpro* settings** instruction).

For additional analyzing of ECG strips a licence is necessary. This can be a *CardioPart 12 m (I or s) USB* connected to this workstation, a local dongle **AMEDTEC *ECGpro* Resting ECG Interpretation** or a network dongle **AMEDTEC *ECGpro* Resting ECG Interpretation (Net)**.
Network licence you can check in menue "*Help* | *Show active workstations…*". Active workstation shows additional string "**(HES)**".

If analysing of strip is not possible, only the **Summary** section is displayed.

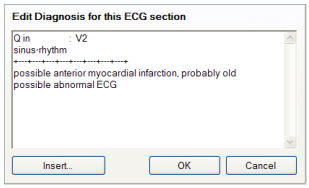
Using *CardioPart12 mr*, you receive the following measurement values for the strip:
- Heart Rate
- Main measurement values
- Angle and amplitude of the waves as well as position type
- Indexes
- QT dispersion
- Rhythm line

With an *CardioPart 12 i* (or *s*) acquisition device, the **Diagnosis** section is displayed, in addition. This section contains the rhythm line and statements to the diagnosis.

Read the section **ECG analysis** of the **AMEDTEC *ECGpro* settings** instruction to carry out following changes, or to display or hide parameters:
- Indication of the results of analysis in a different language,
- Indication of the position types,
- an simple or detailed indication of the rhythm line,
- Indication of the indexes,
- Indication of the interference voltage,
- Indication of the QT dispersion for all leads or for chest wall leads, and
- Indication of the table with pediatric ECG.

☞ Left-click on **Diagnosis** to modify the automatically generated text.

During the comparison of records and in confirmed records, this function is not available.



☞ Change the text by left-clicking in the text field

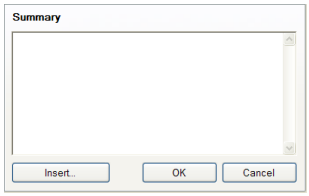
☞ Press Insert... , to insert the acquisition remark (if existing) or boilerplates. According to factory setup, you find terms to the **Rhythm**, **Atrial**, **Ventricular** and **Others** categories.

☞ Change or add this list of terms in "*File* | *Settings...* | *12 Lead ECG* | *Diagnosis statements*".

☞ Complete the input by clicking OK .

☞ Left-click on **Summary** to enter text.

During the comparison of records and in confirmed records, this function is not available.



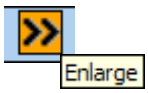
☞ Enter the desired text directly
or
press Insert... , to insert the acquisition remark (if existing) or boilerplates. According to factory setup, you find terms to the **Rhythm**, **Atrial**, **Ventricular** and **Others** categories.

☞ Change or add this list of terms in "*File* | *Settings...* | *12 Lead ECG* | *Diag-*

nosis statements“.

☞ Complete the input by clicking OK .

Enlarging the Window of Results of Analysis



The window in which the results of analysis are displayed can be enlarged from half to full display height. For that, you find the same arrow buttons in this window, as in the **ECG** window.

Changing the View

Open the rhythm view if you want to see an overview of the whole record with a 1- or 2-channel ECG.

☞ Click the **button**
or
Open the menu: „View | Rhythm“.

For that, read section

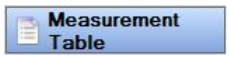
Rhythm on page **115**.

Open the ECG view, if you want to see an overview of the whole record (multi-channel).

☞ Click the **button**
or
Open the menu: „*View* | *ECG*“.

Open the ECG view of a strip, if you want to see the multi-channel ECG, the measured data and the averaged beat.

☞ Click the **button**
or
Open the menu: „*View* | *ECG strip*“.



Open the measurement value table if you want to see the values of the averaged beat of this strip in every lead.

☞ Click the **button**
or
Open the menu: „*View* | *Measurement table*“.

☞ For that, read section **Measurement Value Table** on page **101**.

Open this representation if you want view the enlarged averaged beat of this strip in every lead, to measure it and to correct the wave margins.

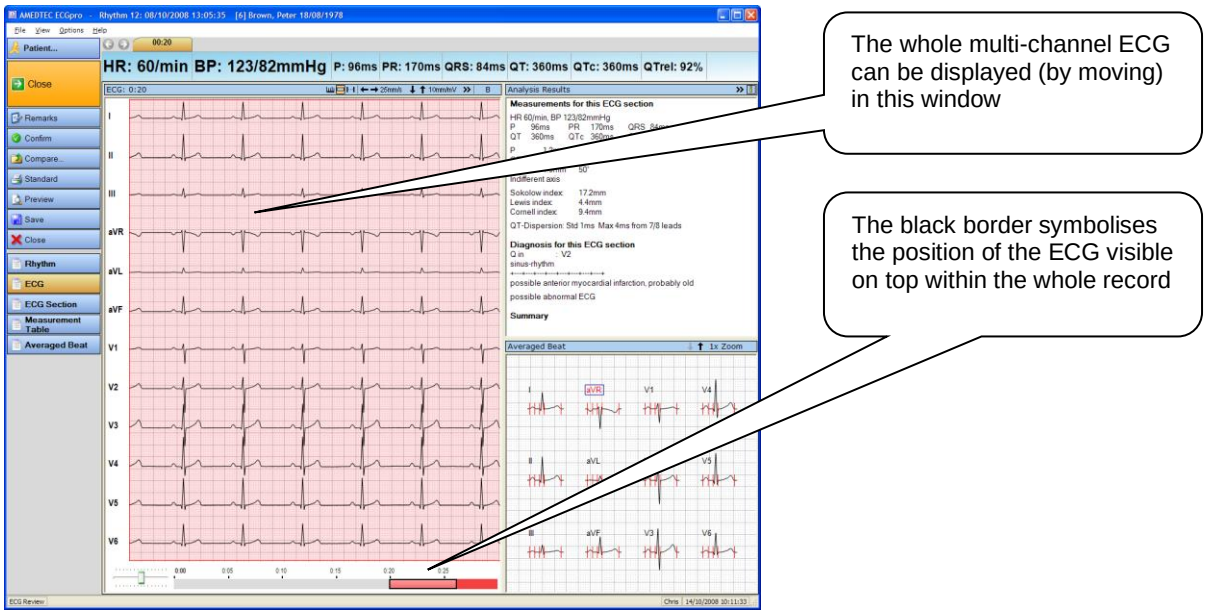
☞ Click the **button**
or
Open the menu: „*View* | *Averaged beat*“.

☞ For that, read section **Averaged Beat** on page **103**.

Open this representation if you want view the Lorenz Plot from whole record or from manualy selected strips.

☞ Click the **button**
or
Open the menu: „*View* | *Lorenz Plot*“.

ECG



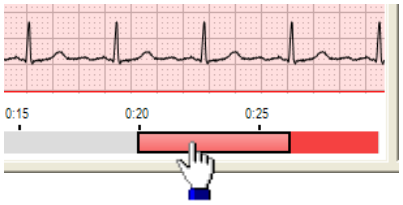
In the main window, the ECG is displayed in multi-channel representation. Using the operating elements described below, you can navigate in the whole record.

The number of the channels visible at the same time and the lead order is changed in the context menu.

How to the change the sensitivity / speed, to move lead positions, to change leads or to change the view was already described in section **Changing the ECG Representation** on page **45**.

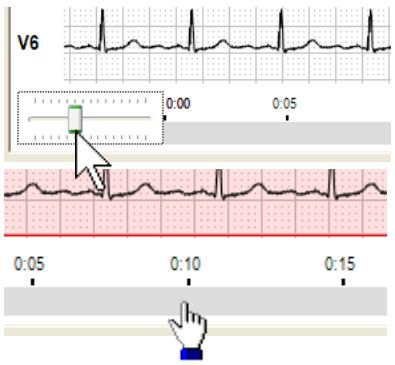
To mark strips, you can be select between 10 seconds and any length.

Navigating in the ECG



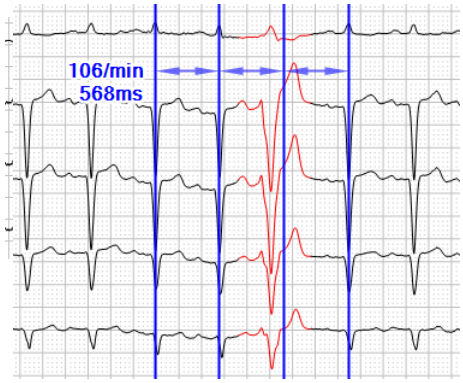
The rectangular frame symbolises the position of the ECG visible on top within the whole record.

- ☞ Left-click in the frame and move it (with pressed left mouse button) on the time bar.



- ☞ To move the ECG continuously, click on the slider and move the control element to the left or to the right.
- ☞ The more you move the slider, the greater the step size of moving the ECG.
- ☞ Click on any place on the time bar to position the multi-channel ECG to this place. (The example shows the ECG at the time of 10 seconds in the middle of the window).

Measuring the Heart Rate / RR Distance



- Click **ECG measurement tool** in the title bar of the ECG window. The marking lines are made visible.
- Left-click on the place in the ECG at which you want to determine the RR distance, and you keep the button pressed. Drag the marking line over the R spike of a beat.
- Click on one of the other lines and move it this on another R spike.
- Right-Click in the ECG to open the context menu. You can add further lines or delete lines.
- Move a line to the left or right margin of the window to scroll the ECG.
- Open the context menu for increasing number of lines or for decreasing number of lines.

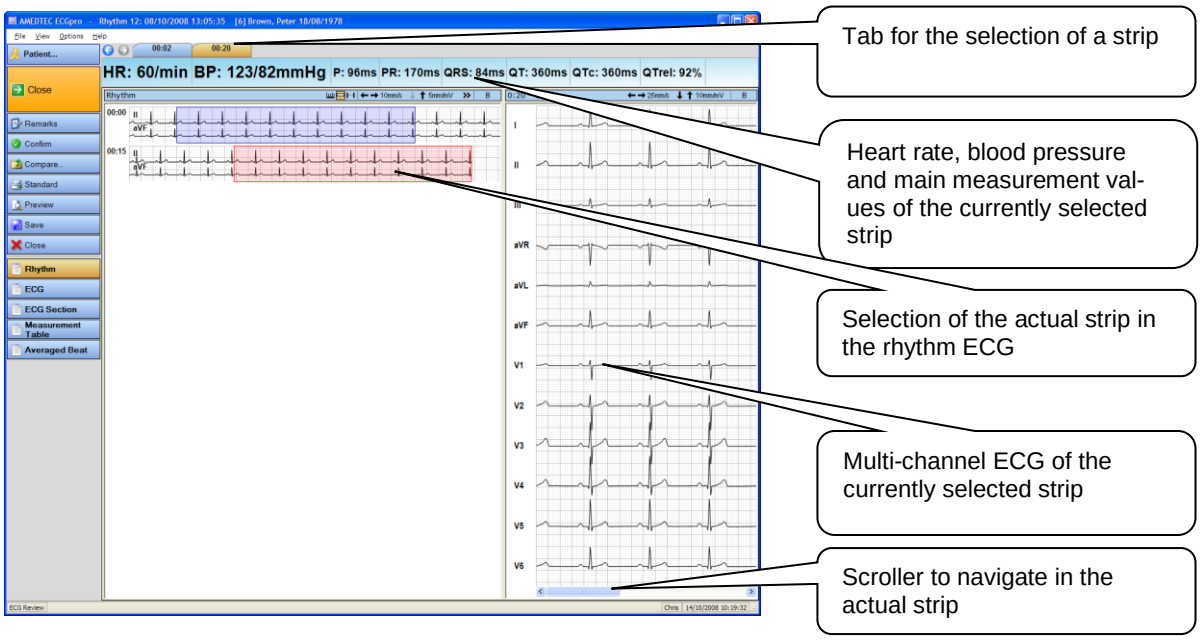
Creating an ECG Strip of 10 Seconds

- Click **Select 10 seconds ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the selected range to the desired position.
- Save the selected strip by pressing the **Edit** button.
- In the time bar, the strip is marked in grey. According to speed, the grey range can be greater or smaller than the visible range.

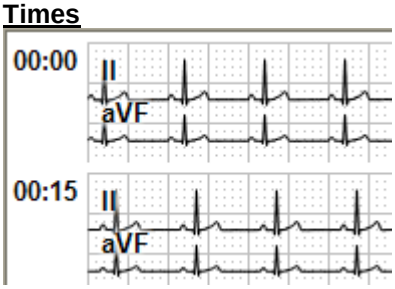
Creating an ECG Strip of Any Length

- Click **Select variable length ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the mouse and select a strip. As soon as the selected strip is longer than 10 seconds, a further mark appears and splits the selected strip. The right-sided part marks 10 seconds which are automatically measured and interpreted.
- If necessary, correct the beginning and the end of the selected strip by positioning the mouse pointer on the left or right margin, pressing the left mouse button and moving the margin with pressed button.
- Click **Edit** and select the desired function in the dialogue box.

Rhythm



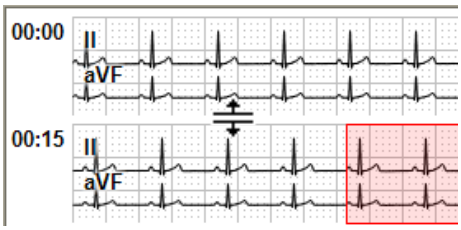
Times



In the left margin of the rhythm window, the beginning times of every ECG line are indicated. The times apply to the start of the acquisition.

The lead names recur in every line.
The channels selected in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *Rhythm ECG* | *Display* | *ECG rhythm*" are used. This setting is overwritten by the lead indicated in the rhythm line during the acquisition (if it is changed).

Changing the Line Spacing



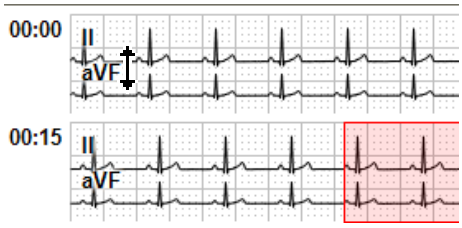
☞ Change the line height, by positioning the mouse pointer exactly between two lines. Press the left mouse button and drag the line height to the desired size.

Note that the line height cannot become as small as you like. The maximum line height is depending on the length of the acquisition.

Changing Leads

- Change leads by positioning the mouse pointer on a lead name and open the context menu with the **right** mouse button.

Changing the Curve Position



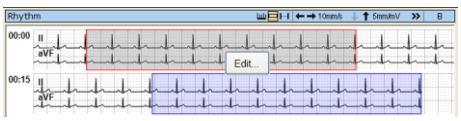
- Move a curve up or down by positioning the mouse pointer on the lead name. Press the left mouse button and drag the line to the desired position. For that, the **ECG measurement tools** may not be active.

Measuring the Heart Rate / RR Distance

- In the header, Click on the **ECG measurement tool** and then on a place to be measured in the rhythm ECG. Left-click on the first distance line and drag all distance lines together to the desired position. Click on another line and drag it in horizontal direction perform the measurement.
- Right-Click in the ECG to open the context menu. You can add further lines or delete lines. The number of lines is stored.

Creating an ECG Strip of 10 Seconds

- Click on the **Select 10 seconds ECG** tool in the header.



- Then Click in the ECG to select 10 seconds of ECG (in each case 5 seconds on the left and on the right of the mouse pointer).
- Change the position by dragging the mouse pointer with pressed left mouse button.
- Save the selected strip by pressing the **Edit** button.

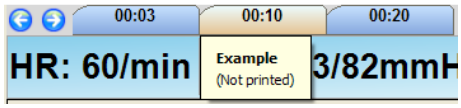
Creating an ECG Strip of Any Length

- Click on the **Select variable length ECG** tool in the header.
- Then click in the ECG to select the beginning of a strip, and drag the mouse pointer with pressed left mouse button to the end of the strip.
- Save the selected strip by pressing the **Edit** button.

Selecting ECG section for HRV

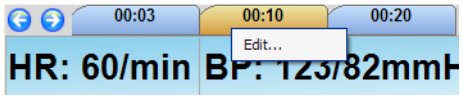
- Click on the **Select ECG strip for HRV** tool in the header
- Select ECG strip for calculation of RR distances. The selected RR distances are displayd in **Lorenz Plot**
- For deleting the strip click left to green mark area.

Selecting Strips



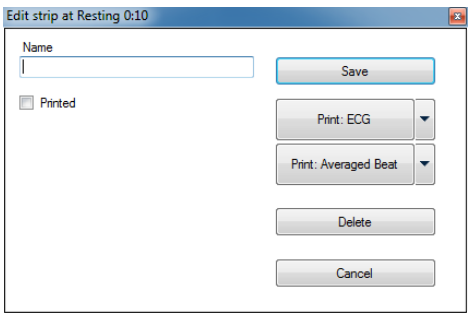
- Use the strip for the evaluation of the rhythm record. For every saved strip, there is a tab. To see the strip one after the other, click .
- Position the mouse pointer on the tab to see the printing state and the name of the strip. The name which was entered on saving or given afterwards is indicated.

Editing Strip



- Right-Click on a tab.

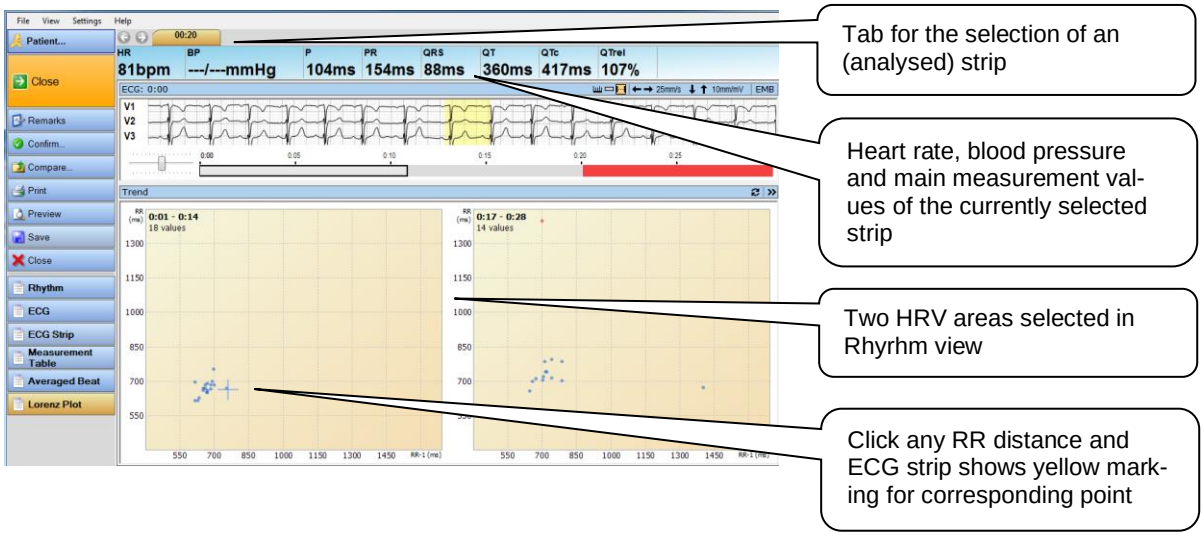
- Alternatively you can left-click on a strip in the **Rhythm** view.



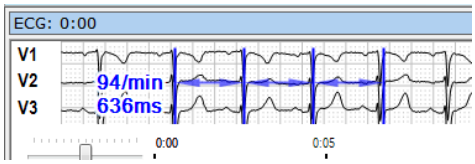
- Open the **Edit** dialogue.
- Give to the strip a short, clear name
  or
  change the existing name.
- To give a name, you must save the strip.
- Print this strip as **ECG**
  or
  as **Averaged Beat**
  or
  see the print preview (arrow button). Change the printing format and the parameters in "*Settings* | *Print...*".

Lorenz Plot

Every RR distance in relation to previous RR is displayed. Every point in diagrame corresponds to any RR distance (ordinate) and belonging RR-1 (abscissa).



Measuring the Heart Rate / RR Distance



- In the header, Click on the **ECG measurement tool** and then on a place to be measured in the rhythm ECG. Left-click on the first distance line and drag all distance lines together to the desired position. Click on another line and drag it in horizontal direction perform the measurement.
- Right-Click in the ECG to open the context menu. You can add further lines or delete lines. The number of lines is stored.

Printing the Record

If you want to print the record in the standard format,

- ☞ Click the button
  or
  press **Ctrl+P**
  or
  open the menu: "*File* | *Print*".

If you want to print the record with format selection,

- ☞ right-click the **button** and select **Dialog**
  or
  open the menu: "*File* | *Print with Format Selection...*".

If you want to display the printing preview,

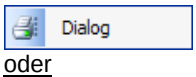
- ☞ Click the button
  or
  press **Ctrl+F**
  or
  open the menu: "*File* | *Printing Preview...*".

If you want to display the printing preview with format selection,

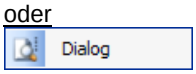
- ☞ right-click the **button** and select **Dialog**
  or
  open the menu: "*File* | *Print with Format Selection...*".

If you want to save a PDF file,

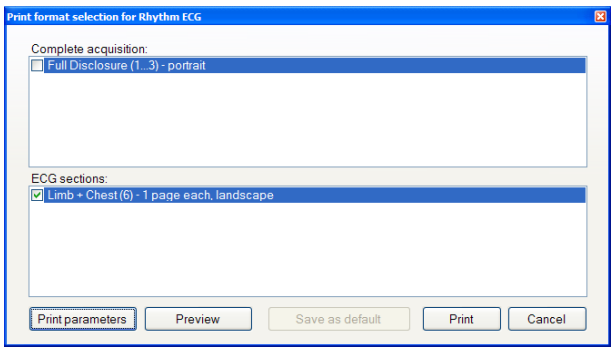
- ☞ Click the button
  and
  select folder and file name.



oder



- ☞ After you have clicked one of both format selection **buttons** shown on the upper right, confirm the **Dialog** button.



You see a box with the selectable print formats.

- ☞ Disable the checkbox if this format should not be printed or be indicated. (If no format selected, the **Print** and **Preview** button are grey.)
- ☞ Select the format or the formats which should be printed or be indicated.
- ☞ Note that the print formats are printed / indicated under **ECG sections** for everybody available strip.
- ☞ Use the **printing parameter** button to change sensitivity, speed, thickness of the ECG curve or intensity and colour of the grid.
- ☞ No matter whether you selected **Print** or **Preview** with format selection, you can start printing or the previewing in this box.

If you want to use these settings for all records in future,

- ☞ press **Save as default**.

The standard print format and the selectable print formats are set in "*File* | *Settings...* | *12 Lead ECG* | *Printing*" separately for every type of record. Read also the manual **Print formats** in the **Printing** section.

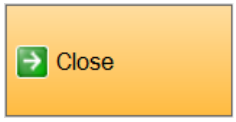
Exercise ECG - View

Open the tests and records as described in section
Opening ECG acquisitions on page **22**.

Title Bar of the Program

The title bar of the program shows the test procedure, the recording date and time as well as the patient's data.

Button Bar



If you have done any changes, a dialog will ask you for **Saving** the changes, **Ignore** the changes or **Cancel** the closing process.

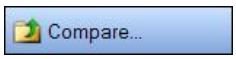
- Click this **button**
  or
  press F2.

Open the Record Info dialogue if to you want to enter a remark or to edit it.

- Click this **button**
  or
  press **F3**.
- Enter the text.
- Click OK.

If you want to confirm the correctness of the diagnosis or the comment ,

- Click this **button**
  or
  press **Ctrl+B**.
- **Note that the record cannot be changed any more after having been confirmed.**
  Also read in section **Confirming Tests** on page **140**.



If you want to compare the opened record with an former record of the patient,

- Click the following **buttons**
  or
  Open the menu: „*View* | *Compare...*“.
- For that, read on the page **99**.

See section **Printing the Record** on page **139**.

See section **Printing the Record** on page **139**.

See section **Printing the Record** on page **139**.

If you want to save changes,

☞ **Click** this button
or
press **Shift+F12**.

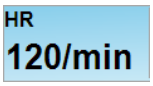
The record is closed. The changes you have carried out are saved.

If you have done any changes, a dialog will ask you for **Saving** the changes, **Ignore** the changes or **Cancel** the closing process.

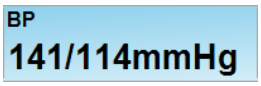
☞ Click this **button**
or
press **Ctrl+X**.

If changes were carried out in the record, you see a dialogue box, in which you can decide again between **Save** and **Don't save**.

Indication Bar

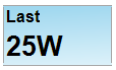


The heart rate indicated refers always to the actual time.
The actual time is indicated farther on the right.

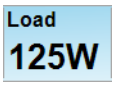


The blood pressure value indicated applies to the actual time. The time of the measurement can be a maximum of 1 minute before the actual time.

The name of the actual load stage and the time in the actual stage are indicated.



The load values of the actual load stage are indicated (or speed and slope of the treadmill ergometer).



The actual time as the total time elapsed in the load phase is indicated. If the cursor is placed in the recovery phase, the total time of the load indicated here.

In recovery, a time is indicated, as soon as the cursor is in the recovery phase. The time since end of the load is indicated.

Changing the View

Open the rhythm view if you want to see an overview of the whole record with a 1- or 2-channel ECG.

- ☞ Click the **button**
  or
  Open the menu: „*View* | *Rhythm*“.
- ☞ For that, read section **Rhythm** on page **126**.

Open the ECG view, if you want to see an overview of the whole record (multi-channel).

- ☞ Click the **button**
  or
  Open the menu: „*View* | *ECG*“.

Open the **ECG strip** view, if you want to see the saved strip (usually one strip per load stage).

- ☞ Click the **button**
  or
  Open the menu: „*View* | *ECG Strip*“.
- ☞ For that, read section **ECG Strip** on page **131**.

Open the **Trend** representation if you wan to view the charts of load, heart rate and ST values.

- ☞ Click the **button**
  or
  Open the menu: „*View* | *Trend*“.

For that, read section **Trend** on page **133**.

Open the **ST-Trend** representation if you want to view the average beats with ST measurement.

- ☞ Click the **button**
  or
  Open the menu: „*View* | *ST-Trend*“.

For that, read section **ST Trend** on page **134**.

Open this representation if you want view the Lorenz Plot from whole record or from manualy selected strips.

- ☞ Click the **button**
  or
  Open the menu: „*View* | *Lorenz Plot*“.

For that, read section **Lorenz Plot** on page **138**.

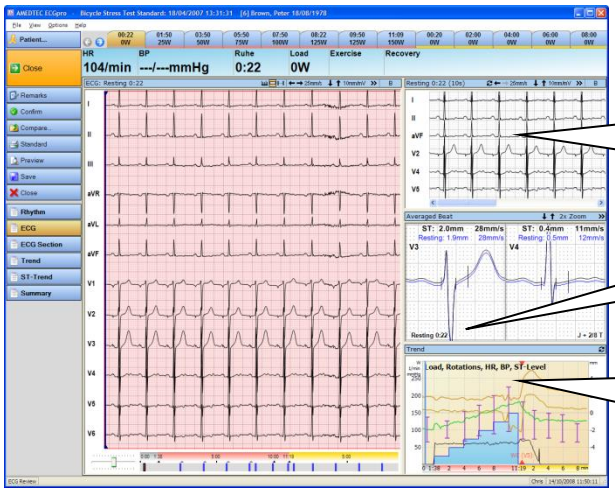
Open the **Summary** representation if you want to get the tabular summary.

- ☞ Click the **button**
  or
  Open the menu: „*View* | *Summary*“.

For that, read section **Summary** on page **136**.

ECG

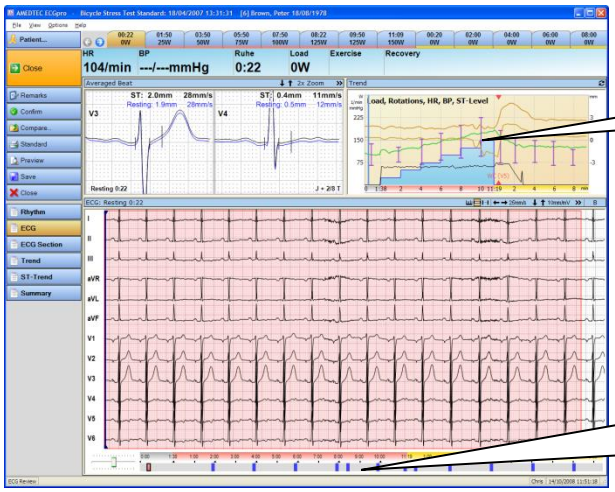
The records are displayed in a multi split screen:



Arrhythmia results are indicated in the **ECG and average beat rate and trend** view

Average beat rate at the actual time (on the bottom left)

The actual time is synchronised in the trend window, in the average beat rate and in the ECG window



Trend charts

Time bar with marking of the currently selected strip (red) and all saved strips (blue)

☞ Change the view in: „*View* | *ECG*“.

☞ Save your setting in „*View*“ by enabling **Use current view as default**.

From now on, the saved view is used as opening screen on opening an Exercise record.

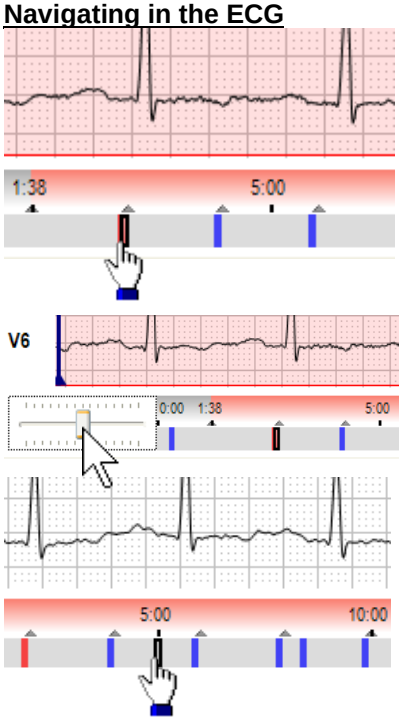
In the main window, the ECG is displayed in multi-channel representation. Using the operating elements described below, you can navigate in the whole record.

The number of the channels visible at the same time and the lead order is changed in the context menu.

How to the change the sensitivity / speed, to move lead positions, to change leads or to change the view was already described in section **Changing the ECG Representation** on page **45**.

To mark strips, you can select between 10 seconds and any length.

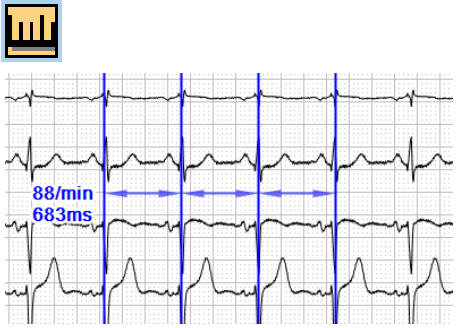
Navigating in the ECG



The rectangular frame symbolises the position of the ECG visible on top within the whole record.

- ☞ Left-click in the frame and move it (with pressed left mouse button) on the time bar.
- ☞ To move the ECG continuously, click on the slider and move the control element to the left or to the right.
- ☞ The more you move the slider, the greater the step size of moving the ECG.
- ☞ Click on any place on the time bar to position the multi-channel ECG to this place. (The example shows the ECG at the time of 5 minutes in the middle of the window).

Measuring the Heart Rate / RR Distance



- ☞ Click **ECG measurement tool** in the title bar of the ECG window. The marking lines become visible.
- ☞ Left-click on the place in the ECG at which you want to determine the RR distance, keep the button pressed, and drag the marking line over the R spike of a beat.
- ☞ Click on one of the other lines and move it onto another R spike. The display of RR and HR is updated continuously.
- ☞ Right-Click in the ECG to open the context menu. You can add further lines or delete lines.
- ☞ Right-Click in the ECG to open the context menu. You can add further lines or delete lines.
- ☞ Move a line to the left or right margin of the window to scroll the ECG.

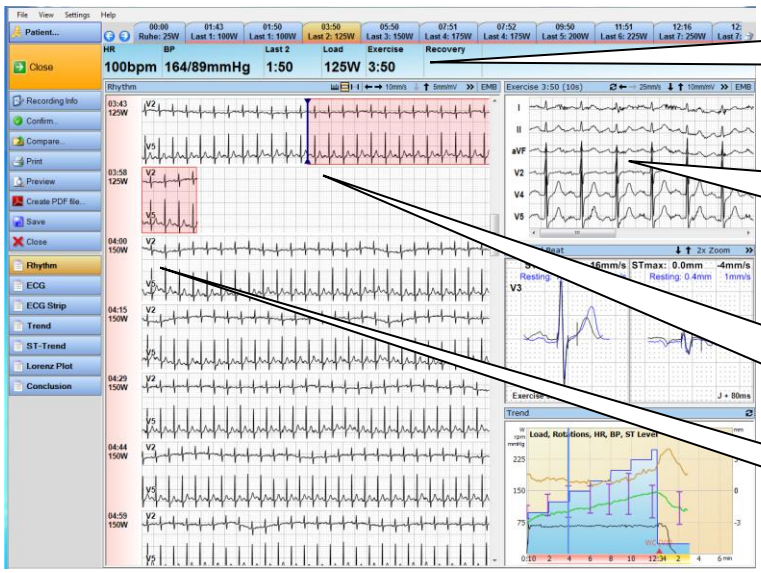
Creating an ECG Strips of 10 Seconds

- Click **Select 10 seconds ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the selected range to the desired position.
- Save the selected strip by pressing the **Edit** button.
- In the time bar, the strip is marked in grey. According to speed, the grey range can be greater or smaller than the visible range.

Creating an ECG Strip of Any Length

- Click **Select variable length ECG** in the title bar of the ECG window.
- Left-click in the ECG and you keep the button pressed. With pressed button, drag the mouse and select a strip. As soon as the selected strip is longer than 10 seconds, a further mark appears and splits the selected strip. The right-sided part marks 10 seconds which are automatically measured and interpreted.
- If necessary, correct the beginning and the end of the selected strip by positioning the mouse pointer on the left or right margin, pressing the left mouse button and moving the margin with pressed button.
- Click **Edit** and select the desired function in the dialogue box.

Rhythm



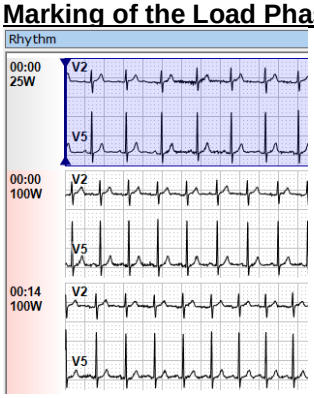
Details in the indication bar apply to the actual time

Multi-channel ECG of the selected and marked strip (here end of Exercise Stage 2)

Marking of the actual time (time of the average beat rate and marking in the trend window – here end of Exercise Stage 2)

Next Exercise Stage is starting on a new line.

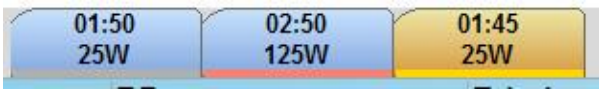
Marking of the Load Phases

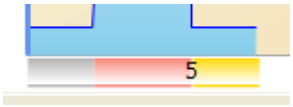


In the left margin of the rhythm window, the beginning times of every ECG line are indicated. The times always apply to the beginning of a phase.
The background colour of this time bar marks the phase in the load record:

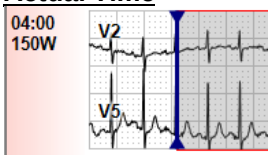
- grey: resting phase
- red: load phase
- yellow: recovery phase.

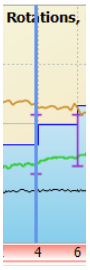
The same colour coding is on the bottom of the tabs and in the footer of the trend chart.

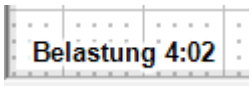




Actual Time







The actual time (and actual load value) is marked with a vertical line in the ECG.
The **Averaged Beat** window shows the phase, and the actual time is displayed on the bottom left.
The **Trend** window draws a blue vertical line. Here, the whole time (not the time per phase) is indicated.

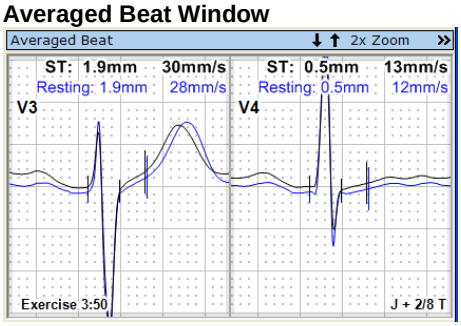
Window with Actual Strip

The **strip** currently marked in red (corresponds to the marked tab) is displayed in a multi-channel ECG window on the top right.

☞ Use all functions which are available in the multi-channel window, such as:

- ➢ change sensitivity and speed,
- ➢ change the View
- ➢ hide and move channels,
- ➢ change channels and
- ➢ measure curves.

Averaged Beat Window

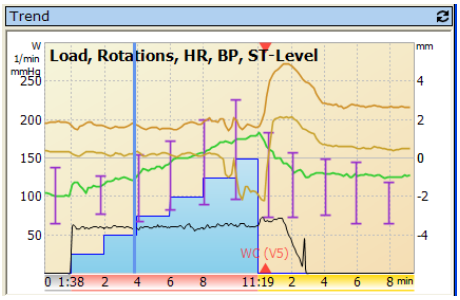


The **averaged beat** is indicated at the actual time. The time indicated on the bottom left corresponds to the time of the vertical marking in the **rhythm** window.

☞ Right-click to open the context menu and select the following functions:

- ➢ change the **speed** and **sensitivity**,
- ➢ change the **zoom factor** (sensitivity, speed and background grid are changed proportionally),
- ➢ change the **ST measuring point** for acquisition,
- ➢ change the **view** and
- ➢ change the distance of the **reference beat**.

Trend Window



In the **Trend window**, the actual time is marked by a vertical blue line.

☞ Position the mouse pointer in the trend window to show the numerical measurement values at the place of the mouse pointer.

☞ Right-click to open the context menu to exclude measurement values from the view.

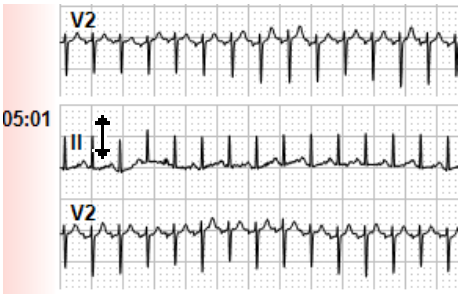
☞ Click  in the header, to view different groups of measurement values.

☞ Change the actual time

- ➢ in the **rhythm** window by moving the vertical sliders,
- ➢ in the **events** window by horizontal moving of the cursor or
- ➢ in the header by clicking a tab.

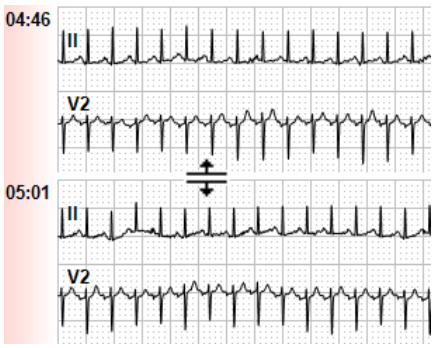
The other windows are synchronised to the new time.

Changing Leads



☞ Change leads by positioning the mouse pointer on a lead name and open the context menu with the **right** mouse button.

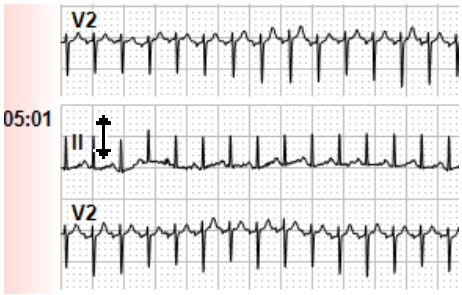
Changing the Line Spacing



☞ Change the line height, by positioning the mouse pointer exactly between two lines. Press the left mouse button and drag the line height to the desired size.

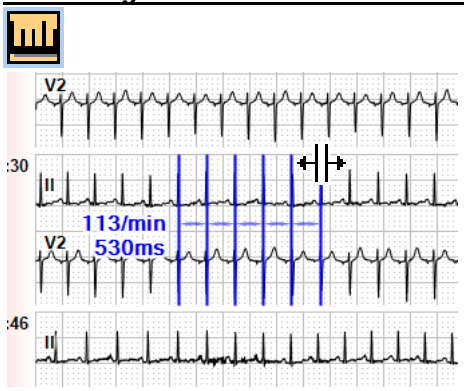
Note that the line height cannot become as small as you like. The maximum line height is depending on the length of the acquisition.

Changing the Curve Position



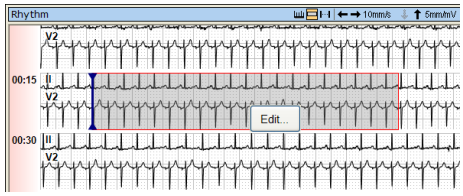
☞ Move a curve up or down by positioning the mouse pointer on the lead name. Press the left mouse button and drag the line to the desired position. For that, the **ECG measurement tools** may not be active.

Measuring the Heart Rate / RR Distance



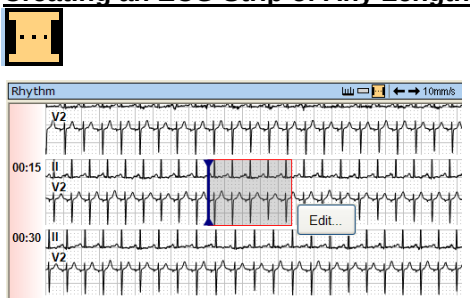
- In the header, click on the **ECG measurement tool** and then on a place to be measured in the rhythm ECG. Left-click on the first distance line and drag all distance lines together to the desired position. Click on another line and drag it in horizontal direction perform the measurement.
- Right-Click in the ECG to open the context menu. You can add further lines or delete lines. The number of lines is saved.

Creating an ECG Strip of 10 Seconds



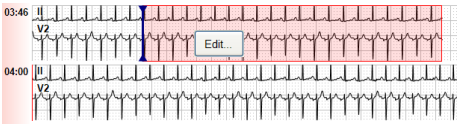
- Click on the **Select 10 seconds ECG** tool in the header.
- Then Click in the ECG to select 10 seconds of ECG (in each case 5 seconds on the left and on the right of the mouse pointer).
- Change the position by dragging the mouse pointer with pressed left mouse button.
- Save the selected strip by pressing the **Edit** button.

Creating an ECG Strip of Any Length

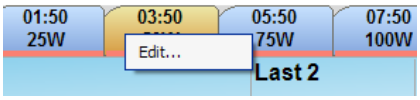


- Click on the **Select variable length ECG** tool in the header.
- Then click in the ECG to select the beginning of a strip, and drag the mouse pointer with pressed left mouse button to the end of the strip.
- Save the selected strip by pressing the **Edit** button.

Editing the ECG Strip

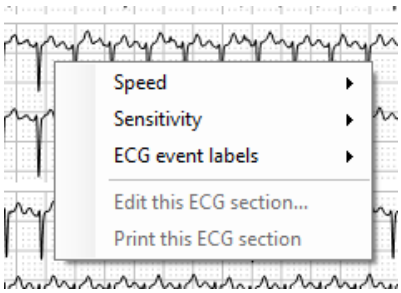


- **Left**-Click on an existing strip
  or
  right-click on the tab belonging to it.



- Open the **Edit** dialogue.
- Give to the strip a short, clear name.
- To give a name, you must save the strip.
- Print this strip as **ECG**
  or
  as A**veraged Beat**
  or
  see the print preview (arrow button). Change the print format and the printing parameters in: „Option | Printing parameters...“

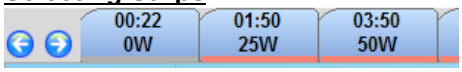
Changing ECG Parameters and View



- Right-Click in the ECG to open the context menu.
- Change the **speed** in the context menu or by means of the buttons in the header.
- Change the **Sensitivity** in the context menu or by means of the buttons in the header.
- Label the rhythm lines with the **beat classification**
  or
  Show arrhythmia events (only with arrhythmia option)
  or
  hide the labels.
- If mouse cursor was positioned over a strip while opening context, additional editing and printing of strip is possible.

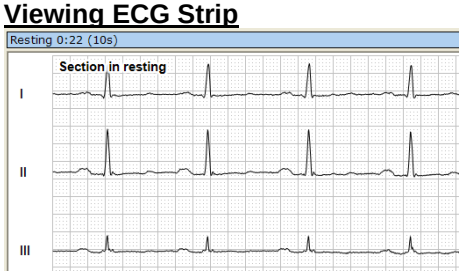
ECG Strip

Selecting Strips



- Use the strips for the evaluation of the exercise record. For every saved strip, there is a tab. To see the strips one after the other, click  .
- Position the mouse pointer on the tab to see the printing state and the name of the strip. The name which was entered on saving is indicated.

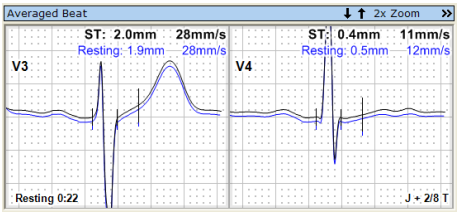
Viewing ECG Strip



In the large multi-channel ECG window, the actual strip is displayed.
If you gave a name on saving, it is indicated on the upper left of the window.

- Use the standard functions for multi-channel ECG windows:
  - change sensitivity and speed,
  - change the view
  - change or hide channels,
  - change channel positions,
  - measure curves.
- Right-click to open the context menu to view the beat types or the arrhythmia results (if arrhythmia option is active).

Averaged Beat

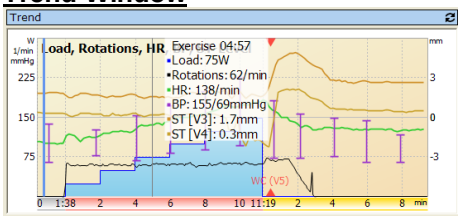


The averaged beat of the currently selected strip is indicated.

☞ Right-click to open the context menu and select the following functions:

- ➢ change the **speed** and **sensitivity**,
- ➢ change the **zoom factor**,
- ➢ change the **ST measuring point** for acquisition,
- ➢ change the **view** and
- ➢ change the distance of the **Reference Beat**.

Trend Window



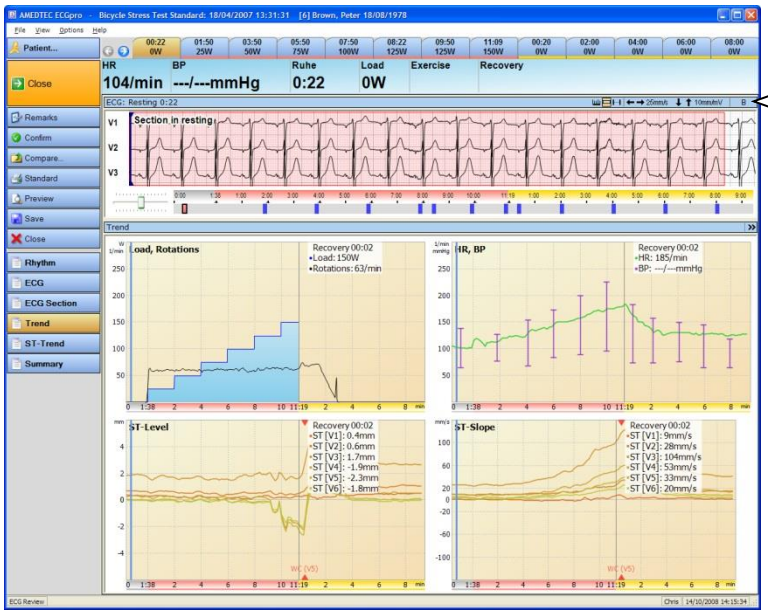
In the **Trend Window**, the actual time is marked by a vertical blue line.

☞ Position the mouse pointer in the result window to show the numerical measurement values at the place of the mouse pointer.

☞ Right-click to open the context menu to exclude measurement values from the view.

☞ Click in the header, to view different groups of measurement values.

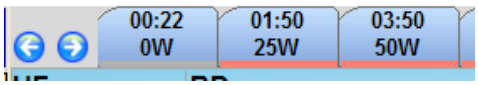
Trend



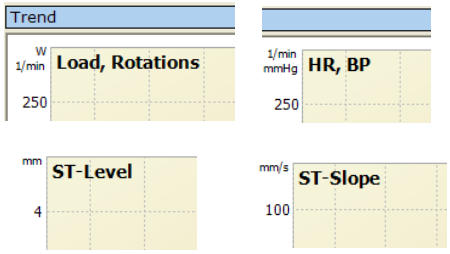
Buttons for
- Measurement tool,
- Selection of 10-seconds ECG,
- Selection of ECG of any length,
- Speed and
- Sensitivity

Indication of the enabled filters

Tab Operation

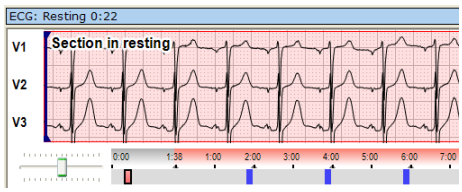


Use the tabs as described in the preceding strip to see the ECG strip at the load stage end in each case and to mark the respective time in the charts.



In each case, the four charts show a group of measurement values.

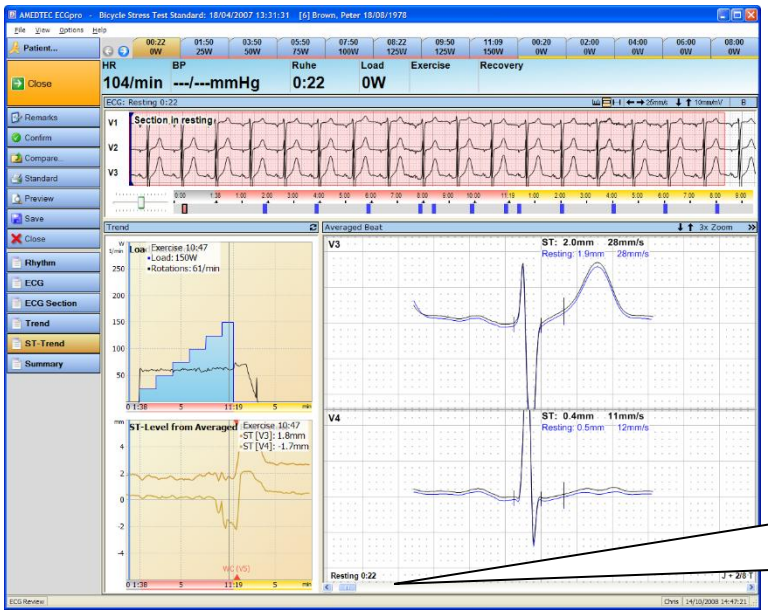
- ☞ Right-click to open the context menu in each of four charts to exclude parameters from the indication.
- ☞ In the context menu of both ST charts, disable the **Indication of the averaged values** to indicate the values computed in every 10-second strip (unsmoothed curve).
- ☞ In the context menu, of both ST charts, enable the **Display ST Value relation to reference** to see the change of the ST values during the acquisition.



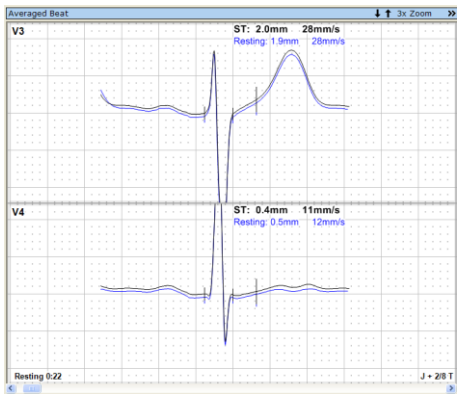
The whole multi-channel ECG in the upper window can be used for scrolling of the record or to control of the marked strips.

- ☞ Right-click to open the context menu.
- ☞ In the context menu, change the **speed**, the **sensitivity**, the **view** or the **labels of events**.

ST Trend



The use of the tabs and the multi-channel ECG corresponds to the preceding **Trend** section.

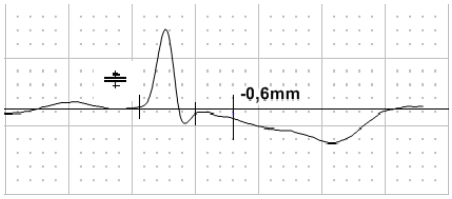


In the large window, the actual averaged beat is indicated.

☞ Right-click to open the context menu and select the following functions:

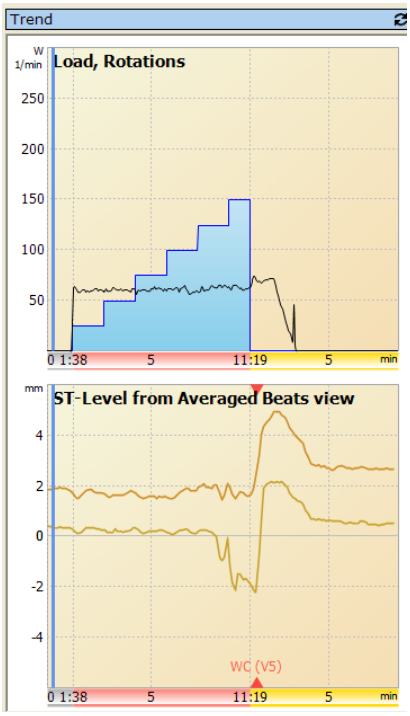
- change the **speed** and **sensitivity**,
- change the **Zoom factor** (in this window, the bigger zoom factor than in the small windows can be selected),
- change the **ST measuring point** for acquisition,
- change the **View**
- change the distance of the **Reference Beat**.
- display an isoelectric line.

☞ Position the mouse pointer a little bit above or below the isoelectric line ↕ and move both complexes together in vertical direction.



☞ Position the mouse cursor exactly on the isoelectric line ≑ and correct the ST measurement value.

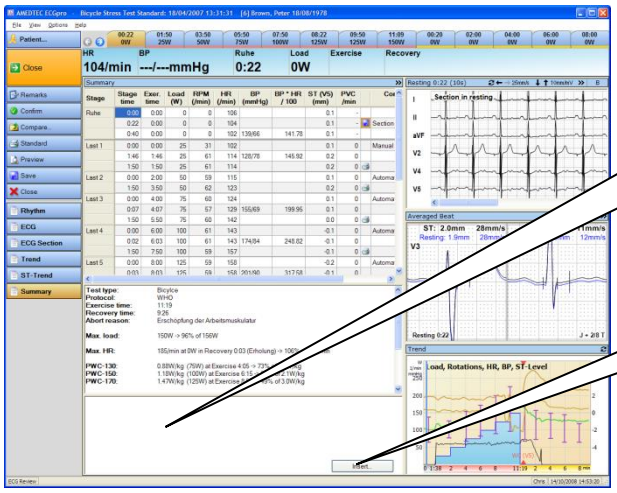
☞ Move the actual time using the horizontal scroller . Keep the buttons ◀ or ▶ pressed to display the average beats continuously in 10-seconds steps. ECG windows and trend chart are updated.



Both charts show the load trend and the ST trends.

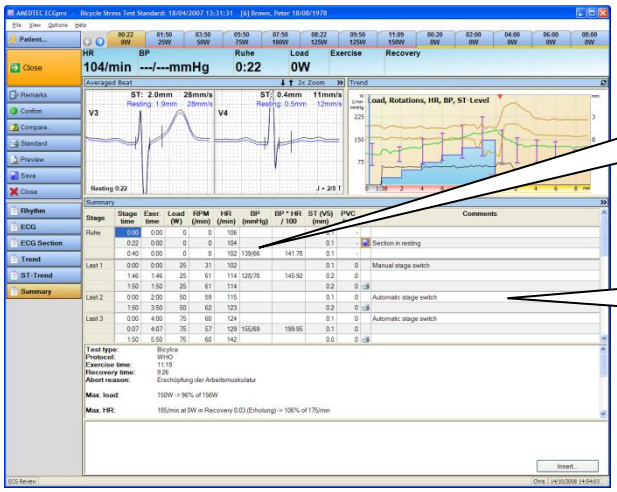
- Click on the blue line and move the actual time with pressed mouse button. ECG window and averaged beat are updated.
- Left-click on any time to position the blue cursor on this time. ECG window and averaged beat are updated.
- Change the ST values in the lower chart using the button in the header.
- Right-click to open the context menu in each of the charts to exclude parameters from the indication.
- In the context menu of both ST charts, enable the **Display smoothed ST values** to indicate the values computed from multiple 10-second strips. Values can differ from values in sub window **Averaged Beat**.
- In the context menu, of both ST charts, enable the **Display ST Value relation to reference** to see the change of the ST values during the acquisition.

Summary



Box for own remarks

Button to insert predefined terms or boilerplates



Blood pressure values can be edited afterwards (for that, click in the box)

The table is not delimited horizontally in the view **summary (widescreen)**

☞ Change the view in: „*View* | *Summary*“.

The **Summary** window consist of the following sub windows:

- result table,
- summary of the most significant load data
- manually created report.

The heights of the sub windows can be customised by moving the horizontal separators.

With help of menue “*View* | *Rebuild summery…*” the actual summery (with all manually changes) will be replaced by standard summery regarding actual settings (for this read in document **Settings** the chapter 3.1.2 Tab page Stress test)

For entering blood gas values enter the menu: “*Settings* | *Blood gases*”.

Result Table

Last 1	0:00	0:00	25	31	102			0.1	0		Manual stage switch
	1:46	1:46	25	61	114	128/78	145.92	0.2	0		
	1:50	1:50	25	61	114			0.2	0		

☞ Click » to display the whole width of the table.

For every load stage, at least one line with beginning time, beginning load, heart rate, ST value and reason of the change-over is displayed.

Further lines are only generated, if events such as

- blood pressure measurement (automatic or manual)
  or
- saving or printing a strip exist.
- If **Blood gases** are used, the most recently measured lactatevalue per line are displayed within 60 seconds.

Saved strip are marked with ., saving and printing, with .

☞ Click or twice to display the corresponding strip in the **ECG Strip** view (see page **131**).

For calculation of Training Hear Rate the exercise stages are used. If Hear Rate in resting or recovery is equal or higher, both values are displayed.

For the indication of the ST values, the channel with Worst-case or the lead V2 is used by factory selection. This channel can be changed manually.

☞ Right-click box ST () in the header. Use the context menu to select the desired channel.

The currently selected strip is highlighted by a letter marked in yellow by analogy with the tab. The **Strip** window and the **Averaged beat** window are assigned to this time.

Blood pressure values can be edited.

☞ Click on an existing blood pressure value and enter the corrected value.

☞ Complete the input with **Enter** or click on another value.

Summary

Test type:	Bicylce
Protocol:	WHO
Exercise time:	11:19
Recovery time:	9:26
Abort reason:	Erschöpfung der Arbeitsmuskulatur
Max. load:	150W -> 96% of 156W
Max. HR:	185/min at 0W in Recovery 0:03 (Erholung) -> 106% of 175/min
PWC-130:	0.88W/kg (75W) at Exercise 4:05 -> 73% of 1.2W/kg
PWC-150:	1.18W/kg (100W) at Exercise 6:15 -> 56% of 2.1W/kg
PWC-170:	1.47W/kg (125W) at Exercise 8:55 -> 49% of 3.0W/kg

The summary is self explicatory to a large extend.

☞ The calculation of the **Target Load** is enabled in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Exercise Settings*". The calculation requires the input of **size** and **weight** of the patient.

☞ The target heart rate is defined in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Heart rate*".

☞ The output of PWC values is defined in "*File* | *Settings...* | *12 Lead ECG* | *Test procedures* | *Stress Test* | *Exercise Settings*".

Own Remarks

The lower part of this window can be used for own remarks.

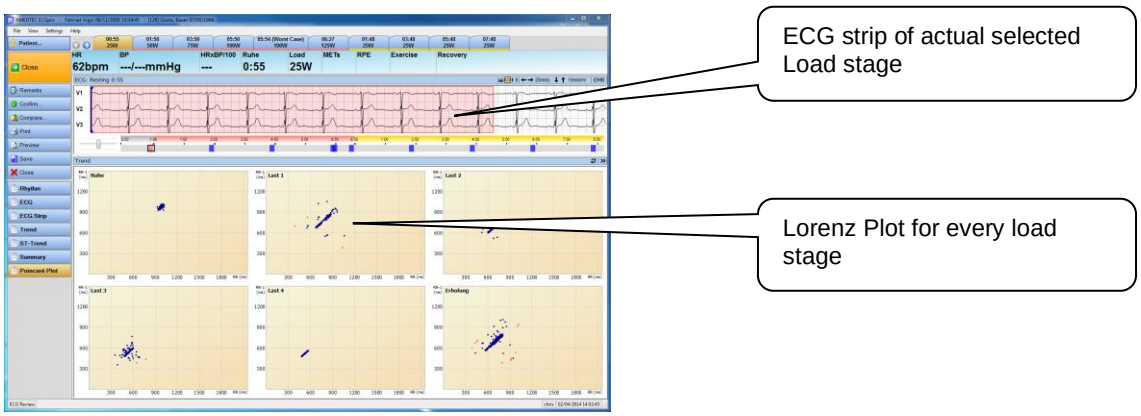
☞ On entering remarks (findings), you can use the auto-type function. Using this function, self-defined shortcuts are replaced by complete terms or sentences.
(refer to "*File* | *Settings...* | *General* | *Auto replacement*").

☞ Create our own summary text with place holter. For this refer to *"File* | *Settings…* | *12 Lead ECG* | *ECG* | *Diagnosis"*.

Lorenz Plot

Every RR distance in relation to previous RR is displayed. Every point in diagrame corresponds to any RR distance (ordinate) and belonging RR-1 (abscissa).

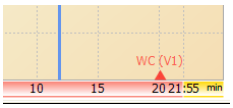
For every load stage a different plot is displayed.
For settings and customization of divergent RR distances open the tab sheet **HRV** in menue "*File* | *Settings…* | *12 Lead ECG* | *ECG*".



Worst Case

The views
- Rhythmus
- ECG
- ECG strip
- Trend and
- ST-Trend

Show an automatically calculated „**Worst Case**".



For **Worst Case** an own ECG strip is created.

In **Summary table** one line is reserved for **Worst Case**.

- ☞ Check the criteria for calculation **Worst Case** im Menue „*Settings* | *ST…*".
  In this dialogue configure the used channels for automatic calculation. Deside, if ST Elevation, ST Deviation or bot his used for calculation.
- ☞ .Make corrections at automatically calculated Worst Case:
  Search manually the correct time point for Worst Case.
  Open the menue „*Settings* | *ST Worst Case*". Click the lead with the highest devianc.
- ☞ Delete the automatically calculated Worst Case:
  Open the menue „*Settings* | *ST Worst Case*" and click the line **No Worst Case**.

Printing the Record

If you want to print the record in the standard format,

- ☞ Click the button
  or
  press **Ctrl+P**
  or
  open the menu: "*File* | *Print*".

If you want to print the record with format selection,

- ☞ right-click the **button** and select **Dialog**
  or
  open the menu: "*File* | *Print with Format Selection...*".

If you want to display the printing preview,

- ☞ Click the button
  or
  press **Ctrl+F**
  or
  open the menu: "*File* | *Print Preview...*".

If you want to display the printing preview with format selection,

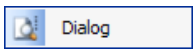
- ☞ right-click the **button** and select **Dialog**
  or
  open the menu: "*File* | *Print with Format Selection...*".

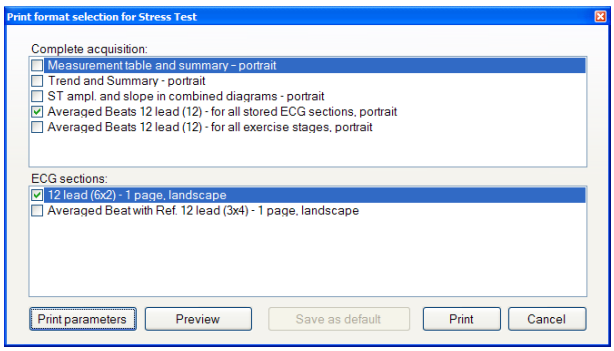
If you want to save a PDF file,

- ☞ Click the button
  and
  select folder and file name.

- ☞ After you have clicked one of both format selection **buttons** shown on the upper right, confirm the **Dialog** button.

oder





You see a box with the selectable print formats.

- ☞ Disable the checkbox if this format should not be printed or be indicated.
- ☞ Select the format or the formats which should be printed or be indicated. The print formats under **ECG strips** are indicated / printed for every automatically or manually saved strip.
- ☞ Use the **Print parameter** button to change sensitivity, speed, thickness of the ECG curve or intensity and colour of the grid.
- ☞ No matter whether you selected **Standard** or **Preview** with format selection, you can start printing or the previewing in this box.

If you want to use these changed settings for all records in future,

- ☞ press **Save as default**.

The standard print format and the selectable print formats are set in "*File* | *settings* | *12 Lead ECG* | *Printing*"

separately for every type of record . Read also **Print formats** instruction in the **Printing** section.

Confirming Tests

You can mark your comments and the diagnosis as validated.
The validation mark includes the date and the full username, as it was entered in the user management.

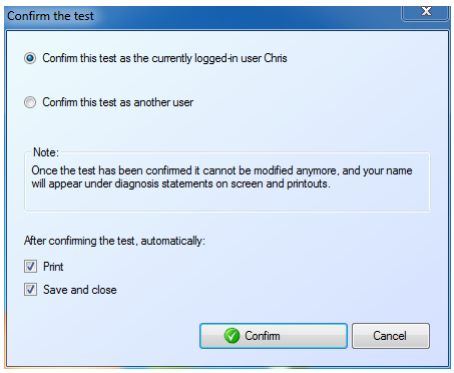
The validation mark is added

- to the **Remarks** dialogue on the screen
- to **Diagnosis/Summary** in the **Analysis Results** window on the screen
- to Diagnosis on the printout
- footer on every page of print out and PDF file

Perform the validation as follows:

☞ Click this **button**
or
press **Ctrl+B**.

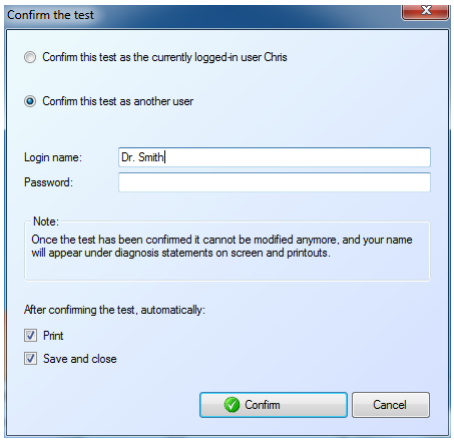
The dialogue **Confirm the test** opens:



☞ If you as the current user have the privilege to confirm, you can click the button **Confirm**.

☞ Activate the check box **Save and close** to save and to close the report after clicking **Confirm** to mark the report as confirmed.

☞ Activate the check box **Print** for starting default format print out when pressing the button **Confirm**.



☞ To perform the confirmation under a different username with other privileges, change the radio button to **Confirm this test as an other user**.

☞ Enter your username and your password.

☞ Click **Confirm** to confirm the test.

☞ Activate the check box **Save and close** to save and to close the report after clicking **Confirm** to mark the report as confirmed.

☞ Activate the check box **Print** for starting default format print out when pressing the button **Confirm.**

In the following cases, the validation will fail:

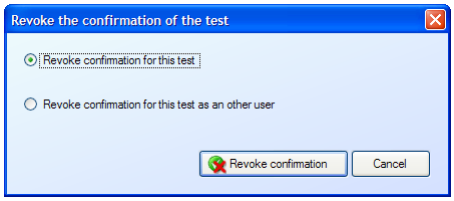
- The user is not logged in the *ECGpro* user management as active user.
- The password is wrong.
- The user is not privileged for conforming.

For username, password and integrated security, ref. to **AMEDTEC *ECGpro* settings**, section **Security, User administration**.

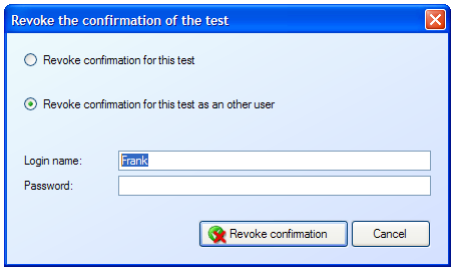
Revoking Confirmation

Under certain conditions, it is possible to delete the protection of an already confirmed test to modify it afterwards (e.g., remark, conclusion, measurement).

☞ Click this **button**

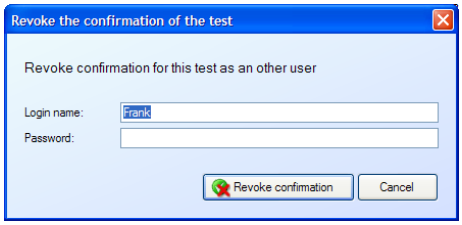


This dialogue is displayed if you are privileged to revoke the confirmation of this test.
You have opened a report which you confirmed by yourselves, and you are entitled to reset own test
or
you have unlimited rights to reset tests.



☞ Change the radio button to revoke the confirmation **as an other user**.

Username and password must be those of a user who is entitled to revoke confirmations.



This dialogue is displayed if you are logged in as a user who has no rights to revoke the confirmation of this test.

The dialogue shows always that user who confirmed the test (even if this user is not allowed to revoke confirmation made by himself).
You must enter username and password of a person who is entitled to reset tests other than his own ones.

Stat ECG

After installation of AMEDTEC *ECGpro* the list of Test procedures encloses the (*Resting) Stat ECG*.
You can start this Test procedure without available patient data. You can watch the running ECG on screen about any space of time. When stopping the recording, the last 10 seconds are saved.
When saving the ECG is not assigned to any patient. You will see an entry on tab sheet **Unassigned recordings**.
Please read in section **Test Procedure Programs** on page **33** .

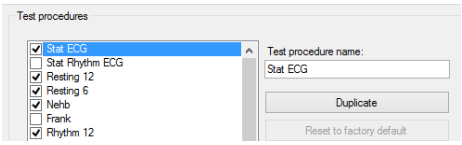
Settings

The following described setting usually are done only once after installation. The settings can be done also to a later time point.

Define recording type

If your recording device **CardioPart 12 USB** or **CardioPart 12 Blue** has (contains) the option mr, i, s or as, you can use for recording of **Stat ECG** also the Rhythm test procedure. At this you can record the ECG for a long time.
During the recording or later you can select strips for analysis or interpretation.

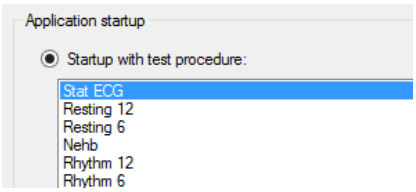
Open the menu: "*File* | *Settings...* | *12 Lead ECG* | *Test procedures*".



- ☞ Select the checkbox **Stat Rhythm ECG**, if you wish the rhythm features at Stat ECG.
  For this you must have the necessary option
- ☞ Uncheck the box **Stat ECG**, if you do not wish the Stat procedures.

Define start option

You can start ECGpro always wit Stat test procedure.
Open the menu: "*File* | *Settings…* | *General* | *Environment*".

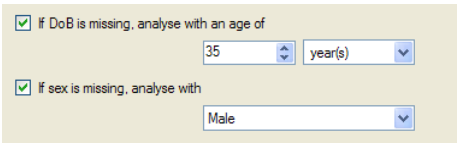


- ☞ Set the checkbox **Startup with test procedure**, if *ECGpro* should start always with a test procedure.
- ☞ Click the line with the **Stat ECG**, if ECGpro should start always with this test procedure.

Age and sex

The automatic analysis program needs for calculation of measurement values and interpretation the age and the sex of the patient. Because this data could not be available at start of an ECG, the recording will not include an analysis.

Open the menu: "*File* | *Settings...* | *12 Lead ECG* | *ECG analysis*"

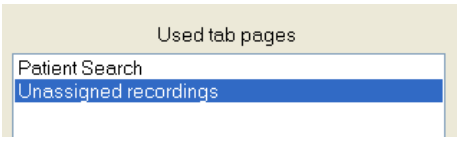


☞ Set both checkboxes to define age and sex for using in analysis program.
In output of **Analysis Results** in section **Diagnosis** (devices with option i, s or as) you will get an hint of presumed sex and presumed age.

Data management

For display the recording the file card **Unassigned recordings** is essential. Here you can assign the recording to an patient.

Open the menu: "*File* | *Settings...* | *Database* | *data management*"



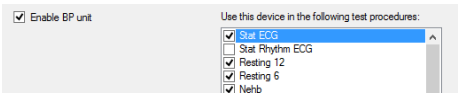
☞ In window **Used tab pages** the **Unassigned recordings** must be available.

Blood pressure device

In all test procedures it is possible to use an automatic blood pressure device. If your system is connected with such a device, you can use it in Stat procedures too.

> **Warning !**
> If your blood pressure device is not ready for use, you can not start the Stat recording !

For using the blood pressure device in Stat procedure, open in menu: "*File* | *Settings...* | *Devices*" the page for connected device (e.g. Spengler SCVL-2007).



☞ Set the checkbox for the Stat procedure if the external device should be used.

Recording Stat ECG

Select Test procedure

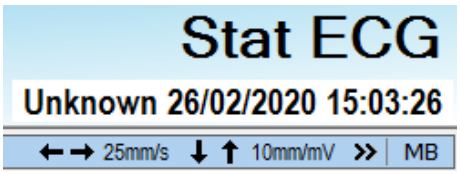
☞ Click the button
or
press **Strg + 1**, if the button is on first position,
or
open the menu: „*Start*“ and click **Stat ECG**.

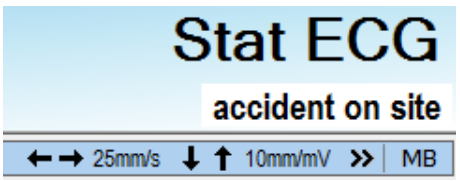
When adding or deleting test procedures, the above mentioned digit can differ.

If you have selected a patient in data management, this patient is NOT used for Stat ECG.

Prepare patient

In head line is shown an automatic generated identification for the acquisition. The identifier consist of the term **Unknown** as soon as date and time, when button is pressed.



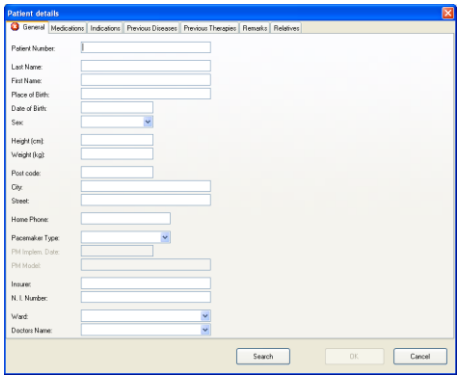


☞ Click the white line and write a short description which helps later to assign to a patient (e.g. accident on site).

You can write the name of patient – if known. This entry will not be used from database – but is assistant when assign to an existing patient.

Inserting patient data

☞ Click the button
or
open the menu: „Patient | Select Patient“.



☞ Insert the patient data in dialogue **Patient details**.

☞ The patient number is not compared with any in database existing patient numbers.

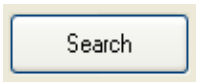
The patient data can be used for assignation to an already existing patient.

When inserting data in this dialogue the recording is not assigned to an existing patient!

Assign recording to known patient

If patient already exists in database, you can assign the Stat acquisition. You also can create a new patient.

- Click the button
  or
  open the menu: „Patient | Select Patient“.



- In dialogue **Patient details** click the button
- For searching an existing patient read **Search Patient Data** on page **30** .

If you select an existing patient here, no entry on file card **Unassigned recordings** is created.

Applying Electrodes

Apply the electrodes as described in section **Applying Electrodes** on page **43**. Please note the section **ECG Filters** on page **44** .

- Apply the patient's cable in such a way that the electrodes are not tensioned.
- For reusable electrodes, use a contact spray.
- Make sure that the patient lies comfortably and is relaxed. The arms should have enough space on the couch. Otherwise the patient will try to hold the arms in the body what leads to artefacts.
  It is recommended put a role under the hollows of the knees of the patient.
- If possible do not use and EMG filter and Mains filter.

Start Stat ECG

☞ Start the acquisition with the button
or
press the key **F2**.

Please note that start is impossible during **Impedance** is running.

☞ With this button you will acquire exactly 10 seconds ECG. After 10 seconds the ECG can be analysed, printed and saved.

Function in (Resting) Stat ECG

☞ For writing comments read section **Entering a Comment** on page **41**.

☞ At any time the recording can be stopped. Please note, that analysis program (measurement and interpretation) needs at least 10 seconds ECG.

☞ When starting the acquisition with button  you can reset the automatic recording time.

☞ How to use the filter, read in section **ECG Filters** on page **44**.

☞ For changing ECG display (sensitivity, recording speed, number of channels, channel position) read section **Changing the ECG Representation** on page **45**.

Function in Stat Rhythm ECG

For writing comments read section **Entering a Comment** on page **41**

☞ At any time the recording can be stopped. Please note, that analysis program (measurement and interpretation) needs at least 10 seconds ECG.

☞ When starting the acquisition with button  you can renew the automatic recording time.

☞ How to use the filter, read in section **ECG Filters** on page **44** .

☞ You can mark distinctive points. Please read section **Rhythm ECG Automatically** on page **59** .

☞ You can break the display of multi channel ECG. For this read section **Rhythm ECG Automatically** on page **59** .

☞ This function saves the last 10 seconds ECG as strip. The main measurement values are calculated and displayed. Please read section **Rhythm ECG Automatically** on page **59** .

☞ You can save an strip with maximum 30 seconds. Later you can label or delete this strip. For more information read section Rhythm ECG Automatically on page **59**.

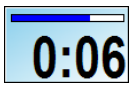
☞ This button will start continuously printing. Depending from your settings are printed one, two or three channels ECG.

☞ Note, that continuously printing you must stop manually.

☞ This button will print the last 10 seconds in adjusted print format.

☞ For changing ECG display (sensitivity, recording speed, number of channels, channel position) read section **Changing the ECG Representation** on page **45** .

Stop Acquisition



☞ Acquire at least 10 seconds of undisturbed ECG.

☞ Sop the acquisition with the button
or
press key **F2**.

The last 10 seconds will be analysed (if sex and age are available).

☞ An acquisition started via button **Start Auto** you can finished premature with the button
or
the keys **Ctrl+T.**

For evaluation of ECG several functions are disposal:

☞ For (**Resting) Stat ECG** read the in section

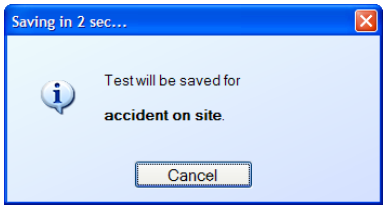
☞

☞ **Checking the Record** on page **53**.

☞ For Stat **Rhythm ECG** read in section **Checking the Record** on page **63**.

Save Acquisition

☞ Save the acquisition with the button
or
with the key **F2**.



☞ For a time of 3 seconds you can cancel the storage process.

Assign the recording

The assignment of the recording to an patient can be done later. Requirement is the availability of patient data in *ECGpro* database.
All recordings not assigned to an patient you will find in **Data management** on file card **Unassigned recordings**.

- ☞ Click this button to open the Data management.
- ☞ Click the file card **Unassigned recordings**.

For more information read in section **Data Management** on page **17** .

Click with right mouse button on a recording. Select one of the following activities:

- Assign,
- Open,
- Print,
- Print (with format selection),
- Preview,
- Delete.

If the checkbox **Use in auto search** in dialogue **Unassigned Recordings** is set, the search string will be searched in fields:

- Patient Number,
- External Patient number,
- Alternative Patient number,
- Last Name,
- First Name,
- Date of Birth.
- Case number

With double click on a recording you will open the dialogue for selecting the patient, Select the patient or create a new patient, which you would like to assign the recording. For more information read section **Search Patient Data** on page **30** .

Measurement Program and Diagnostics Program

ECGpro uses the **H**annover **E**CG **S**ystem **HES**® as measurement and diagnostics program.

HES has been developed in cooperation with internationally recognized cardiologists since 1968.

The HES ECG programs took part in all tests of the European project "Common Standards For Quantitative Electrocardiography", CSE, i.e., the program results have been checked internationally regardless of the program developers in an independent test centre. 500 to 1220 ECG, selected by independent experts, were checked.

The following description should give an overview of the working principle of the HES program.
A reference manual is available for more detailed questions. For this, please ask your dealer.

ECG Signal Processing

The data may require to be calibrated or reformatted for the HES Program. After that in a preprocessing phase noise is checked and to the extent possible removed. The QRS complexes are localized and ECG cycles with similar morphology of P-wave, QRS complex and ST-T are synchronized and averaged. The normal beats form in this way the so-called Representative Cycle. If there are monoform extrasystoles these will as well be averaged and relevant parameters for beat typing are measured.

After averaging of each cycle type the wave recognition, i.e., the determination of P-onset, P-offset, QRS-onset, QRS-offset, and T-offset is performed and for the Representative Cycle of the normal beat type approximately 1200 measurements are determined..

Evaluations of the HES Program

During signal processing RR-intervals, beat typing, and information on the P-wave is collected and used for rhythm interpretation. From the measurements of the Representative Cycle scores are derived and by using the results of a complex set of multivariate tests the allocation (“diagnostic interpretation”) to one of the groups Normal, Anterior Myocardial Infarction, Inferior Myocardial Infarction, Lateral Infarction, Right Ventricular Hypertrophy, Left Ventricular Hypertrophy, Biventricular Hypertrophy is performed. For each of these diagnostic categories levels of confidence, consider / possible, probable, or definitive are computed. (Please note, in case of a result “definitive” no qualifier is print out with the diagnostic statement, e.g., definitive Normal or Myocardial Infarction will result just in a statement “Normal” or “Myocardial Infarction”).

Representative Cycles
The Representative Cycles are average cycles as explained before of the “Normal” ECG complexes. Pointer information is provided for printout of wave-onsets and wave offsets to make possible the visual quality check. The Representative Cycles should always be printout with its fiducial markers for quality assurance by the ECG reading physician.

Measurement Results
There are “global”, i.e., measurements common for all leads, for instance measurements like P-duration, PR-interval, QRS-duration, QT-interval, and spatial parameters for example frontal vectors.
Furthermore, there are lead-specific measurements provided in detail for each of the “classical” wave forms P, Q, R, S, ST, T, etc. provided (examples for printouts are given on pages at the end).
For derivation of interpretative statements, the program takes advantage of many other measurements from the QRS-complex and the ST-T wave part which are characteristic for the morphologic structure of this ECG.

Rhythm Analysis
The rhythm analysis considers RR-intervals, the P-wave shape, and the PR-interval (derived from signal processing during “P-R contour analysis”), the morphology of the QRS-complex (extrasystoles, escape beats) and beat couplings, e.g., prematurity, compensatory pause, bigeminus, trigeminus, etc.). Respective statements are printed out, e.g., “sinus rhythm with n extrasystoles with compensatory pause”.

P-Wave interpretation
Based on the conventional criteria on amplitudes and duration of the P-wave statements are derived regarding left atrial overload, right atrial overload, prolonged atrial conduction.

Hints on specific findings

Within the program practically all ECG parameter relevant for the diagnostic interpretation are tested for “normality”. Morphological peculiarities, e.g., Q-waves, reduced R-amplitudes, Delta-waves, ST-changes, etc. are checked and specific hints to these changes are printed out if the 90 % limits of the normal values are exceeded.

The hints on specific findings shall bring the focus of the physician looking at the ECG computer printout to the peculiarities of this ECG. In most of the cases these hints will ease the understanding of the statistical classification results or even confirm it.

Repolarization abnormalities and T-wave changes
In case of abnormal ST-T and flat or large T-waves statements point to these abnormalities and specify the lead where this abnormality has been detected. However, sometimes T-wave abnormalities are not a specifically mentioned or detailed described, e.g., if those abnormalities are included in the identification of the age of an infarction.

Intraventricular conduction defects
Specific statements are provided on conduction delays, incomplete and complete bundle branch blocks and the preexitation syndrome. Also the left anterior hemiblock is identified and in case of involvement of both bundle branches a statement on intraventricular conduction defect is given.

QRS-T-evaluation (“interpretation” of the QRS-T morphology)
Interpretation (“diagnostic classification”) of the ECG is derived by means of logistic and statistic decision functions. The ECG under consideration is – simply spoken – compared for resemblance with Normal or specific Abnormal sets of ECGs of the learning and testing data bases used for development of the Hannover ECG Classification Program. For this data base cases like “Normal”, Infarction with various locations, Left and Right Ventricular Hypertrophy have been confirmed by ECG independent diagnostic tests.

From these ECG data sets by means of discriminant function analysis characteristic parameters and their distributions have been determined and are used for derivation of scores and multivariate discriminant functions. The program does not use just isolated wave forms (e.g., Q-waves or RS-amplitudes) but also a large number of parameters from the wave independent sampling of the depolarization phase (QRS) and the repolarization phase (ST-T).

By means of these diagnostic algorithms the ECG is allocated to groups Normal, Right Ventricular Hypertrophy, Left Ventricular Hypertrophy, Biventricular Hypertrophy, Anterior Myocardial Infarction, Inferior Myocardial Infarction, Infarction (e.g., large infarcts where the anterior wall as well as the posterior wall or the lateral wall may be involved) and also a group where Infarction and Left Ventricular Overload has been detected. As mentioned before, to the extend possible, hints are given regarding the age of an infarction.

It should be mentioned that sensitivity and specificity of the classification algorithm may be adjusted to specific applications by means of “weighting” factors without changing the program logic or criteria. This might be of interest, e.g., in epidemiological studies.

Global Interval Measurement
Interval measurement and “global” wave durations are displayed in red color and marked with an “*” if they deviate from the normal values.
The thresholds are:

- P duration ≥ 128ms
- PQ interval ≥ 200ms
- PQ segment ≤ 21ms
- QRS duration (dependent on age)
  - Age > 11 years: > 100ms
  - Age ≥ 9 years: > 95ms
  - Age ≥ 6 years: > 90ms
  - Age ≥ 3 years: > 85ms
  - Age < 3 years: > 80ms
- QTrel > 114% or QTrel < 90%

Treatment of isoelectric segments within the QRS-complex

The wave of depolarization is a spatial entity, which means that the onset of a wave will not be evident in all leads at the same time. To determine the global QRS interval duration, the earliest appearance of a wave in any of the leads is used. Isoelectric segments in the QRS complex of the other leads are treated as part of the subsequent significant wave. Similarly, the latest QRS end is used, and isoelectric segments at the end of the QRS complex in the other leads are included in the preceding wave.

Result presentation
For each ECG recorded the Representative Cycle of the normal beat including the markers for the measurement reference points and the QRS-configuration description, a rhythm strip, and the essential interval measurements are printed out. AMEDTEC ECGpro uses instead of “Representative Cycle” the term “Averaged Beat”. Beat- and wave form annotations (as required, e.g., by the FDA) are provided on each standard printout. Within the appendix examples for the typical one-page analysis printouts are shown where the rhythm strip with beat annotations, The Representative Cycles with wave form annotations, interval measurements and hints to specific findings, and the QRS-T interpretation including a summarizing bottom line statement are given. This highly condensed printout has proven to be most suitable in many clinical applications. (ECG raw data are shown for the analyzed ECGs as well.

It is also possible to print out a set of “Standard Measurements” as shown on the tables. Please note, there are many more measurements inside the program, including amplitudes and durations for each of the QRS-waves found. (The standard table contains only the measurements for the Q, and the largest R and S-waves of the QRS-complex while there may be R’; R”, S’, S”-waves).

Rhythm Line
Depending on option of the acquisition device, a rhythm statement is displayed under **measured data** (option m or mr) or under **diagnosis** (option i, ai, s or as) . The QRS complexes found are represented in this line by a sign. In “*File* | *Settings...* | *12 Lead ECG* | *ECG analysis*“, you can hide this rhythm chart or show it as **Simple** or **Complex**.

In addition, the QRS are also marked in the ECG rhythm line in the lower edge of the printout. These signs can differ from the marking of the QRS in the above-mentioned rhythm statement.

According to setting, the complex types are symbolised by following signs:

	ECG line	Rhythm chart	
		Simple	In detail
Dominant	N1	+	+
Dominant with abnormal P and T wave	N1	+	o
Dominant with abnormal P wave	N1	+	p
Dominant with abnormal T wave	N1	+	t
Dominant with base line variation	N1	+	b
Dominant with abnormal RR interval	N1	+	r
Dominant at 10-seconds margin	N1	+	i
Extrasystole type 1	V1	V	2
Extrasystole type 2	V2	V	3
Extrasystole type 3	V3	V	4
Aberrant	A	A	A
Disturbed complex	X	X	X
Pacemaker	P	P	P

Beat Classification in the ECG
In the ECG at rest as well as in the exercise ECG, the beat types can be indicated in the ECG.
In the rhythm ECG, the beat classification can be indicated only for saved strips.

	Marking in the ECG	Used in Rest	Used in Ergo
Dominant	N1	✓	✓
Dominant 2	N2		✓
Dominant undetermined	N3		✓
Extrasystole T1	V1	✓	✓
Extrasystole T2	V2	✓	✓
Extrasystole T3	V3	✓	✓
Extrasystole T4	V4		✓
to			
Extrasystole T20	V20		✓
Further extrasystoles	V21		✓
SVES	S		✓
Escape Systole	E		✓
Aberrant	A	✓	✓
Complex with disturbance	X	✓	✓
Pacemaker complex	P	✓	✓

Pediatric ECG

For patients of an age till 16 years including, no diagnostics is created. Instead of it, a measurement value table is created.
In this table, the measurement values of the patient are compared with those from statistics distributed after Gauss. Basis for it are tables created by Andrè Davignon et al. of the same name.
If the values of the patient are beyond this distribution, these are marked with *.

☞ Open: "*File* | *Settings…* | *12 Lead ECG* | *ECG analysis".* In the **Analysis** group, you can select the gauss distribution of 2% to 98% or from 5% to 95% for the table.

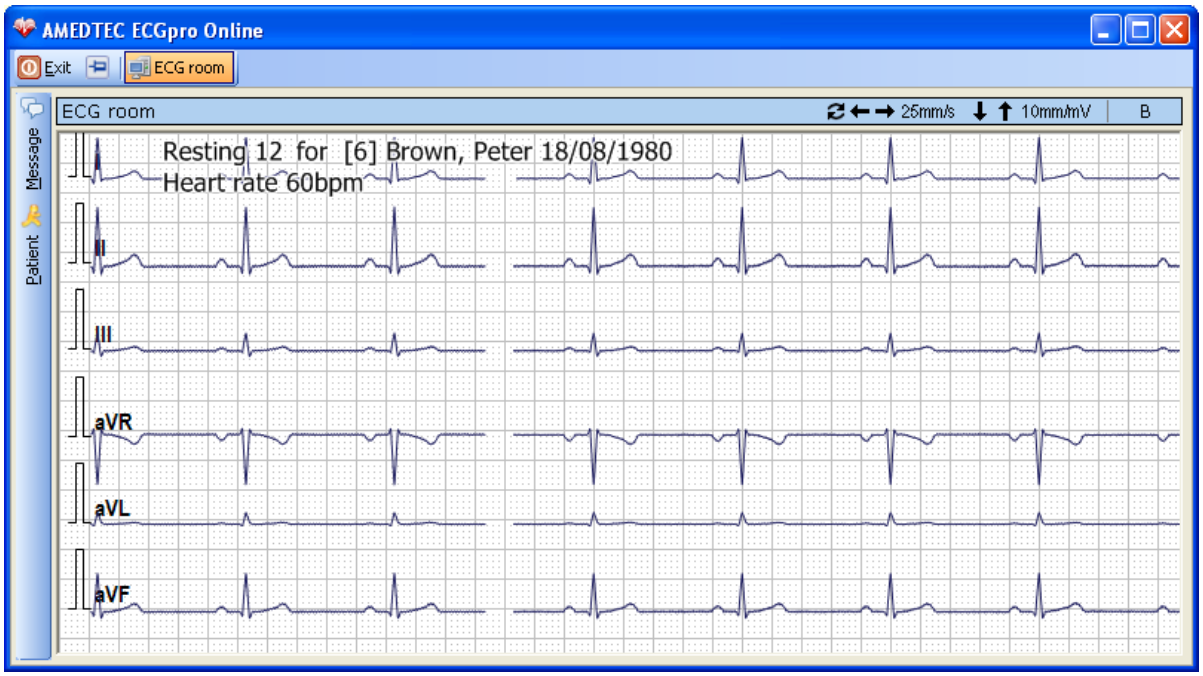
Please, note that in spite of the very good performance of the HES programme, the automatic evaluation is only an aid for the doctor.
The correctness of the results cannot be guaranteed. Therefore, every kind of measurement results and diagnoses must be checked and confirmed by the doctor.

Notice: **According to factory selection, records are not analysed as long as date of birth and sex of the active patient were not entered.**
In „*File* | *Settings …* | *12 Lead ECG* | *ECG analysis*", you can enter a default for the age and the sex which is used for an analysis in case of missing entries.

ECGpro Online

Using the AMEDTEC *ECGpro* online program, you can transfer the ECG acquisition from one or more work stations (acquiring station) in the network to other work stations (observing station) on a real-time basis.

The *ECGpro* online window size is freely adjustable and can be always held in the foreground (on top of opened applications). Several acquiring stations can be monitored at the same time.



To be able to use *ECGpro* online, the following requirements must be fulfilled:

- The transmitting and the receiving PC must work in the network with the same AMEDTEC *ECGpro* database (i.e. a network installation is necessary).
- The transmitting work station (acquiring station) acquires the ECG by means of a *CardioPart 12 USB* or *CardioPart 12 Blue*.
- The receiving PC (observing station) must have an ECGpro online licence. This can be a local dongle (AMEDTEC ECGpro online) or a licence in the network dongle (AMEDTEC *ECGpro* online 1Net).
- Work stations to transmit ECG data must have activated the checkbox

  ☑ Allow ECGpro Online clients to monitor ECG from this workstation

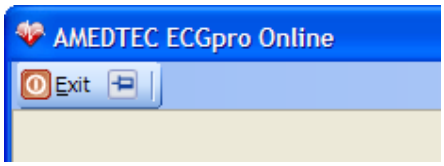
  in the tab sheet **CGpro Online** of "*File* | *Settings...*| *12 Lead ECG* | *ECG*". ECG can be transmitted from several work stations at the same time.

AMEDTEC ECGpro Online may not be used for observation in the sense a medical device of the class IIb according to the Medical device act, Annex IX.

Starting ECGpro Online

To start the program, click "*Start* | *Programs* | *AMEDTEC ECGpro* | *AMEDTEC ECGpro Online*".
It is advisable to create a desktop icon (use the right mouse button and create a new shortcut which refers to "*Programs* | *AMEDTEC ECGpro* | *s05Online.exe*" or drag the icon from the start group on the desktop).

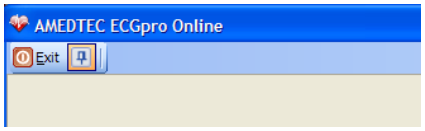
Log in with username and password or through integrated security by analogy with AMEDTEC *ECGpro*. Also read in section **Start of Program** on page **15**.



- ☞ Click  to keep the ECGpro Online in the foreground, i.e, always on top of all running applications.
- ☞ Click  to deactivate the always-on-top-function. Note that it may be possible that you cannot observe the ECG any longer.

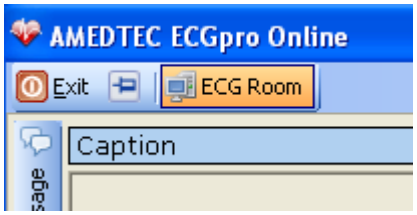
Selecting the Transmitting Station

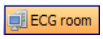
The names of the possible transmitting stations in which AMEDTEC *ECGpro* is opened are indicated as a button above the ECG field.



- ☞ Click button with the name of the work station from which you wish to receive ECG data.

The button is displayed, as soon as AMEDTEC *ECGpro* was launched on this work station. It of no significance whether the ECG acquisition, the data management or Holter ECG was opened.

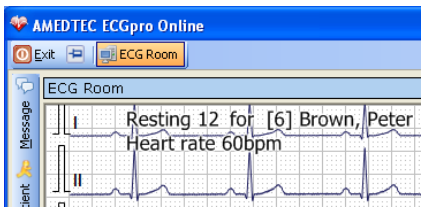


As soon as a work station was selected, the 

button is activated.

At the same time, the 

button is showed at the left edge. Using this button you can transmit messages to the capture station (read section **Transmitting messages**).



As soon as ECG acquisition was started ECG, the name of the work station appears in the header of the ECG window.
In the ECG window, the name of the selected test procedure, patient's number and name of the patient are indicated. If available, the heart rate is displayed.

The capturing station, for its part, signals the selection of the transmitting station by means of the button the button 

. With it, the operator is informed about the fact that this ECG is transmitted transmits to another work station.

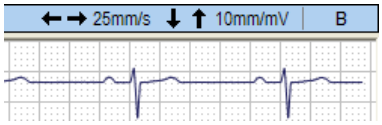
Attention: This is NOT an acknowledgement whether the ECG is really monitored.

Changing the ECG Parameters

In the header, the selected lead program is indicated on the left.

Changing Speeds

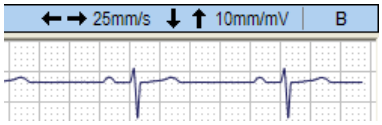
You can change the speed of the displayed ECG:



- Click ← to decrease the speed.
- Click → to increase the speed.
- Alternatively in the context menu
  Right-click in the ECG and go to speed submenu.
  Select the desired speed.

Changing Sensitivity

You can change the sensitivity of the displayed ECG:

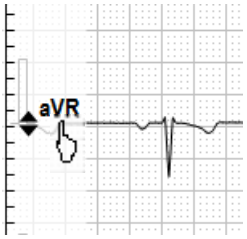


- Click ↓ to decrease the sensitivity.
- Click ↑ to increase the sensitivity.
- Alternatively in the context menu
  Right-click in the ECG and go to sensitivity submenu.
  Select the desired sensitivity.

Moving a Lead Position

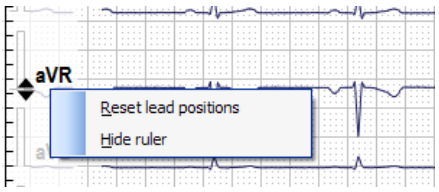
Every lead can be moved in vertical direction. This is to prevent channels from being written into each other. The changed position is not saved.
On moving, the original positions can be recovered. At this, the positions of all leads are recovered. It is not possible to recover only the position of a certain lead.

You can move the position of a lead:



- Left-click the inscription of the lead the position of which you want to move.
  A scale is displayed.
- With pressed mouse key, move the curve up or down to the desired position.
- Left-click beyond the ruler to hide it immediately, or use the context menu as shown in the following illustration.
  Otherwise the ruler is automatically hidden after a short time

You can recover the original positions:

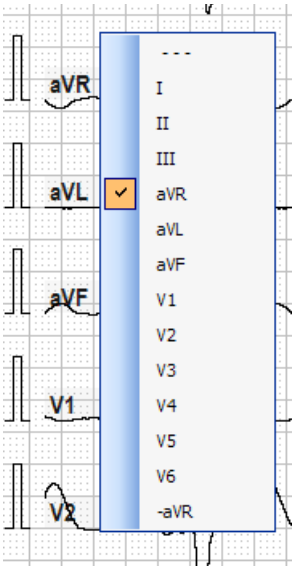


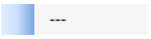
- With visible ruler, right-click on one of the lead inscriptions. A context menu is opened.
- Click on **Reset lead positions**.

Changing a Lead

Every lead can be changed or hidden. This change is not saved.

You can change the lead:



- ☞ Right-click on the inscription of the lead you wish to change or to hide.
  A context menu in which the currently selected lead is marked, is opened.
- ☞ In the context menu, click on the lead you want to display from now on.
- ☞ Click  to hide the lead.
- ☞ If you opened the context menu, but do not want to change lead, you must close the object menu again. Click on the marked entry or beyond the context menu in the ECG.

Changing the View

Different views are available for the representation of the ECG. To define the views, they the viewing is divided into lines and columns.

The views are changed in a context menu. The entries are constructed as follows:

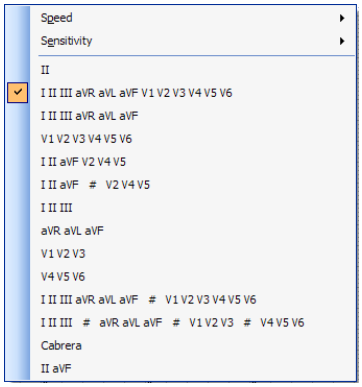
Column1 # column2 # column3 # column4

Column1 stands for all leads which is displayed in the **first** column one below the other.
Column2 stands for all leads which is displayed in the **second** column one below the other.
Column3 stands for all leads which is displayed in the **third** column one below the other.
Column4 stands for all leads which is displayed in the **fourth** column one below the other.

See the following three examples.

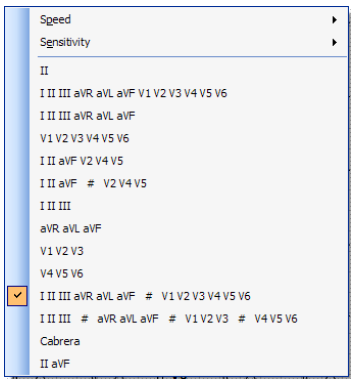
You can change the view:

- ☞ Right-click in the ECG representation. A context menu is opened.
- ☞ Select the desired view.

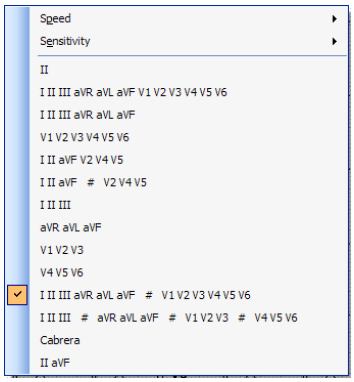


1 column with 12 leads

In case you selected a 3-channel or a 6-channel representation, you can use  in the header to switch to the other lead groups.



2 columns with 6 leads each



4 columns with 3 leads each

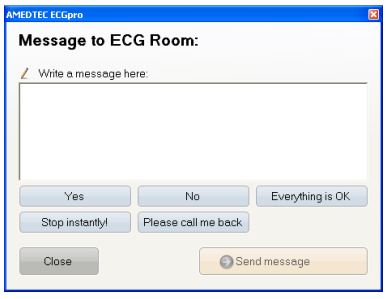
To change available views or to add further views, read section **Test Procedures** in the **AMEDTEC *ECGpro* settings** instruction.

Transmitting Messages

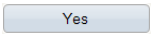
AMEDTEC *ECGpro* Online as well as AMEDTEC *ECGpro* can receive and transmit messages.

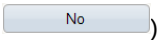
To transmit a message from AMEDTEC *ECGpro* Online to AMEDTEC *ECGpro*, click 

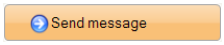
.



An edit box shows the name of the work station to which the message is transmitted. It is the same work station from which you receive the ECG.

- ☞ Click in the white space and write a message.
- ☞ Click one of the blue buttons (for example, 

or 

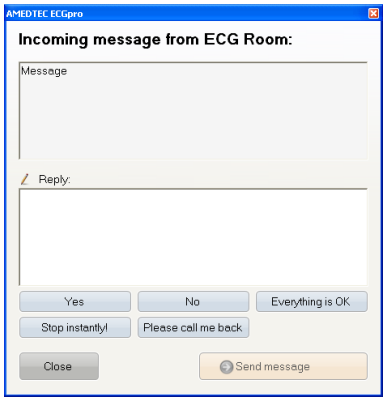
) to take over the button text into the edit box.
- ☞ Click 

, to send the message shown in the edit box.

For every single test procedure, you can change or add messages (blue buttons). Different messages can be defined for transmitting and receiving stations. For that, read section **Test Procedures** in the **AMEDTEC *ECGpro* settings** instruction.

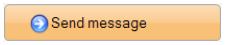
Receiving Messages

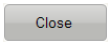
As soon as *ECGpro* Online was started on a work station and an acquiring station was selected, this work station can transmit a message. Read section **Selecting the Transmitting Station** on page **154**.



The name of the work station by which the message was transmitted is indicated above the window with the received message.

The inactive box shows the text of the massage.

- ☞ Click in the active (white) box to write an answer
  or
- ☞ click one of the blue buttons to select a formulated text.
- ☞ Click 

, to send the message shown in the edit box.
- ☞ Click 

not to send an answer and to close the window.

Showing the Patient Data

During on ECG acquisition 

, you can use the button 

on the left side to see the patient's data. To show the patient's data, you have the selected fields (read the section **Patient's details** of the **AMEDTEC *ECGpro*** instruction). You can change or correct patient's data only in **AMEDTEC *ECGpro***, but not in **AMEDTEC *ECGpro* Online**.

Exiting ECGpro Online

Click 

to exit ECGpro Online in a work station. It is of no significance whether or not an ECG is transmitted.

On the transmitting work station, it is signalled by greying out of the 

button that this work station is not monitored any longer.

Network

ECGpro includes the ***ECGpro* NetworkLight** network.

***ECGpro* NetworkLight** offers the following functions:

- Interlinking of maximum 3 steady PCs with *ECGpro*. There is no floating licence. The first three PC who start **AMEDTEC *ECGpro*** are reserved for Network light.

- One of the PCs is used as a server. All patient's data and records are saved in the database on this server. Furthermore, the settings of *ECGpro* are saved in this database.
  This PC must not be part of **Network light**.

- The lists of the patient's data and records are updated on the *ECGpro* PCs all 30 seconds.

- On each of the *ECGpro* PCs, the same record can be opened at the same time . The workstation, who opens the recording first, can edit this recording. All other workstations can open the recording in RO modus (read only).

HL7

HL7 Connectivity supports the Communication from AMEDTEC ECGpro with Hospital Information System by using the Interface standard HL7 (version 2.x).

For using this connectivity an **AMEDTEC *ECGpro* HL7** licence has to be activated. Precondition for this is the **AMEDTEC *ECGpro* Net** dongle.

AMEDTEC ECGpro HL7 - Standard
- Interface for bidirectional data transfer via HL7.
- Import of patient and patient visit information by ADT messages.
- Results including textual report are restored to hospital information system.

AMEDTEC ECGpro HL7 - A19
- Query function via QRY^A19 to call for patient information.
- The number of patient records in AMEDTEC ECGpro is significantly decreased because of loading only necessary patient data.

AMEDTEC ECGpro HL7 - Order Entry
- Receive pending orders from hospital information system.
- The Scheduled tasks send with ORM messages are displayed in work lists.

AMEDTEC ECGpro HL7 – PDF export
- Automatic export of reports and diagnosis in PDF format as ORU or MDM message to hospital information system.

AMEDTEC ECGpro HL7 – Waveforms
- Automatic export of waveform data for resting/stress ECG (SCP, aECG / HL7 v3 FDA XML, or Philips XML), and Holter-RR ABPM measurement table.

AMEDTEC ECGpro HL7 – Discrete Results Values
- Automatic export of testresults values as discrete data elements.

Please note that it is impossible to export reports using HL7 interface acquired with CardioPart 12 USB-P or CardioPart 12 Blue-P devices.

DICOM

The DICOM connectivity is used for communication between AMEDTEC ECGpro and hospital information system (PACS) using DICOM standard.

For using this connectivity an **AMEDTEC ECGpro DICOM** licence has to be activated. Precondition for this is a **AMEDTEC *ECGpro* Net** dongle.

AMEDTEC ECGpro DICOM – MWL (Modality Worklist)

- Receive pending orders from hospital information system.
- The order includes patient and patient visit information.

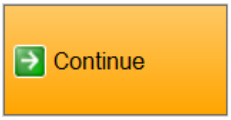
AMEDTEC ECGpro DICOM – encapsulated PDF

- Automatic export of reports and diagnosis in PDF format.

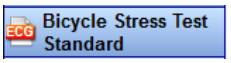
Please note that it is impossible to export reports using DICOM interface acquired with CardioPart 12 USB-P or CardioPart 12 Blue-P devices.

Operating with Keyboard

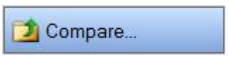
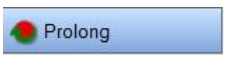
The following tables show how to operate the software with help of keyboard.
The tables are sorted by keys.

Keyboard	Button	Function
F2		Select Patient, Start, Stop, Save,
F3		Enter comments, select Clinic, Ward, Doctor, Information about devices and recording details
F4		Marker in Rhythm and Stress test procedures
F5		Save 10 Seconds in Rhythm and Stress Test procedures
F6		Pause in Rhythm and Stress test procedures
F8	in Kopfzeile 	gleichartige Sheets umschalten (gleiche Anzahl an Zeilen und Spalten)
Shift+F3		Enter manually measured BP values
Shift+F12		Close and Save the recording

Keyboard	Button	Function
←	In headline 	In multichannel ECG: decrease speed
→	In headline 	In multichannel ECG: increase speed
↓	In headline 	In multichannel ECG: decrease sensitivity
↑	In headline 	In multichannel ECG: increase sensitivity
Ctrl+↑	Display: Load 	In bicycle stress test: increase load by 5W
Ctrl+↓	Display: Load	In bicycle stress test: decrease load by 5W
Ctrl+←	Display: Speed 	In treadmill stress test: increase speed by 0,1mph
Ctrl+→	Display: Speed 	In treadmill stress test: decresa speed by 0,1mph
Ctrl+↑	Display: Elevation 	In treadmill stress test: increase grade by 0,5%
Ctrl+↓	Display: Elevation 	In treadmill stress test: decrease grade by 0,5%

Keyboard	Button	Function
Ctrl +1		Start (Resting) Stat ECG
Ctrl +2		Start Resting 12 ECG
Ctrl +3		Start Test procedure Nehb
Ctrl +4		Start Test procedure Rhythm 12
Ctrl +5		Start Bicycole stress test
Ctrl +6		Open the Data management

The table belongs to default factory settings. If there are done any changes in „*File* | *Settings…* | *12 Lead ECG* | *Test procedures*“, the numbers may differ!

Keyboard	Button	Function
Ctrl +A		Resting ECG: start of 10s ECG Rhythm ECG: start of 30s ECG
Ctrl +B		Confirming this recording
Ctrl +E		Search patient or opens patient details
Ctrl +F		Print preview
Ctrl +O		Opens a list of recordings for comparison
Ctrl +P		Print default format
Ctrl +R		Reset timer, restart of automatically recording
Ctrl +S		Manually start (without time limit)
Ctrl +T		Resting ECG and Rhythm ECG: Stop
Ctrl +T		End stress test
Ctrl +X		Cancel, shows dialog at unsaved data

Troubleshooting

For messages, which contain error codes, or which are not self-explaining in other ways, please contact our support team.

In most cases, warnings or error messages of AMEDTEC *ECGpro* CardioPart 12 are self-explaining. However, if the problem still cannot be resolved, please contact the support team.

Our support can be reached by phone +49 3771 5982750, or email service@amedtec.de.

Due to ongoing development, AMEDTEC reserves the right to change specifications and documentation without prior notice.

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