

EC Sense

version 4.0



Resting ECG Operator's manual

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1 Introduction

1.1 Intended use

EC Sense is intended to be used for recording of Rest ECGs, Exercise ECGs and Long ECGs. *EC Sense* can be used for patients using implanted pacemakers.

1.2 Contraindication for use

The application of ECG is widespread and a recognized form of examination. Users are required to have sufficient training and knowledge to judge whether the device can be used or not. There are no known medical impediments for using ECG.

1.3 About *EC Sense*

Cardiolex AB has developed a series of ECG recording products named *EC Sense* (previously Lexor X100) intended to be used for the recording of Rest ECGs and Exercise ECGs.

Depending on how *EC Sense* was ordered it can be delivered with different acquisition units and software options.

1.4 System components

1.4.1 *EC Sense* components

The *EC Sense* series consists of the following components:

| Product | Description |
|-----------------|---|
| <i>Lexor D</i> | Acquisition unit for connecting to the patient, if the <i>Lexor D</i> option is ordered. |
| <i>Lexor Q</i> | Acquisition unit with vacuum electrode unit for connecting to the patient, if the <i>Lexor Q</i> option is ordered. |
| <i>EC Sense</i> | Product for recording and reviewing Rest ECGs, Exercise ECGs and Long ECGs. <i>EC Sense</i> can be ordered with different options. |

1.4.2 Related services and products

The following services and products could be used together with *EC Sense*.

| Product/Service | Description |
|--------------------|---|
| <i>EC Store</i> | Central storage system from Cardiolex that could be connected to <i>EC Sense</i> , used for Rest ECGs, Exercise ECGs and Long ECGs. |
| <i>MegaCare</i> | Central storage system that could be connected to <i>EC Sense</i> , used to archive Rest ECGs, Exercise ECGs and Long ECGs. Reports sent for archiving can be edited in MegaCare. |
| <i>MegaCare FD</i> | Service from Cardiolex that could be connected to <i>EC Sense</i> , used for Rest ECGs, Exercise ECGs and Long ECGs. <i>MegaCare FD</i> is a combination of <i>EC Store</i> and <i>MegaCare</i> to offer <i>MegaCare</i> clients full disclosure Exercise ECGs. |
| <i>EC View</i> | Product from Cardiolex for viewing and editing Rest ECGs, Exercise ECGs and Long ECGs stored in a central storage system. <i>EC View</i> is very similar to <i>EC Sense</i> except that it is not possible to record ECGs. |

1.4.3 External devices

The following external devices may be connected to *EC Sense*: (Not delivered by Cardiolex)

| Product | Model/Manufact | Description |
|-----------------------|--|---|
| Ergometer | Ergoline 500 Ergomed 940 Rodby 990 Monark 839/939 | Ergometers suitable to connect to <i>EC Sense</i> with Exercise ECG option. |
| Blood pressure device | <i>SunTech</i> Tango+ Ergoline | Automatic blood pressure devices suitable to connect with <i>EC Sense</i> with Exercise ECG option. |
| SpO2 device | Ergoline | SpO2 measurement device that can be connected to <i>EC Sense</i> with the Exercise ECG option. |

External devices that use a QRS signal may be connected to *EC Sense* with Exercise ECG option.

1.5 Safety information

This manual contains different types of safety messages written in italics on a grey background. These safety messages are placed where it is most likely that a potential danger may arise, or where the user needs additional information. The following types of messages are used:



Warning indicates a potential hazard which, if not avoided, may result in death or serious injury for the patient and/or the user.



Caution indicates a potential hazard which, if not avoided, may lead to personal injury or product damage.

NOTE:

NOTE provides the user with information on how to use the device in the best way.



Read accompanying documents (user instructions).

1.6 Operator's manual

This operator's manual is intended for the user and it includes important information for safe use and proper care of the device. The Operator's manual is an integral part of the device which should always be made available to the user. There is also a System manual, intended for technical staff, which includes information about technical specifications, installation instructions, configuration information, EMC declaration and service instructions.

1.6.1 How to read this manual

Please read all instructions and pay extra attention to safety information, warnings and cautions. Verify that the device has been properly installed in accordance with the instructions and that the users have sufficient knowledge about the requirements, including the safety instructions that have to be followed to protect the patient and yourself.



The user should read the entire operator's manual.

Read this manual carefully and pay attention to all of the safety instructions before using EC Sense. If this is neglected the patient's and your own safety is at risk.

The safety information in this manual is presented where it seems most likely that a potential hazard could occur.

1.6.2 Revision history


The information in this manual is subject to change without further notice. Version number and date is printed on each page of the operator's manual.

1.6.3 Legal rights

No part of this Operator's manual may be copied, reproduced in any form or translated without the written permission from Cardiolex.

1.7 Regulatory requirements

1.7.1 Medical Device Directive

EC Sense fulfils the requirements of the Medical Device Directive MDD/93/42/EEC and the Swedish legislation of medical devices LVFS 2003:11 and bears the marking: 

1.7.2 Electrical safety

EC Sense fulfils the requirements of the Electrical safety standard IEC/EN 60601-1 and applicable parts of IEC/EN 60601-1-1 and IEC/EN 60601-2-25.

1.7.3 Classification

EC Sense is classified as follows:

| Requirement | Specification |
|---|---|
| MDD class | Class IIb equipment |
| Type of protection against electric shock | Medical equipment class I |
| Applied parts | Type CF. Equipment is defibrillation-proof. |
| Degree of protection against harmful ingress of water | No protection against ingress of water |
| Method of cleaning | May be disinfected with a combination of water and alcohol. Please refer to the section "Cleaning and maintenance" for further information. |
| Degree of safety application in the presence of flammable anaesthetic gas | Not suitable for use in the presence of flammable anaesthetic gas |
| Mode of operation | Continuous mode |

1.7.4 Electromagnetic emission and immunity

EC Sense fulfils the requirements of the EMC standard IEC/EN 60601-1-2.

The electromagnetic compatibility with other equipment in the proximity must be considered when using ECG equipment.

Electronic equipment can both receive electromagnetic interference from other electrical equipment as well as causing electromagnetic interference with other electrical equipment. The acquisition unit is tested for electromagnetic compatibility (EMC) in accordance with the standard IEC 60601-1-2. In Europe the IEC standard is recognised as the European norm EN 60601-1-2.

The acquisition unit should not be placed nearby or on top of any other electrical equipment. If the equipment needs to be placed near to other equipment, a functionality check should be carried out to verify proper performance in the environment where it is intended to be used.

Fixed, portable and mobile communication equipment that uses radio communication may affect the performance of a medical device. Please refer to the “EMC declaration” in the System manual for recommended distances between radio communication equipment and ECG equipment.

The use of other cables than those provided by the manufacturer may cause higher emissions and reduced protection against disturbances.

1.8 Information about the manufacturer

EC Sense is designed and manufactured by the Swedish company Cardiolex AB.

Manufacturer
Cardiolex AB
Vretenvägen 6
SE-171 54 Solna
Sweden

2 Acquisition unit

2.1 Description

EC Sense comes with an acquisition unit. This manual describes the use and care of the acquisition unit named *Lexor D*. Technical information regarding *Lexor D* can be found in the System manual.

The acquisition unit connects to a PC via an USB port, from which the acquisition unit also gets powered.

The acquisition unit and the associated PC software are the fundamental parts in the *EC Sense* system (previously Lexor 100).

The acquisition unit must be connected to a CE marked PC, which meets the requirements of IEC 60950, and shall be placed outside the patient's vicinity. If a PC shall be used in the patient's vicinity it must be CE marked and meet the requirements of IEC 60601-1 (please refer to the System manual).

The connector of the patient cable of *Lexor D* is tamper proof as specified in the System manual.

Lexor D is intended to be connected to a patient cable.



WARNING

Lexor D may only be used together with an electrode system that has integrated defibrillation proof.

Only approved electrode systems with proper tamper proof connectors may be used.

2.2 Responsibility of the user

The product described in this manual is designed to function in accordance with the labelling and supplied information. This applies to all parts, and if any part or the entire product is worn, damaged, incomplete, corrupted, infected or can not be used for other reasons the product shall NOT be used at all. Such part or product shall be immediately replaced in accordance with the manufacturer's replacement service program. The user of the product is solely responsible for any malfunction caused by the improper use of the product as described above or if any modification has been carried out by anyone other than a Cardiolex authorized person.

2.3 Safety and cautions

2.3.1 Prior to use

Before using the product, make sure to check that no interferences occur between this product and any other devices used nearby. This also applies to nearby equipment that emits or receives radio frequencies.

2.3.2 During use

The product and the performance may be disturbed by interference from other devices which emit higher levels than what is permitted according to IEC/EN 60601-1-2. It is therefore recommended to place the product as far as possible from any emitting sources.

This product may be susceptible to ESD (Electro Static Discharge) that is introduced to the product through the patient or the user. Electro static discharges may cause artefacts in the ECG data which may lead to false interpretation. The user must be aware of this and check that no artefacts are present in the ECG data which constitute the basis for interpretation and treatment.

2.3.3 Interference

Keep power cords and other cables away from the acquisition unit, electrode set, patient cable and USB cable to avoid AC interference.

Cardiolex is not responsible for any problems caused by radio frequency interference between the product and other sources. Neither for emitted radio frequencies from the product, that may affect other medical devices exceeding the permitted levels according to applicable standards. More information about interference can be found in the "EMC declaration" in the System manual.

2.3.4 Patient safety

Lexor D is constructed so that the connection of the patient always should be “floating” (isolated) from the connection of the PC via the USB and thereby not in contact with electrical protective earth.

The user should NOT connect any other systems to the patient without verifying that a reliable isolation can be achieved for any such system. If this is neglected, the permitted levels of total leakage current may be exceeded.



WARNING

Electrical equipment that are non-medical devices, such as PCs, may not be placed in the vicinity of the patient, as specified in the IEC/EN 60601-1-1 standard.

Any combination of acquisition units and non-medical devices shall be approved by personnel competent to verify electrical safety prior to use. This also applies when isolation transformers are used.



WARNING

No patient cables or electrode sets other than those specified in this manual should be used. They are part of the safety system of this product, and the use of other systems may put the patient at risk and alter the product's performance and the defibrillation proof

Do not come into contact with any part of the *EC Sense* system during defibrillation. It is advised to check the performance of the system after defibrillation.

EC Sense should not be used together with HF surgery devices.

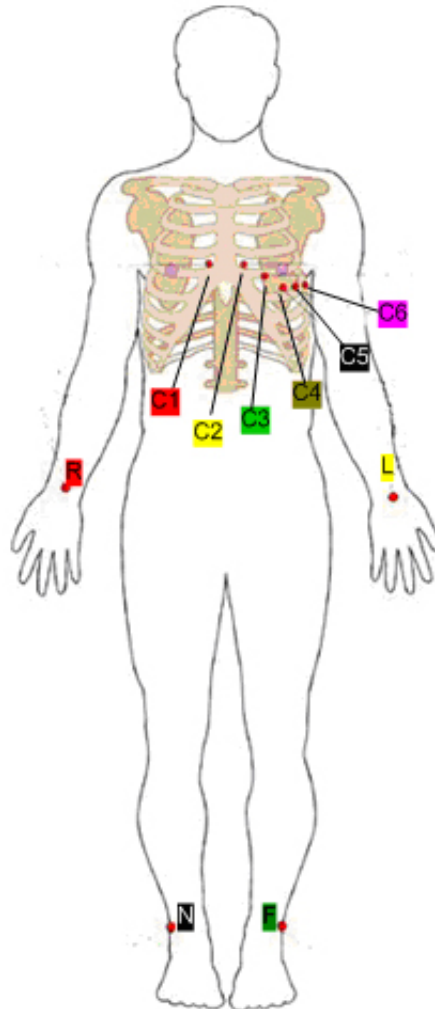


CAUTION

Place a towel or similar between the patient's skin and Lexor D to prevent possible allergic reactions if Lexor D is to be used for a longer period.

2.4 Electrode setting

2.4.1 Adult ECG electrode setting



The electrodes should be placed according to the figure above. Shave excessive hair growth if needed.

NOTE

If the electrodes are placed differently the analysis may generate misleading results.

2.4.2 Pediatric ECG electrode setting

The electrode placement on children differs from the placement on adults. When the program analyses an ECG as a pediatric ECG, it assumes that this placement is used.

NOTE

If the electrodes are placed differently the analysis may generate misleading results.

The electrodes on children should be placed as follows:

- C1 shall be placed where C4 normally is but on the right side.
- C2 shall be placed where C1 is normally placed.
- C3 shall be placed where C2 is normally placed.
- C4-C6 shall be placed where they normally are placed.
- R, L, N, F shall be placed where they normally are placed.

This gives the following leads:

- C1 – V4R
- C2 – V1
- C3 – V2
- C4 – V4
- C5 – V5
- C6 – V6

2.4.3 Electrodes

EC Sense displays leads that are based on all electrodes. The quality of the examination depends on all electrodes being properly attached and that thorough skin preparation has been carried out.

The following electrodes have been verified to be used together with EC Sense:

Lexor D: Unomedical Unilect long-term, Ref 4060
Ambu Blue Sensor M, REF M-00-A
Ambu Blue Sensor M, REF M-00-S



WARNING

Use of other electrodes may affect the recovery time during defibrillation and the user will have to take the full responsibility for such use. When connecting to the patient, make sure that the electrodes don't come into contact with other conductive materials. The patient's safety will then be at risk.

2.5 Maintenance and care

2.5.1 Millivolt pulse

Use the millivolt pulse at regular intervals to check the integrity of the amplifier chain.

2.5.2 Cleaning of Lexor D

Lexor D can be cleaned with water, lukewarm soap water or a neutral detergent.

It is also possible to disinfect *Lexor D* with chemical disinfectants containing ethanol (70-80%), propanol (70-80%) or aldehydes (2-4%).

Avoid excessive fluid; instead use a cloth that is slightly damp.



Cleaning and disinfection shall only be done by surface cleaning.

Lexor D is not protected against ingress of dust or water. This must be considered when cleaning the product.

2.5.3 Cleaning of electrode system connected to Lexor D

Follow the recommendations of the manufacturer when cleaning the electrode system.

2.5.4 Recycling and disposal

Used single-use electrodes should be handled according to the appropriate manufacturer's recommendation. The product and its packaging shall be recycled in accordance with local and national waste management regulations.

The waste of electric and electronic equipment must not be disposed of as unsorted municipal waste, but must be collected separately for disposal. Contact Cardiolex for further information on how the acquisition unit *Lexor D* shall be disposed of.

2.6 Storage and transport


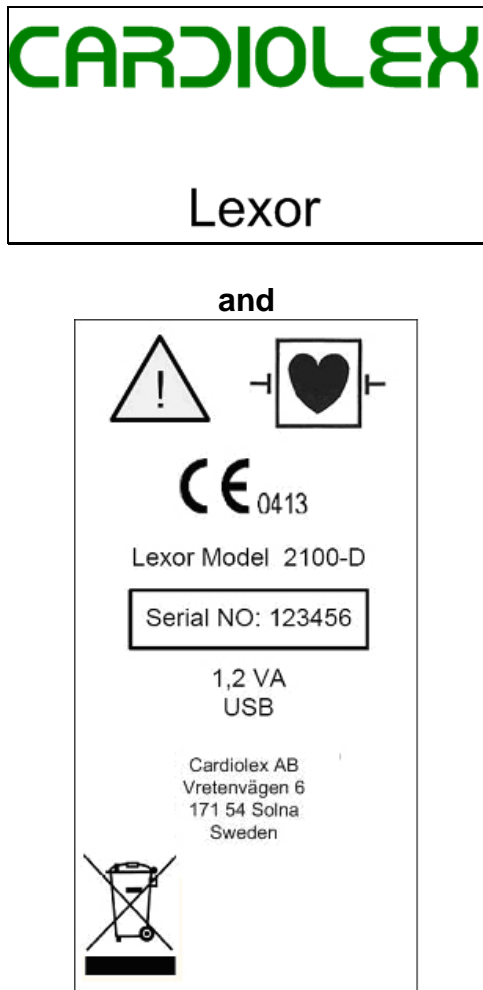
Storage and transport of the system, or any parts thereof, must meet the following requirements:

Temperature: -20°C to + 70°C





Humidity: 10% to 90%, non condensing

2.7 Labels

The system marking is placed on the *Lexor D* unit.

| Serial numer over 100810 | Serial number under 100810 |
|--|---|
|  |  |

2.7.1 Explanation of symbols

| Marking/Symbol | Meaning |
|---|--|
|  | Defibrillation proof, type CF equipment |
|  | Refer to the Operator's manual |
|  | CE marking. Indicates that the product conforms to the Medical Device Directive 93/42/EEC. The number refers to the Notified Body that has approved the product. Fulfils the requirements of the Swedish legislation LVFS 2003:11. |
| SERIAL NO: 123456 | Serial number |
| 1,2 VA | Power consumption |
| USB | PC connection via USB |
| Manufacturer and address | Cardiolex AB Vretenvägen 6 SE-171 54 Solna Sweden |
|  | Indicates that the product conforms to the EU directive 2002/96/EC regarding waste from electric and electronic equipment. Please refer to separate instructions on the decommissioning of products. |

3 About EC Sense

3.1 Menus and basic functions

This section gives a general explanation of the basic functions of *EC Sense* and how to operate the menus. The user shall be familiar with these functions before starting an ECG examination.

3.1.1 Start-up screen




The start-up screen will be presented for a few seconds to indicate that *EC Sense* has started.

3.1.2 Menus and shortcut key commands

Many functions in the program can be activated in several ways: To select a function you can either:

- Click on a menu item in the upper menu bar
- Click on an icon
- Right or left click on the mouse inside the ECG/Report windows to open a pop-up menu
- Use the keyboard and shortcut key commands

In general the keys function as follows:

| Key | Function |
|---|---|
| F1-F12 | Activate program functions with the function keys F1-F12. |
| Alt + letter | Press the Alt key and the first letter in a command simultaneously to open a menu. |
| Return | Use the Return key to confirm a selection and/or move to the next text box. |
| Tab | Use the Tab key to move inside a list of selections and/or move to the next text box. |
| ↑ ↓ | Increase/decrease a value or move up/down in a list of selections. |
| ESC | Stop and escape from an activity. |
|  | An exclamation mark in a red circle will be displayed if data entry is incorrect. |

If you don't want to, or can't use, the mouse most patient data can be entered from the keyboard with a few shortcut key commands using the function keys. When working with reports or settings it will be more or less necessary to use the mouse.

NOTE

Shortcut key commands have a different meaning depending on from where they are activated in the program. Commands that are used for entering patient data do not have the same function as they have in the report mode. The tables in each section show which shortcut key that can be used for the described mode.

3.1.3 Real time display

Depending on the selected system settings the items on the screen may look different. In this manual the settings for *EC Sense* reflects the system as when it is delivered from the factory.












- | | |
|---------------------------|-------------------------------|
| 1. ECG monitoring window | 5. Lead ID |
| 2. Upper icon bar | 6. Lower icon bar |
| 3. Menu bar | 7. Patient ID and information |
| 4. Monitoring information | |

3.1.4 ECG monitoring window

EC Sense uses most of the screen for curve display. The curves are updated with a wiping bar. The most recent ECG data from the patient can be seen to the left of the empty gap in the ECG traces. The ECG presented to the right is delayed for a few seconds, depending on the selected sweep speed

3.1.5 Upper icon bar

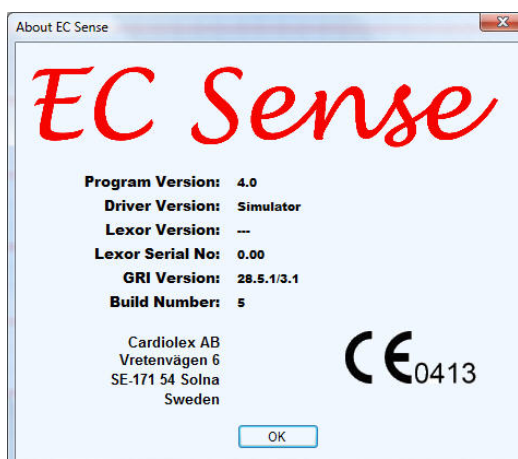
Most icons are presented on the upper part of the screen. They have the following functions: (Corresponding function key is also presented).

| Icon | Fn | Function |
|---|----------|--|
|  | F2 | Enter patient information. |
|  | F3 | Use AUTO 1 to record a Rest ECG according to a predefined sequence. |
|  | F4 | Use AUTO 2 to record a Rest ECG according to a second type of predefined sequence. |
|  | F5 | Start a real time printout of the traces displayed on the screen. |
|  | F6 | Start a predefined printout of the real time ECG. |
|  | F5 F6 | Stop the ongoing printout. |
|  | F7 | Show a list of the examinations that are stored in <i>EC Sense</i> or in the central storage system. |
|  | F8 | Start the option Exercise Test. (The icon is not displayed if the option is not installed). |
|  | F9 | Start the option Long ECG. (The icon is not displayed if the option is not installed). |

3.1.6 Menu bar

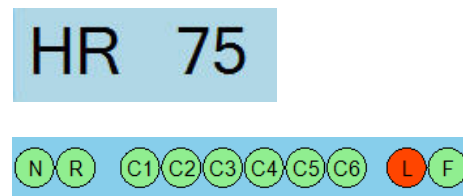
The following selections are available from the menu bar:

| Menu | Command | | Function |
|--------------|----------------------|-----------------------|--|
| <i>File</i> | <i>Patient Info</i> | F2 | Enter patient information |
| | <i>Auto 1</i> | F3 | Start automatic ECG sequence 1 |
| | <i>Auto 2</i> | F4 | Start automatic ECG sequence 2 |
| | <i>Man Print</i> | F5 | Direct printout of traces in real time |
| | <i>Rhythm Print</i> | F6 | Formatted printout of traces in real time |
| | <i>Exercise Test</i> | F8 | Start Exercise Test (option) |
| | <i>Long ECG</i> | F9 | Start Long ECG (option) |
| | <i>Examinations</i> | F7 | Open the list with examinations |
| | <i>Settings</i> | Ctrl+ Shift+ Up | Change settings |
| | <i>Exit</i> | | Quit the program |
| <i>View</i> | <i>Leads</i> | ► | Select which leads to be displayed |
| | <i>Speed</i> | ► | Select sweep speed |
| | <i>Gain</i> | ► | Select gain |
| | <i>Tremor Filter</i> | Ctrl+F | Activate tremor filter |
| | <i>Millivolt</i> | F10 | Print a millivolt pulse (calibration) |
| <i>Tools</i> | <i>Patients</i> | | Add new or delete old patients |
| <i>Help</i> | <i>About</i> | | Information about <i>EC Sense</i> software versions etc. that is needed in the case of any complaints or problems. |



3.1.7 Monitoring information

The upper right area displays current HR and information about the signal quality of the electrodes. The HR value is updated after every new heartbeat.



If any of the electrodes has a poor connection, the corresponding electrode will be indicated with a red circle. Electrodes where the signal quality is very weak or questionable will be indicated with a yellow circle.

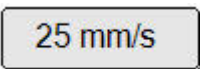
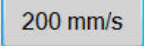
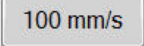
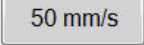
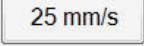
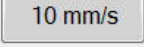
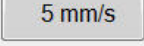

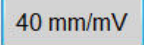
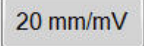
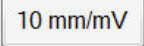
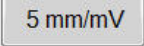

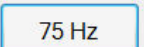

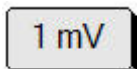
3.1.8 Lead ID

The area displaying the lead IDs is located to the left on the screen.

| Key/Icon | Function | Selection |
|----------|--|-----------|
| | <p>Used to change lead combination. Click on the mouse inside the area to show a list of different lead combinations →</p> <p>It is possible to define which leads that should be displayed under each selection (see "Settings" in the System manual).</p> | |
| | <p>If less than 8 leads are selected, all leads will not be displayed simultaneously on the screen. Instead the leads will be shown on several consecutive pages. The up arrow at the top, or the down arrow at the bottom, can be used to scroll between the pages. (The arrow will only be displayed if less than 8 leads are selected).</p> | |

3.1.9 Lower icon bar

When clicked on, the icons on the lower part of the screen display different options on how to record the ECG. They are used to change speed, gain and/or filter characteristics. *EC Sense* can be configured so that filter, gain, lead combinations, heartbeat values and grid will be reset to default settings upon start-up and selection of a new patient (“see “Settings” in the System manual).

| Key/Icon | Function | Selection |
|---|---|--|
|  | Used to change sweep speed. The speed on the screen (or on the printout when MAN is selected) can be selected to one of the following → |       |
|  | The gain on the screen (or on the printout when MAN is selected) can be selected to one of the following → |     |
|  | Muscle filter can be activated or deactivated. → Frequency can be selected between 35, 75 or 100 in <i>Settings</i> . The selected frequency will be displayed. Filter status will be displayed on the screen and on MAN/RHYT printouts. |   |
|  | Generate a millivolt pulse throughout the amplifier chain. | |

3.1.10 Information area

The name of the patient and the ID are displayed on the lower part of the screen. This area also indicates the status of any connection to a central storage system and if a MAN or RHYT printout is in progress.

3.2 Patient information

3.2.1 Introduction

The patient information contains all data about the patient. The type of information that is acquired depends on how *EC Sense* is configured. A unique identifier code (ID) is used to identify the patient. When *EC Sense* is connected to, and communicates with, a central storage system related patient data can be retrieved from that system.

NOTE

A large number of patients and examinations can be stored in EC Sense. EC Sense is designed to manage only one patient at a time to avoid the risk of mixing up patients.

If no ID is selected for the patient, the system allocates a temporary ID.

3.2.2 Patient data and examination data

Patient data and examination data differs in the way that:

- Patient data is the information that has to do with a patient's personal details.
- Examination data is the information that is connected to a specific examination such as blood pressure, height and weight at the time of the examination.

EC Sense allows for one patient to have several examinations. The patient ID number is the unique information that identifies the patient and corresponding ECG in *EC Sense* and the central storage system.

EC Sense offers several ways to configure what type of patient information that shall be requested and how to perform the examinations. See "Settings" in the System manual on how to configure the system.

3.2.2.1 Patient data

The following type of information relates to the patient:

| Item | Data used for | Free choice |
|--|---|-------------|
| Patient ID (unique patient identifier) | Mandatory , different ID formats can be configured. | |
| Last name | Will be automatically entered if the patient is stored in <i>EC Sense</i> or when connected to a central storage system. | |
| First name | Will be automatically entered if the patient is stored in <i>EC Sense</i> or when connected to a central storage system. | |
| Birth date | Can be automatically calculated depending on the configured ID format. | |
| Age | Input parameter used in the analysis. Can be automatically calculated depending on the configured ID format. | |
| Sex | Input parameter used in the analysis. Can be automatically calculated depending on the configured ID format. Possible selections: <ul style="list-style-type: none"> • Undefined • Man • Woman | |
| Race | Input parameter used in the analysis, select either: <ul style="list-style-type: none"> • Undefined • Caucasian • Asian • Afro American • Other | √ |

3.2.2.2 Examination data

The following type of information is connected to a specific examination:


| Item | Data used for | Free choice |
|--|---|-------------|
| Drugs. Two selections are possible | Input parameter used in the analysis, select two out of: <ul style="list-style-type: none"> • No medication • Unknown medication • Digitalis • Diuretic • Beta blocker • Quinidine • Procainamide • Amiodarone • Disopyramide • Lignocaine • Other anti-arrhythmics • Psychotropic • Steroid • Other medication | √ |
| Clinical class. Two selections are possible | Input parameter used in the analysis, select two out of: <ul style="list-style-type: none"> • Normal • Myocardial infarction • Myocardial ischemia • Hypertension • Congenital heart disease • Valvular heart disease • Pericarditis • Respiratory disease • Endocrine disease • Implanted pacemaker • Pulmonary embolism • Post operative cardiac surg • Other • Cardiomyopathy • Unknown | √ |
| Location | Free text box | √ |
| Operator | Free text box | √ |

| | | |
|--|--|---|
| Physician | Free text box | √ |
| Height | Enter a value (only figures could be entered). A red exclamation mark indicates an incorrect entry. | √ |
| Weight | Enter a value (only figures could be entered). A red exclamation mark indicates an incorrect entry. | √ |
| Blood pressure | Enter a value (only figures could be entered). A red exclamation mark indicates an incorrect entry. | √ |
| Electrode setting | Input parameter used in the analysis, select either: <ul style="list-style-type: none"> • Standard • Pediatric | √ |
| User Defined Items. Up to 5 items are possible | Input parameter used in the analysis. See "Settings" in the System manual. | √ |

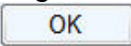

3.2.3 Entering patient data

Patient data needs to be entered before the examination starts. This can be done by either selecting a patient from a predefined list or by entering new information in the patient data window.

Patient data entry

1. Click on  or press F2.
2. Enter information about the patient in the window that opens.

Click on *New Patient* to clear the window if a new patient shall be registered. Enter any information necessary for the examination. Click with the mouse inside a white text box or move between the boxes by using the return key.

If the patient is stored on the local PC, or when the central storage system is connected, simply enter the patient ID and click on  to retrieve the related patient information. An ID check is performed, indicated by  that flashes if the information is incorrect or disappears when the correct ID is entered.

If the patient is already stored in the system, the information will be filled in automatically when leaving the text box or when clicking on *OK*.

3.2.4 Retrieving patient data

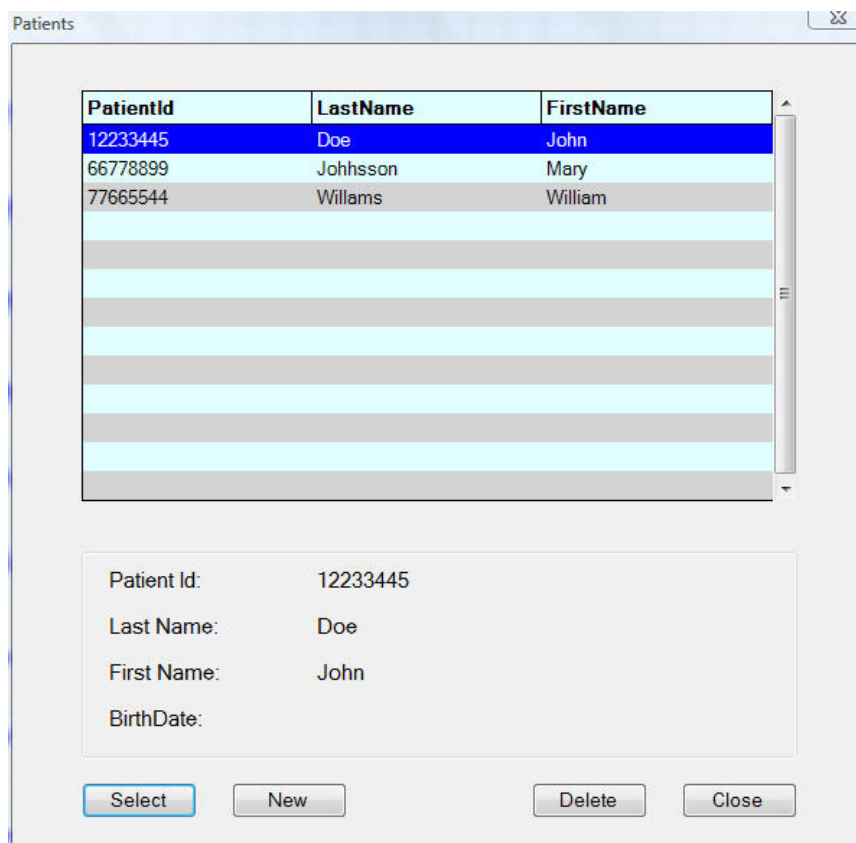
Patient data, for previously registered patients, can be retrieved by making a search on the local PC or in the central storage system.

1. Click on *Patient ID*.



The screenshot shows a form titled "Patient". It contains four input fields: "Patient ID:", "Last Name:", "First Name:", and "BirthDate:". The "Patient ID:" field is highlighted with a red circle.

2. The patient list opens.



The screenshot shows a window titled "Patients". It contains a table with three columns: "PatientId", "LastName", and "FirstName". The first three rows of the table are highlighted in blue. Below the table is a form with four fields: "Patient Id:", "Last Name:", "First Name:", and "BirthDate:". The "Patient Id:" field is filled with "12233445". At the bottom of the window are four buttons: "Select", "New", "Delete", and "Close".

| PatientId | LastName | FirstName |
|-----------|----------|-----------|
| 12233445 | Doe | John |
| 66778899 | Johhsson | Mary |
| 77665544 | Williams | William |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

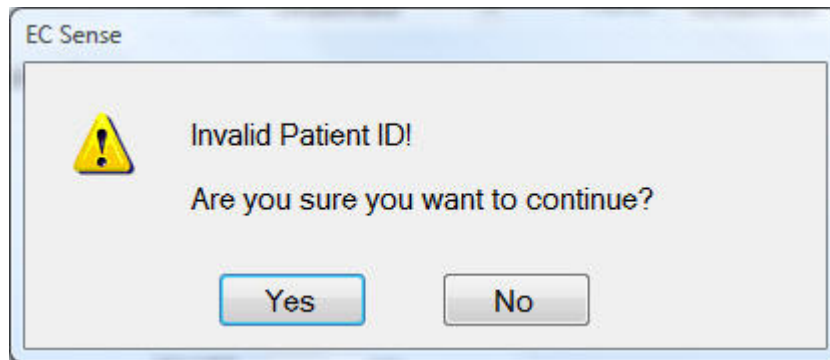
Patient Id: 12233445
Last Name: Doe
First Name: John
BirthDate:

Select New Delete Close

3. Highlight a patient on the list and click on *Select*.
4. Patient data for that patient will be entered automatically in the text boxes.

3.2.5 Examination without patient ID

If *AUTO 1*, *AUTO 2* or *Exercise Test* is started, and no patient data has been entered, the patient data window will open automatically. Ignoring to enter patient ID, followed by a click on *OK*, will open the following window indicating that the patient ID is invalid.



If *Yes* is selected then *EC Sense* will allocate a specific ID for the examination according to the following format:

YYMMDDHHMMSSCart-ID

NOTE

It is not possible to acquire, analyse and store an ECG without any attached ID information about the patient. This is a safety function to avoid the risk of mixing patients and ECGs.

3.2.6 Temporary ID number

If the information about the patient is unknown at the time of the examination a temporary ID could be used. *EC Sense* supports the allocation of a temporary ID according to the Swedish "National Temporary ID number CIS 10/2003"

The temporary number has the same format as a Swedish personal ID number, such as: *YYMMDDNNXC* or *CCÅÅMMDDNNXC*

Explanation:

- 'CC' is the century for the patient
- 'YY' is the birth year of the patient
- 'MM' is a number between 00 and 19
- 'DD' is a number between 32 and 59 (to differ from true IDs that have numbers between 01 and 31).
- 'NN' is an arbitrary number between 00 and 99
- 'X' is the sex (males have odd numbers and females have even numbers).
- 'C' is a checksum number using an algorithm to check the whole number

The following example is an ID number for a female patient:
57 04 18 0024.

EC Sense calculates the sex and verifies the check sum according to the format above if temporary ID numbers are used.

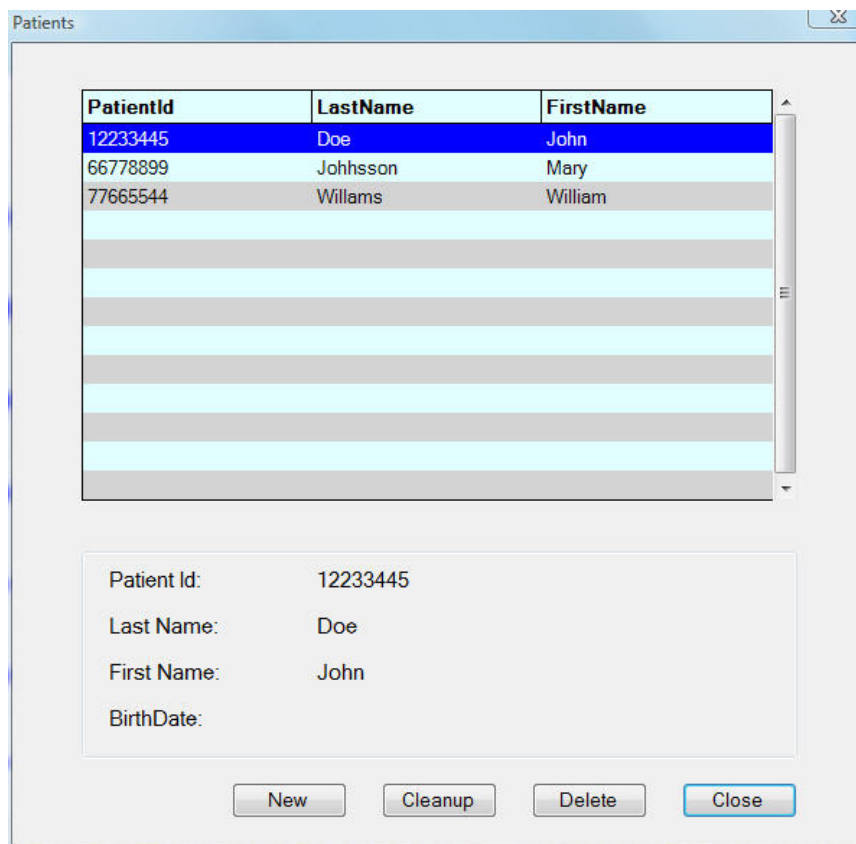
3.2.7 Validity of patient ID

The following method is used to avoid a mix-up of patients in *EC Sense*:

- Patient data is reset after 30 seconds of leadfail (or 30 s after finished MAN printout) in all electrodes, or in the R electrode, if an ECG has been printed out or stored for that patient.
- Patient data is reset after 5 minutes of leadfail in all electrodes or in the R electrode.

3.2.8 Managing patient information

Click on *Tools* → *Patients* in the menu bar to open the list of stored patients.



| PatientId | LastName | FirstName |
|-----------|----------|-----------|
| 12233445 | Doe | John |
| 66778899 | Johhsson | Mary |
| 77665544 | Williams | William |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | |
|-------------|----------|
| Patient Id: | 12233445 |
| Last Name: | Doe |
| First Name: | John |
| BirthDate: | |

The window allows you to add new patients, manage and remove old patients.

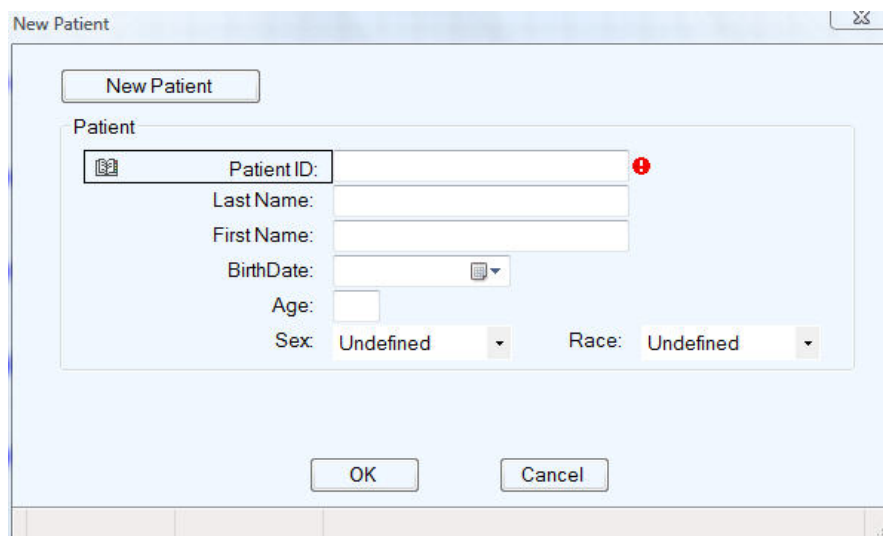
- Click on *New* to add a new patient.
- Click on *Cleanup* to remove all patients without examinations.
- Click on *Delete* to remove the patient that is highlighted on the list.
- Click on *Close* to close the patient management window.

NOTE

Please observe that Cleanup and Delete will also remove all examination data for each patient.

3.2.9 Add a new patient

It is possible to register patient data in advance without starting an examination. This is done by selecting *New* from the *Patients* window.



New patient window


Patient ID must be entered.

Click on *OK* when the required information has been filled in. The information will be stored in *EC Sense* and can be used later when starting an examination. If *EC Sense* is connected to a central storage system a search will be initiated and the corresponding text boxes will be filled in automatically when leaving the patient ID box, provided that the patient exists in the system.

3.2.10 Patient data from work list with booked patients

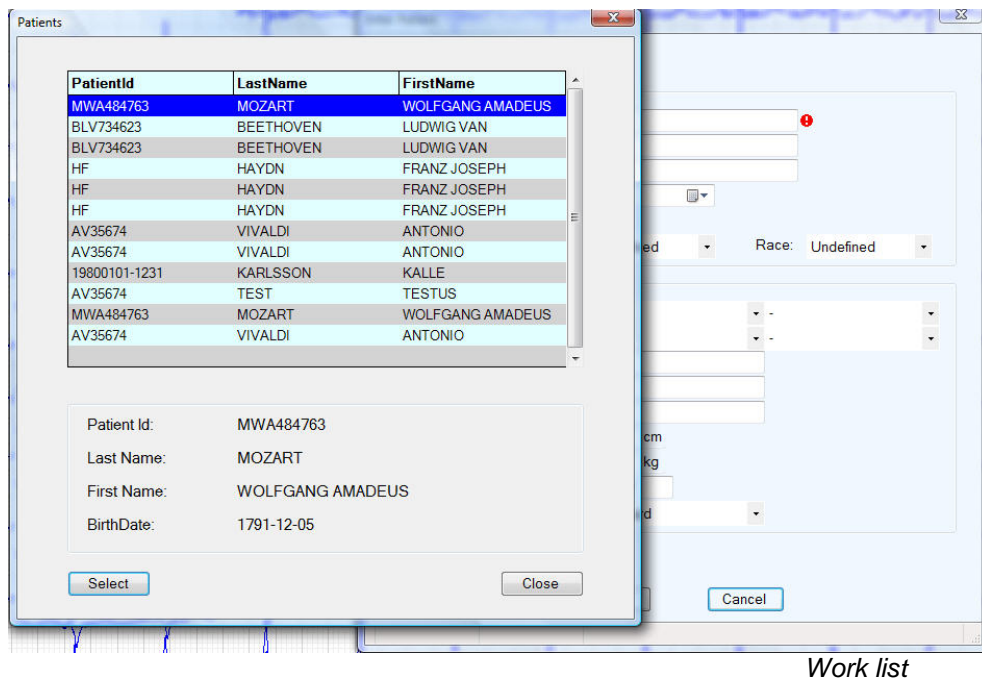
The patient list with booked patients will open automatically for every new examination if *Work list* has been selected in *Settings*, and if *EC Sense* is connected to a central storage system that can manage work lists. The patient to be examined is selected from the work list which contains all data about the patient. The patient data is registered in the work list when the patient is being scheduled for an examination, which is often done in advance.

The patient list is normally opened when a new examination is selected, i.e. when Rest ECG is started from Auto 1 or 2. The work list will also

open when clicking on  or F2, or when selecting *File* → *Patient Info* from the menu.

NOTE

The work list will open automatically when a new examination is selected, if EC Sense is configured with work list. When the work list is deselected under Settings, the patient info window will be opened directly without the work list.



Work list

Patients can be selected from the patient list once it is opened.

- Click on *Select* to select a highlighted patient. The information will be copied to the window for patient data.
- Click on *Close* to close the patient data window.

Enter Patient

New Patient

Patient

Patient ID: HF

Last Name: Haydn

First Name: Franz Joseph

BirthDate: 2012-04-30

Age: 0 Y 0 M 0 D

Sex: Male

Race: Undefined

Examination Data

Drugs: -

Clin.Class: -

Location:

Operator:

Physician: MEYER

Height: cm

Weight: kg

BP: /

Electrode setting: Standard

OK Cancel

Patient from work list

At the bottom of the window you can see from where the patient information is retrieved.

Patients must have been entered in advance and a network connection must exist, otherwise the patient list will be empty.

The *Settings* allows for different configurations, such as:

- Only show patients that have been entered today, last week, last month or with no limit.
- Select patients from different lists.
- Select patients according to examination type.
- Select patients according to Unit name.

See the System manual for information on how to configure the *Work list* and how to connect to a central storage system.

4 Resting ECG

4.1 Introduction

EC Sense is designed to acquire, interpret, print out and store the ECG in a safe and efficient way. This section includes a quick start guide, step-by-step instructions for resting ECG, descriptions of all functions and options available for the user in each step and a reference chart of commands.

4.1.1 Intended use

Rest ECG in *EC Sense* is intended to be used for acquisition, interpretation, printout and storage of 12 lead ECG. It is implied that the patient is at rest and that the electrodes are properly attached according to the instructions in this manual.

4.1.2 Evaluation of presented data

All data that is displayed and printed out by *EC Sense* matches the acquired data. In addition, the user can enter own patient data. It is important for the user to be aware of, and verify, that the patient ID and other information are entered correctly. *EC Sense* has a number of safety mechanisms to avoid the risk of mix-ups and user mistakes.

4.1.3 No contact with ECG unit

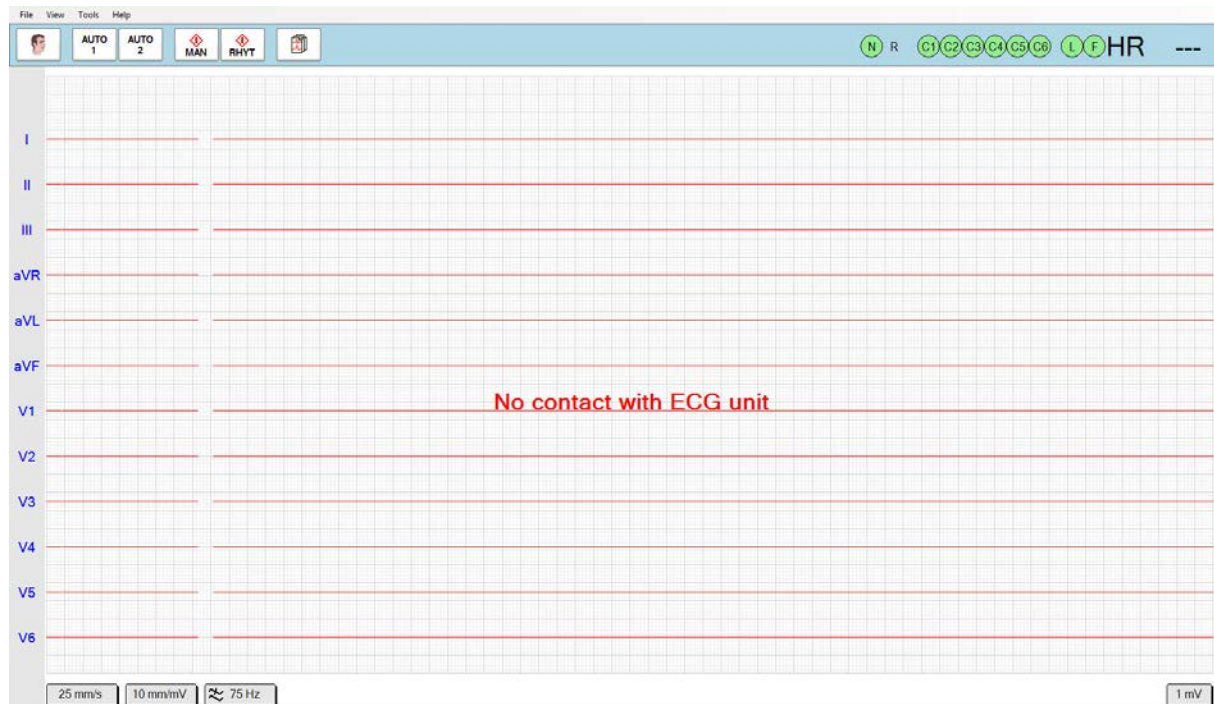
This message is displayed when there is poor or no contact with the acquisition unit.

The following message will be displayed with red text in the ECG monitoring window: **No contact with ECG unit**. In addition, leadfail will be displayed.



WARNING

When the message “No contact with ECG unit” is displayed, the user must be aware that all ECG data and other presented information shall be considered to be false and shall therefore not be used for clinical evaluation.

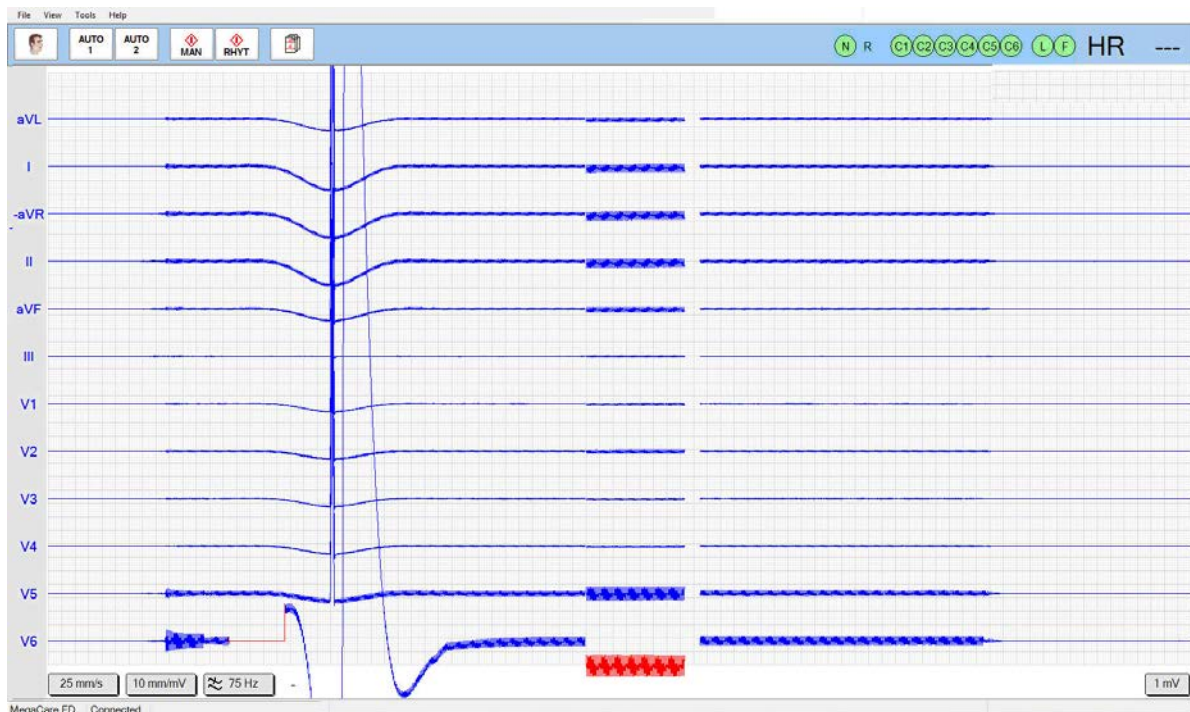


4.1.4 Monitor filter

At defibrillation high energy is generated which may cause the ECG data to be displayed outside the ECG monitoring window. To reset the ECG traces to the baseline as quickly as possible a 0.5 Hz filter (monitor filter) is automatically activated. This filter will affect the signals. It is only the non-delayed baseline filter that uses the automatic monitor filter.

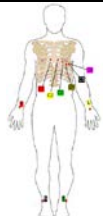

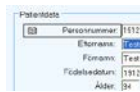
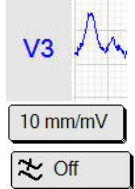
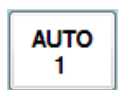
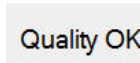




ECG data that is presented directly after defibrillation may be affected by a monitor filter.



4.2 Quick start guide

This quick start guide gives a brief explanation on how to use *EC Sense* for Resting ECG. The user can use this "quick start guide" as a summarised description on how to record an ECG.


| Icon | Key | Instruction |
|---|-----|---|
|  | | 1. Prepare the patient and connect all electrodes according to desired lead electrode placement. Check that the patient cable is connected to the acquisition unit. |
|  | F2 | 2. Click on the icon for entering patient data. |
|  | | 3. Enter the patient information in the dialogue box. If the PC is connected to a central storage system the information will be filled in automatically. |
|  | | 4. Select desired leads, gain and filter settings. Check the quality of the ECG signals. |
|  | F3 | 5. Start an automatic sequence, e.g. AUTO 1. |
|  | | 6. Verify that the quality of the analysed ECG is OK. |
|  | F4 | 7. Print out the result if desired (when a printer is connected and if not automatically done in the AUTO sequence). |
|  | F5 | 8. Review and save the analysed ECG on the local PC or in a central storage system. This could be included in the automatic sequence. |
| | | 9. Disconnect the patient. |

4.3 Recording a resting ECG

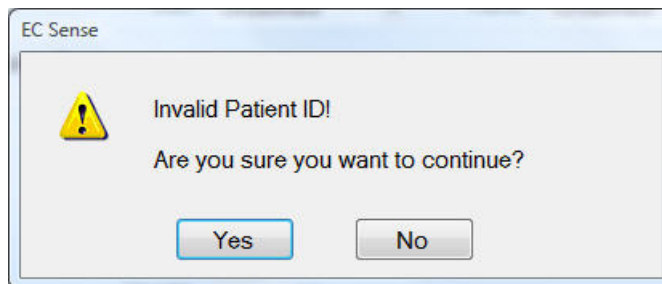
The step-by-step instructions below explain how *EC Sense* can be used to record a resting ECG.

1. Prepare the patient. Attach the electrodes to the patient and connect the patient cable to the acquisition unit. For electrode settings see previous section.



2. Press  and enter patient data. If the patient is already stored in the system, just enter the patient ID.



If no patient ID is entered, a message will be displayed when trying to start an AUTO sequence.



WARNING

For the patient's safety, ask the patient for the patient ID and verify that it corresponds to the information on the screen before starting the examination.

3. Check the quality of the ECG signals. Look at the ECG and make any necessary adjustments, e.g. changing leads. (See 4.4 for further information.) Start the acquisition when the patient is relaxed and when the ECG signals are displayed with good quality. It is also possible to print out the displayed ECG directly by selecting one of the following alternatives:
 - MAN printout: A manual printout of a real time ECG is started on a printer and will continue until the STOP key is hit.
 - RHYT printout: One page of ECG is acquired and is printed out on a printer. The page could be configured in different ways in *Settings*.

4. Start the acquisition. The acquisition is started by selecting one of the two alternatives:
 - *AUTO 1*. Automatic acquisition where *EC Sense* runs a series of tasks in a sequence that have been configured in *Settings*. In the *AUTO* sequences *EC Sense* acquires the ECG and calculates the values continuously. Depending on how it is configured it is possible to analyse acquired data either forward or backward. The sequences could also be configured to include a quality check question and a printout on a printer. For more information of the automatic sequences see 4.8.
 - *AUTO 2*: Automatic acquisition where *EC Sense* runs an alternative series of tasks that have been configured.
5. Review the result from *AUTO 1* or *AUTO 2* in the Report mode. In the automatic sequence it is possible, if configured, to check the signal quality before the result is displayed. If the signal quality is accepted, the ECG can be reviewed in the Report mode. The Report mode offers several types of reports to be reviewed. See 5.
6. Click on  to start a printout of the report on a connected printer (this task can also be included in the *AUTO* sequence). More options for printouts are available in the Report mode. See 5.
7. Click on  and select where to save the result. (Automatic sequences may include automatic saving as a task).
8. Disconnect the patient.

NOTE

Printouts from MAN and RHYT will not be saved. Printouts to a PDF or XPS printer will generate files that can be saved.

4.4 Real Time mode

In real time mode it is possible to change the settings of the ECG that is displayed in real time.

4.4.1 Selecting leads

Clicking in the leads area opens a menu with different lead combinations to be selected. Click on any of the options to select a lead combination. The selected lead combination will be displayed on the screen as well as being printed out if MAN printout is activated. However, *EC Sense* always acquires a 12 lead ECG irrespectively of which lead combination that has been selected.

Some lead combinations doesn't display all leads simultaneously on the screen. When this happens an arrow will appear in the left upper and lower part of the screen.

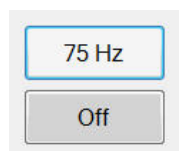


Click on the arrow to show next page in the lead combination.

4.4.2 Filter

The tremor filter can be changed with the filter button in the lower icon bar. Depending on how *EC Sense* is configured the following filters are available:

- Notch filter (50 Hz/60Hz/Off)
- Tremor filter (35Hz/75Hz/100Hz could be configured)
- Baseline filter (a correcting filter is always activated)
- Baseline filter with lead check (a correcting filter as well as a filter of 0.05 Hz for checking electrodes, can be configured under *Settings*).



The only filter that can be activated from the ECG monitoring window is the tremor filter. All other filters must be configured under *Settings*. Click on the filter button and select to turn the filter on or off. The frequency of the filter can be configured under *Settings*. The button will show the status of the filter, with *off* when deselected, or with the selected frequency when it is activated.

Depending on the selected filters (see "Settings" in the System manual) the scrolling ECG will be displayed in real time with different filter settings and delays.

- When *Filtered* is selected, the ECG will only be displayed with the correcting baseline filter, since this filter always is activated. The displayed ECG will be delayed.
- When *Filter with Electrode Check* is selected, the ECG will also be displayed with a baseline filter of 0.05 Hz without delay, so that the signal quality can be checked in real time.



Filtered with Electrode Check

Green arrow points out old data that is going to be wiped out with the new sweep.

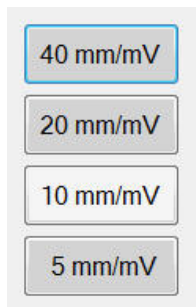
Blue arrow points out the start of baseline filtered (0.05 Hz) data, meaning real time.

Red arrow points out the start of baseline filtered (correcting) data with delay.

Black arrows point out the delay introduced by the correcting baseline filter. The electrodes could be checked within this area if *Filtered with Electrode Check* is selected.

4.4.3 Gain

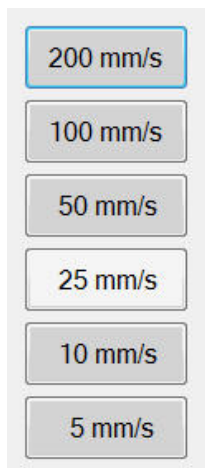
Select with the button in the lower icon bar.



Click the gain button to select different gain for display and MAN printout. The text on the button will show the selected gain.

4.4.4 Speed

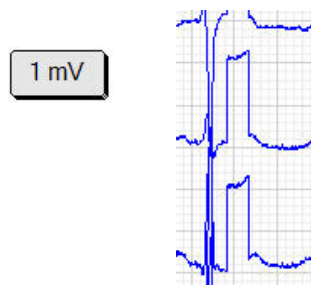
Select with the button in the lower icon bar.



The speed is equivalent to paper speed and represents how many mm per second the ECG data travels on the screen or on paper. The ECG in the ECG monitoring window and the MAN printouts is based on the selected speed.

4.4.5 mV pulse

Select with the button in the lower icon bar.



This button is used to generate a 1 mV pulse throughout the amplifier chain. It will be presented in the ECG monitoring window and on MAN and RHYT printouts. Click on the button to generate a pulse of 1 mV.

4.5 Electrode information and HR

4.5.1 Heart rate

This area displays the heart rate and is continuously updated.



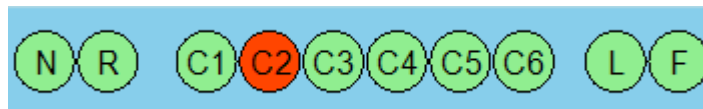
4.5.2 Leadfail

The upper part of the screen shows information about the electrodes and if any electrodes have poor skin contact. Electrodes with poor contact will also show in the corresponding lead with a red trace instead of a blue trace in the ECG monitoring window.

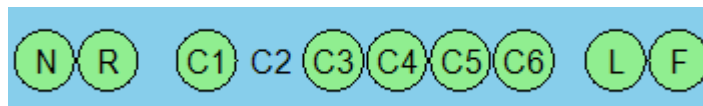
4.5.3 Electrode check

The electrode check information consists of 10 circles where electrodes with poor skin contact will be indicated between an alternating red flashing circle and no circle. Electrodes with good skin contact will have a green colour.

If there is a failure in **C2**, the electrode check information will alternate between:

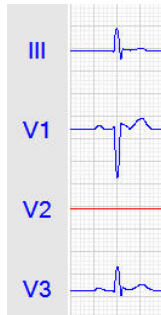


and

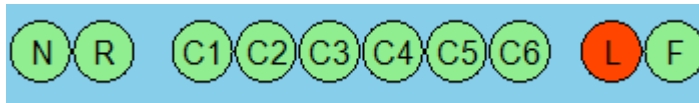


Failure in the **N** electrode can not be detected and will therefore never be presented. When failure occurs in all electrodes, it will only flash red on the **R** electrode.

A leadfail will be shown in red in the ECG monitoring window. In the example below **V2** is indicated with red.



When a failure occurs in one electrode that is included in many leads, as for instance L, then the lead check information will display:



At the same time the affected leads will be indicated as red traces (in this case all except lead II)



Red ECG traces indicate that these leads are incorrect since they are affected by the missing electrode.

If an electrode is missing

- C1-C6 are indicated individually
- L-F are indicated individually
- R is indicated individually
- N is not indicated (signal earth)


NOTE


Red traces mean that these leads are not reliable signals.

4.6 Real Time printouts

4.6.1 Manual printout on printer

The printout function can be activated at any time during the ECG

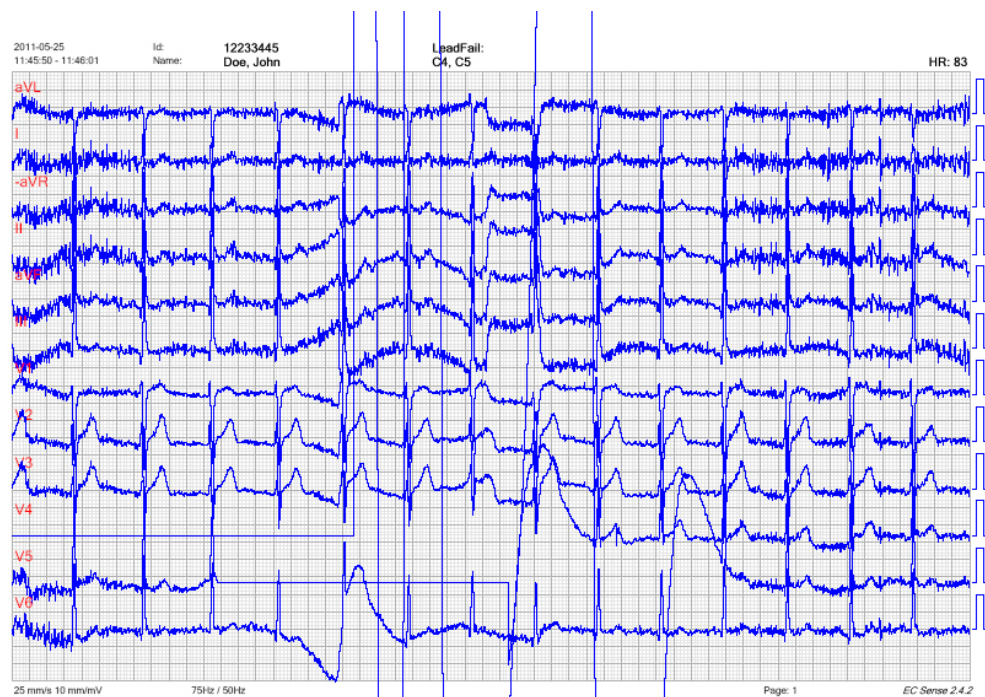
acquisition by clicking the  button in the upper icon bar, or pressing the F5 key.

Once activated the button will change to , and the message "Printing in progress", followed by the number of pages, can be seen at the bottom of the screen.

NOTE

A dimmed (grey) button indicates that there is no printer connected. The printer to be used as Real Time printer must be configured. See "Settings" in the System manual.

Even if the actual printing on the printer is delayed, the printed ECG will still correspond to the ECG displayed on the screen. The example below shows an ECG with leadfail.




The following information will be printed on each page together with the ECG data:

1. The top left corner will show date and time period (start – stop) for the current page together with name and ID of the patient.
2. Any detected leadfail will be indicated in the middle at the top. If a problem has occurred in any electrode during the time period of the printed page, this will be indicated. If the automatic defibrillation filter has been activated to reset the leads that are out of range, then these will be indicated as leadfail. Regardless of the chronological order in which the electrodes failed they will be presented in the order of C1, C2, C3, C4, C5, C6, L and F. If leadfail occurred in all electrodes on the current page, then only R will be displayed.
3. The current heart rate is presented in the top right corner.
4. At the bottom of the page, the following information is presented, from left to right:
Paper speed, Gain, Tremor/Notch filter, Cart ID, Location, current page number and the software version number of *EC Sense*.

If the lead combination, gain or any other parameters are changed while the printing is in progress, then the page will be printed out with the current settings and selections for the page that is transferred to the printer.

The manual printout will continue until stopped by the user by clicking



on , or after 100 printed pages.

A MAN printout is also stopped when the user selects a new function, for instance an automatic sequence.


NOTE

The current patient ID will be printed on the MAN printout. It is the responsibility of the user to verify that the correct ID is printed in order to prevent mixing ECGs up.

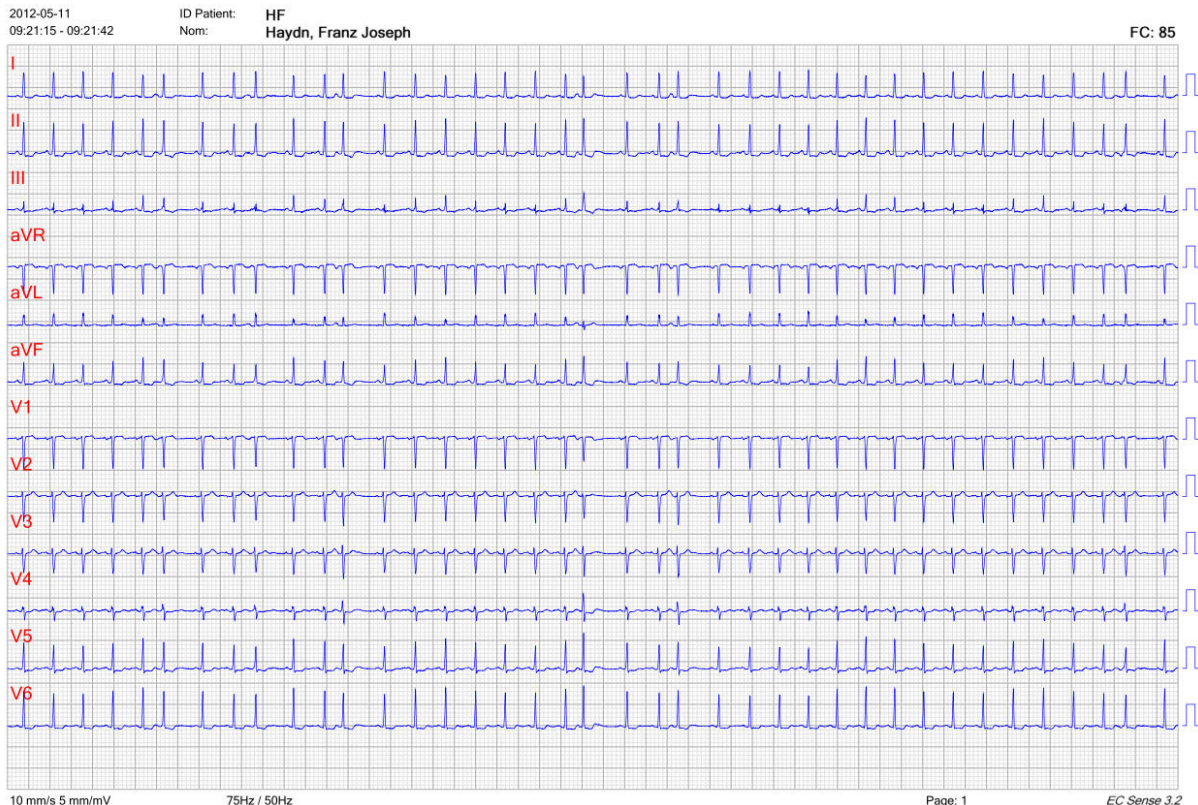
4.6.2 Rhythm printout on printer

For Rhythm printout the ECG will be printed according to the selected settings. To change the settings for printouts, see "Settings" in the System manual.



The function is activated by clicking on  in the upper icon bar. Even if the actual printing on the printer is delayed, the printed ECG will still correspond to the ECG displayed on the screen. An example of a printing format will follow. The printout will take into account whether

EC Sense is setup for Cabrera leads and/or paediatric leads. A dimmed button means that no printer is available.



The following information will be printed on each page together with the ECG data:

1. The top left corner will show date and time period (start – stop) for the current page together with name and ID of the patient.
2. Any detected leadfail will be indicated in the middle at the top. If a problem has occurred in any lead during the time period of the printed page, this will be indicated.
If the automatic defibrillation filter has been activated to reset the leads that are out of range, then these will be indicated as leadfail. Regardless of the chronological order in which the electrodes failed they will be presented in the order of C1, C2, C3, C4, C5, C6, L and F. If leadfail occurred in all electrodes on the current page, then only R will be displayed.
3. The current heart rate is presented in the top right corner.
4. At the bottom of the page the following information is presented, from left to right:
Paper speed, Gain, Tremor/Notch filter, Cart ID, Location, current page number and the software version number of *EC Sense*.

The printout speed will be according to the selected speed.

NOTE

The current patient ID will be printed. It is the responsibility of the user to verify that the correct ID is printed in order to prevent mixing ECGs up.

NOTE

If the page has been transferred to the printer but not yet printed, it can only be stopped if the printer supports such functions.

4.7 ECG with interpretation

Depending on how *EC Sense* is configured, the automatic sequence can include interpretation of the ECG. Interpretation can be activated in the *Settings*. The interpretation program also analyses any interference, which means that ECG with poor quality (like artefacts or noise) or missing electrodes will be included. If the signals have poor quality the interpretation will be less accurate compared to signals that have high quality (without interference). In the worst case the interpretation will be incomplete or misleading.

It is our recommendation that the user verifies the clinical quality of the signals on the screen before starting acquiring the ECG. As part of the automatic sequence a signal quality check can be included, giving the user the possibility to check whether the acquired ECG has high quality, see 4.8 in the next section.

EC Sense uses a confirmed unmodified version of GRI (Glasgow Royal Infirmary, prof. Peter W Macfarlane) which is a well recognised program for proposing interpretation of the ECG. The proposed interpretation is based on calculated data and can not fully replace the clinical opinion from a professional.

All interpretation must always be reviewed and evaluated by clinical personnel with proper training and competence.



CAUTION

The GRI interpretation program is integrated in EC Sense. This advanced, clinically well recognised program presents highly reliable interpretation. However, the user must bear in mind that the proposed diagnosis only is a suggestion! Prior to using the proposed diagnosis to make decisions about the treatment of a patient, it must always be evaluated by skilled and competent personnel.

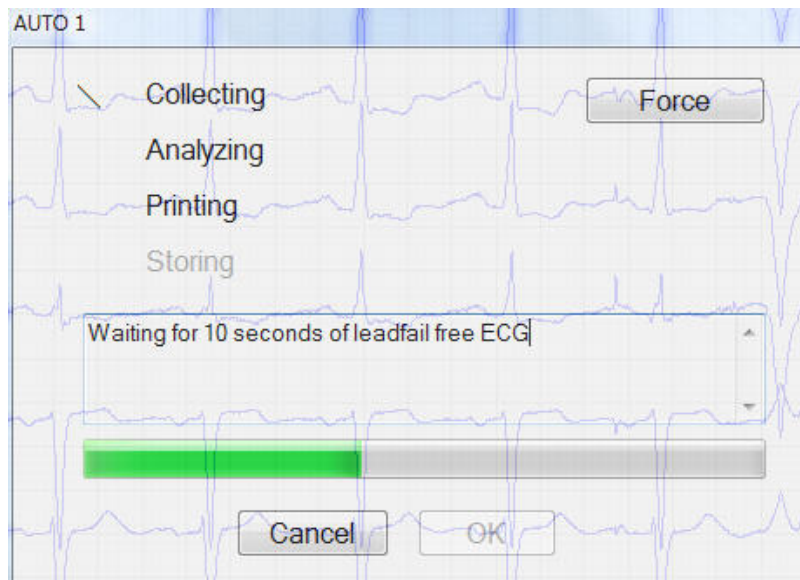
4.8 Automatic sequences

Two types of automatic sequences (*AUTO 1* and *AUTO 2*) can be configured and used. An automatic sequence is started when clicking on any of the two icons.



The steps in the automatic sequence are presented in the progress window, as shown in the example below. Different steps may be included depending on how *EC Sense* is configured (See "Settings" in System manual).

Below is an example of the steps in a typical automatic sequence:




In this configuration the sequence starts with acquisition, continues with analysing and finally prints out the ECG. No automatic storing will take place, hence the dimmed text. In the message window an explanatory text for each step is displayed.

The sequence can be stopped at any time with the *Cancel* button.

The button *Force* stops the acquisition and starts analysing the ECG directly, even if the 10 seconds of ECG without leadfail has not yet been acquired.

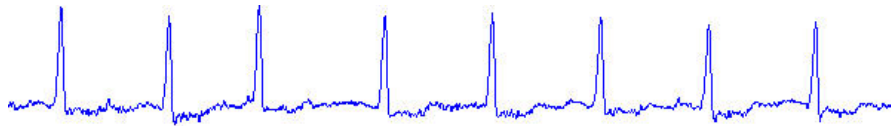
Along with each step in the sequence, a symbol will be displayed with the following meaning:

- An active step is indicated by a rotating bar to the left of the text.
- A finished step is indicated by a tick mark. ✓

- If an error has occurred in a step, this will be indicated by the symbol .

A progress bar shows how far the sequence has elapsed in time.

The user is given the possibility to check the quality of the ECG before the analysis result is presented, and will be prompted with the following question:



| | | |
|-------------|---|-----------------------------------|
| Quality OK? | <input checked="" type="button" value="Yes"/> | <input type="button" value="No"/> |
|-------------|---|-----------------------------------|











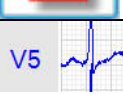
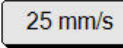
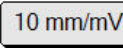

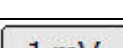
The message will only be displayed if the AUTO sequence is configured with this setup (see “Settings” in the System manual). If *Yes* is selected the analysis continues, while *No* stops the sequence and returns to real time mode.

4.8.1 Report after automatic sequence

After the automatic sequence (AUTO 1 or AUTO 2) the report mode is normally activated. There are different types of report formats to be selected. Please refer to the section “Resting ECG reports” for the different reports.

4.9 ECG Commands

The table below shows the commands that are available for Resting ECG.

| Function | Icon | Menu item | Fn key | Comment |
|-------------------------|---|--------------------------------------|----------------|---|
| Enter patient data |  | <i>File → Patient Info</i> | F2 | |
| Automatic sequence 1 |  | <i>File → Auto 1</i> | F3 | |
| Automatic sequence 2 |  | <i>File → Auto 2</i> | F4 | |
| Print out real time ECG |  | <i>File → Man Print</i> | F5 | |
| Print out rhythm ECG |  | <i>File → Rhythm Print</i> | F6 | |
| Stop print out |  | <i>File → Man Print/Rhythm Print</i> | F5, F6 | The button is active if a printout has started |
| Examinations |  | <i>File → Examinations</i> | F7 | |
| Settings | | <i>File → Settings</i> | Ctrl+ Shift+Up | Configure the program |
| Exit this program | | <i>File → Exit</i> | | Click on X in the top right hand corner |
| Exercise Test |  | <i>File → Exercise Test</i> | F8 | Only active if Exercise ECG option is installed |
| Start Long ECG |  | | F9 | Only active if Long ECG option is installed |
| Stop Long ECG |  | | F9 | |
| Leads |  | <i>View → Leads</i> | | Click inside the leads area |
| Speed |  | <i>View → Speed</i> | | |
| Gain |  | <i>View → Gain</i> | | |
| Tremor filter |  | <i>View → Tremor Filter</i> | Ctrl + F | |
| mV-pulse |  | <i>View → Millivolt</i> | F10 | |
| Patients | | <i>Tools → Patients</i> | | |

5 Resting ECG reports

5.1 Menus and functions

The report mode opens after the registration or when opening an ECG examination. The table below gives a brief explanation of the common functions that can be used in the report mode.


5.1.1 Menu bar





The menu bar at the top of the Report mode page has the following drop down menus for Resting ECG:

| Menu | Command | Function |
|--------------|-------------------------------|--|
| <i>File</i> | <i>Patient info</i> | F2 Enter patient information |
| | <i>Print</i> | F4 Print out the default report |
| | <i>Print ...</i> | Change the printout temporarily, see 5.2.11 |
| | <i>Print Preview</i> | Ctrl + W Preview the report that is currently displayed |
| | <i>Save</i> | F5 Save the examination |
| | <i>Real time Examinations</i> | F6 Quit and return to real time mode |
| | <i>Settings</i> | F7 Open the examination list |
| | <i>Exit</i> | Ctrl+Shift+Up Open settings to configure program (refer to the System manual for information) Quit the program |
| <i>Tools</i> | <i>Patients</i> | Patient data management |
| <i>Help</i> | <i>About</i> | Information about the software |

5.1.2 Icon bar

The following functions are available in the report mode from icons or function keys:

| Icon | Key | Description |
|---|-----|---|
|  | F2 | 1. Change or add patient information. Information in the grey areas cannot be altered. Please note that it is not possible to change the patient ID. Re-analysis will occur automatically if any of the parameters that affect the interpretation is changed. |

| | | |
|---|----|--|
|  | F4 | 2. Print out the default report. If no printer is connected the button will be dimmed. More options are available if clicking on the arrow: <i>Print page</i> - Print the page that is on the screen <i>Print sub report</i> - Print all pages in the report |
|  | F5 | 3. Store the ECG on the local PC or in the central storage system, if connected. |
|  | F7 | 4. Retrieving an examination from the local PC, or from central storage system, can only be done after the current ECG has been stored. The user will be asked if the current examination should be stored or not. |
|  | F6 | 5. Quit and return to real time mode. If the ECG has not been stored, the user is prompted with a question. |

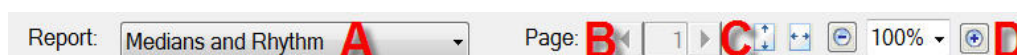
NOTE

Please note that it is not possible to modify Resting ECGs in EC Sense.

5.2 Report printouts

This section describes and presents the different report formats. All reports can be viewed and printed. It is possible to select one report format to be opened as a default report. See settings in the “System manual” for information on how to select a report as default.

The following functions can be used when viewing reports:



- A. Select a report type.
- B. Move to next page, if the report has several pages.
- C. Enlarge the displayed report sideways or in height.
- D. Zoom in/zoom out of the displayed report.

Report example



A on the report shows the patient ID.

B indicates different types of reports that can be selected in a menu.

Cardiolex Standard

2x6

3x4

12-lead

H1

Medians and Rhythm

Medians, Rhythm and Matrix

Megacart Standard

Combined Report

C presents the proposed interpretation. (Interpretation is only available if the option has been ordered and is selected in Settings.)

D presents calculated examination results. Time is given in milliseconds and amplitude in millivolt.

E shows information on selected Speed, Gain, Tremor/Notch filter, Card ID, Location and software version for printout.

F shows the software version number of the acquisition program.

NOTE

No interpretation will be shown under C if the program has been configured to exclude interpretation. See “Settings” in the System manual.



CAUTION

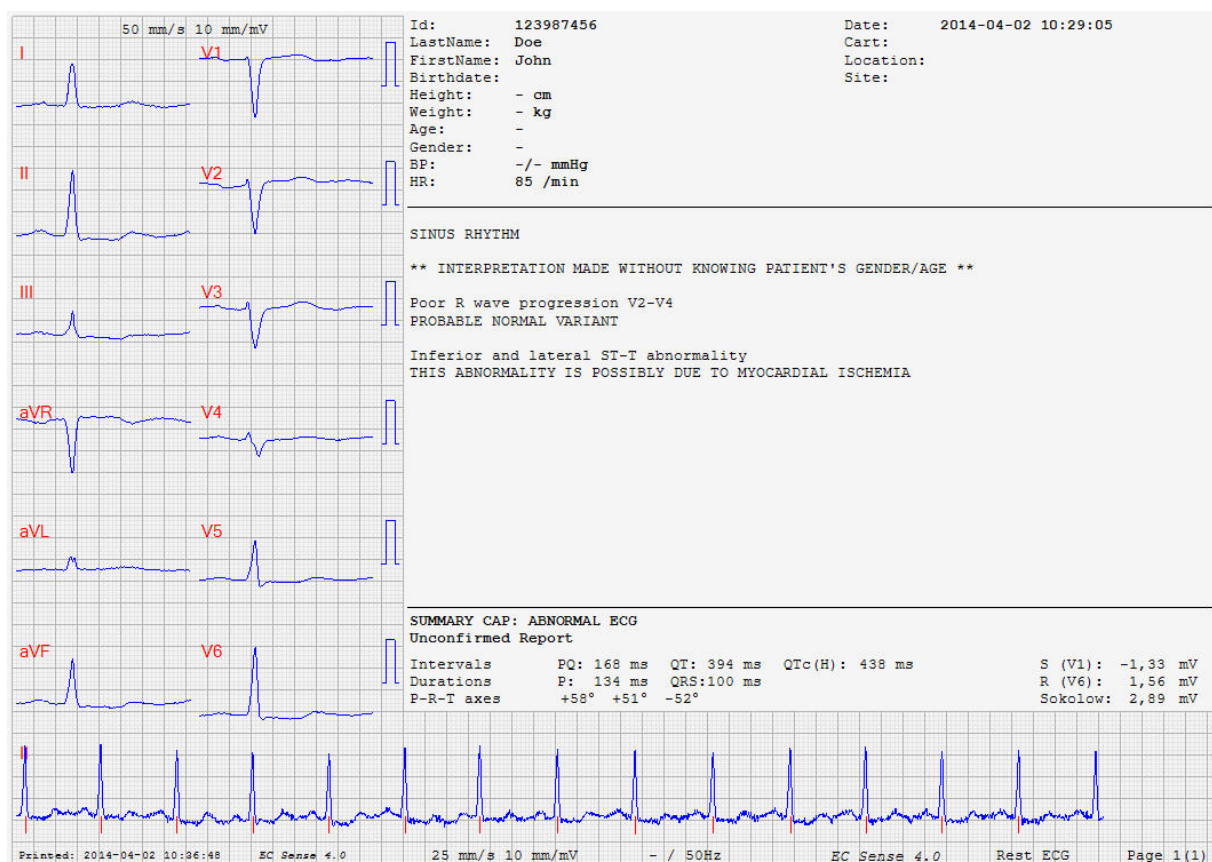
The GRI interpretation program is integrated in EC Sense. This advanced, clinically well recognised program presents highly reliable interpretation. However, the user must bear in mind that the proposed diagnosis only is a suggestion! Prior to using the proposed diagnosis to make decisions about the treatment of a patient, it must always be evaluated by skilled and competent personnel.

Report formats

The following types of reports are available under the *Report* tab:

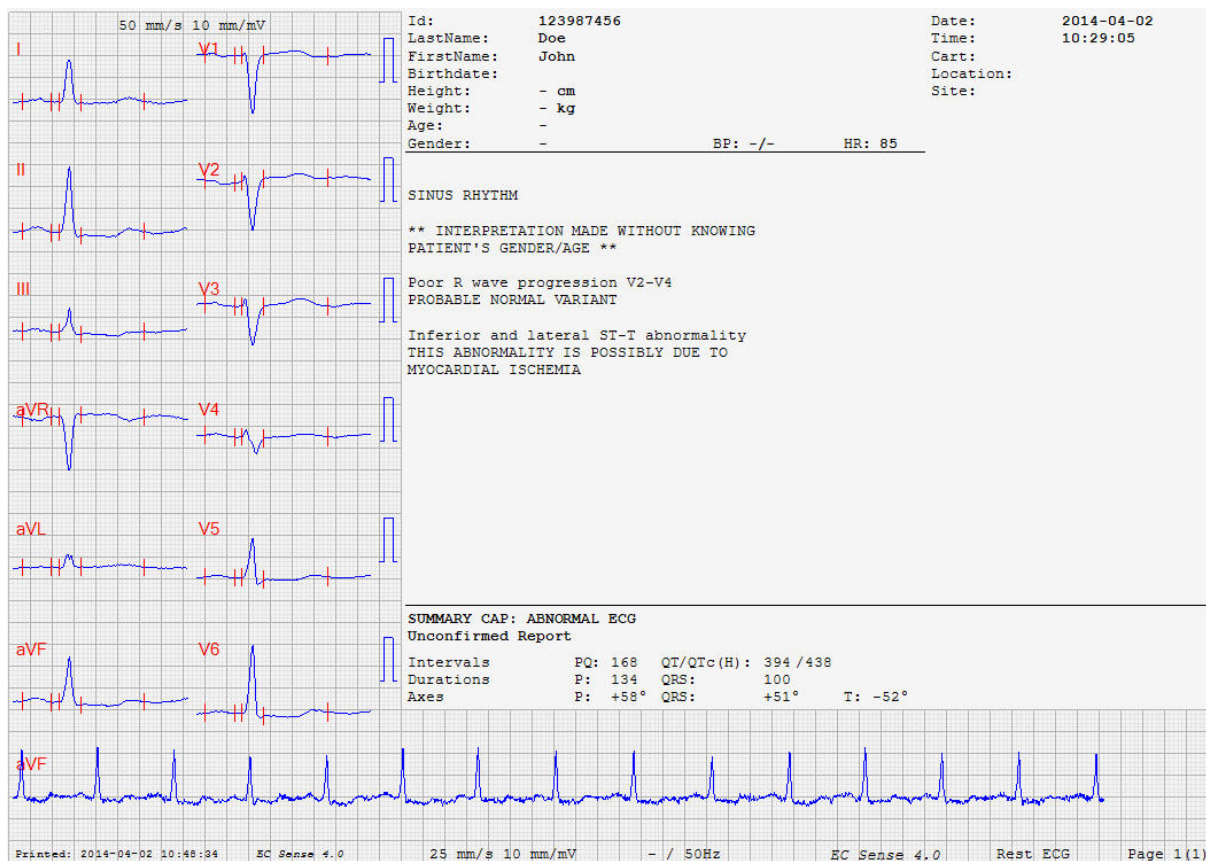
5.2.1 Cardiolex Standard report

This type of report is similar to the MegaCart report which is very common in many clinics. In addition the Cardiolex report includes the Sokolov-Lyon index and QRS markers (if selected in *Settings*). It consists of a page with averaged complexes for 12 standard leads, interpretation (if configured with interpretation) and a rhythm trace. It is printed in landscape format.



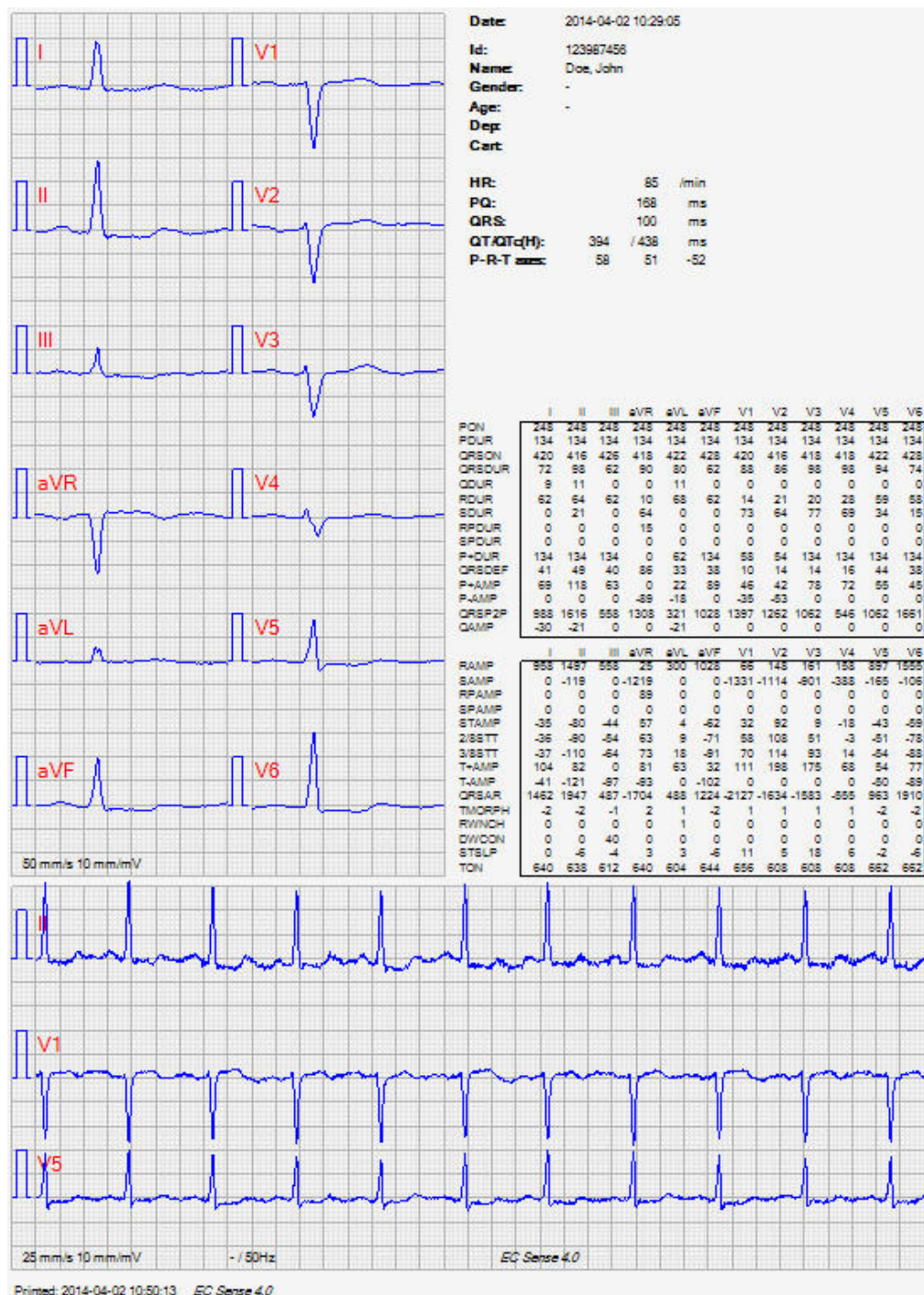
5.2.2 Megacart Standard report

This type of report is very common in many clinics. It consists of a page with averaged complexes for 12 standard leads, interpretation (if configured with interpretation) and a rhythm trace. It is printed in landscape format.



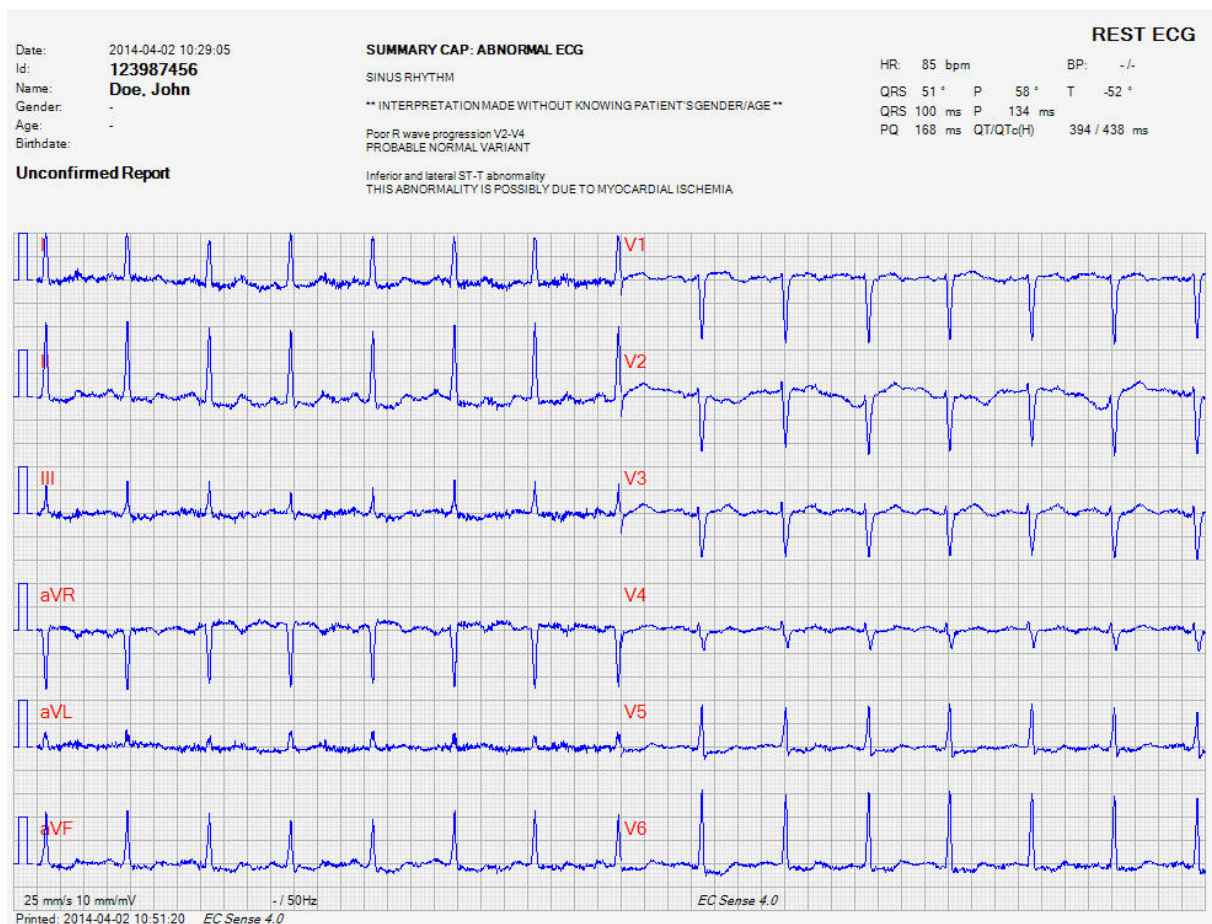
5.2.3 Medians, Rhythm and Matrix report

This report contains averaged complexes for 12 leads, detailed ECG information in a matrix and rhythm ECG for 3 leads (can be configured). It is printed in portrait format.



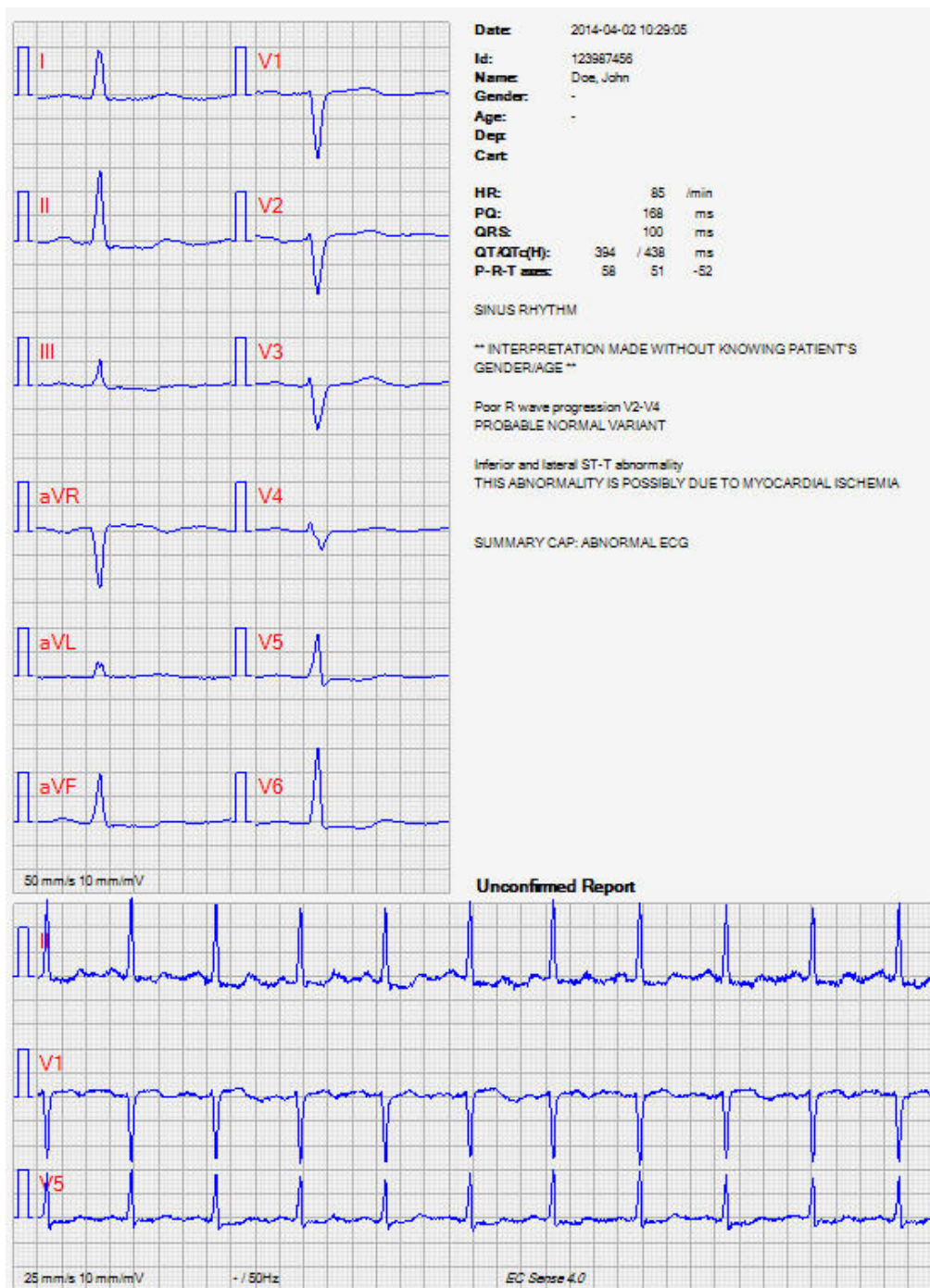
5.2.4 2x6 report

This report contains interpretation (if configured) and rhythm ECG for 2 x 6 standard leads. It is printed in landscape format.



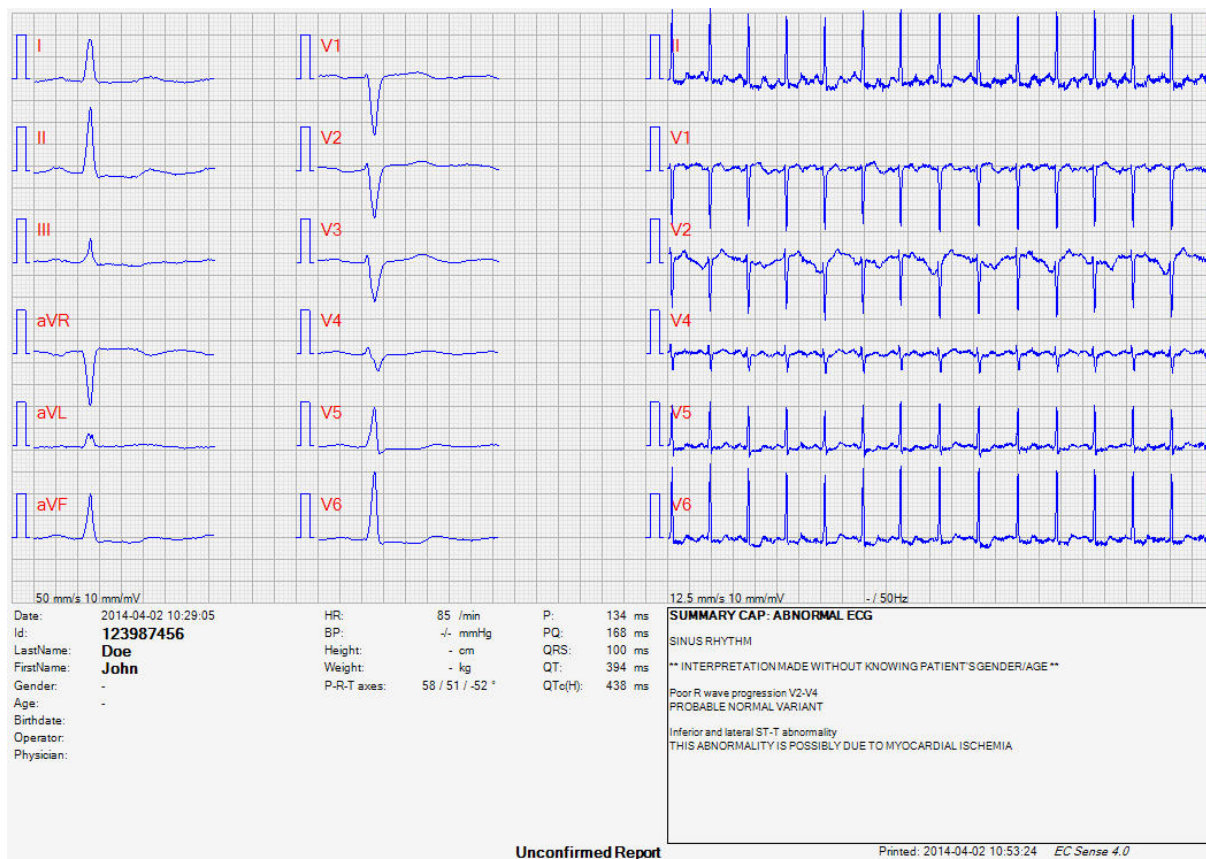
5.2.5 Medians and Rhythm report

This report consists of interpretation (if configured), averaged complexes for 12 leads and rhythm ECG for 3 leads (can be configured). It is printed in portrait format.



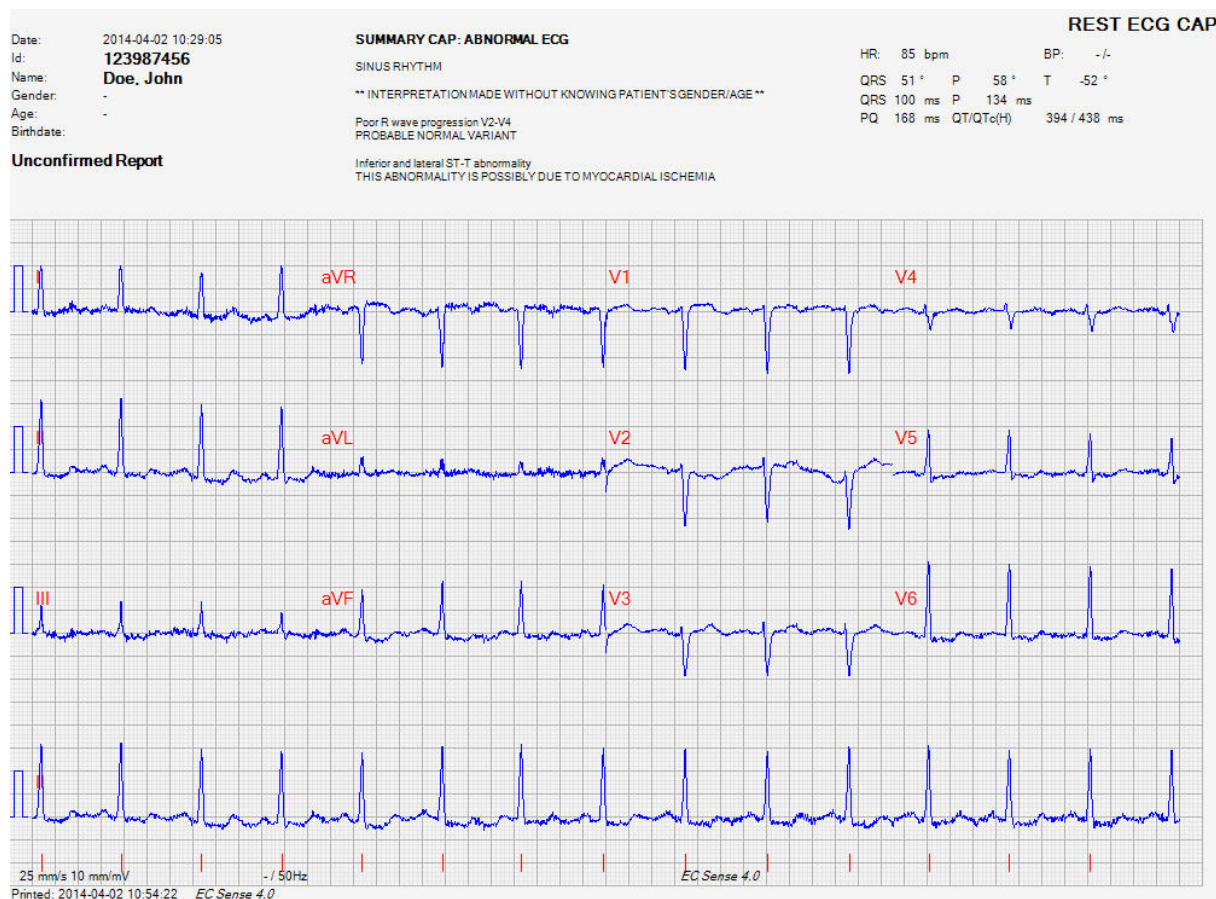
5.2.6 H1 report

This report consists of interpretation (if configured), averaged complexes for 12 leads and rhythm ECG for 6 leads (can be configured). It is printed in landscape format.



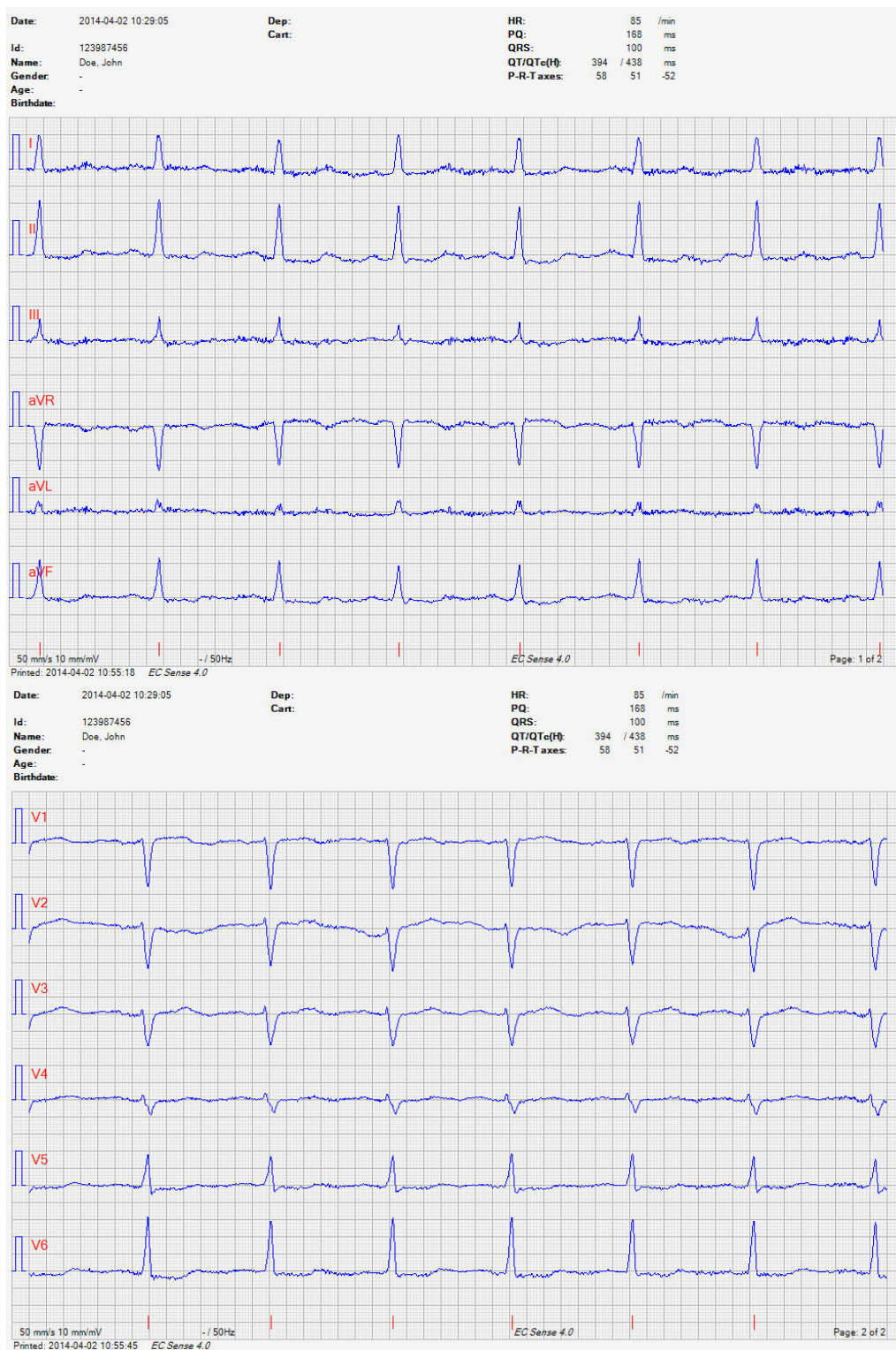
5.2.7 3x4 report

This report consists of interpretation (if configured), rhythm ECG for 3x4 leads and one rhythm ECG with QRS markers (can be configured). It is printed in landscape format.



5.2.8 12-lead report

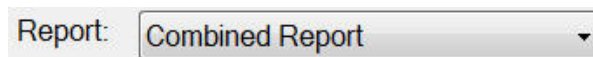
This report contains rhythm ECG for 12 standard leads. It is printed on two pages in landscape format, one page with chest leads and one with limb leads. It can be printed with QRS markers, if configured in *Settings*. These are printed as red vertical bars.



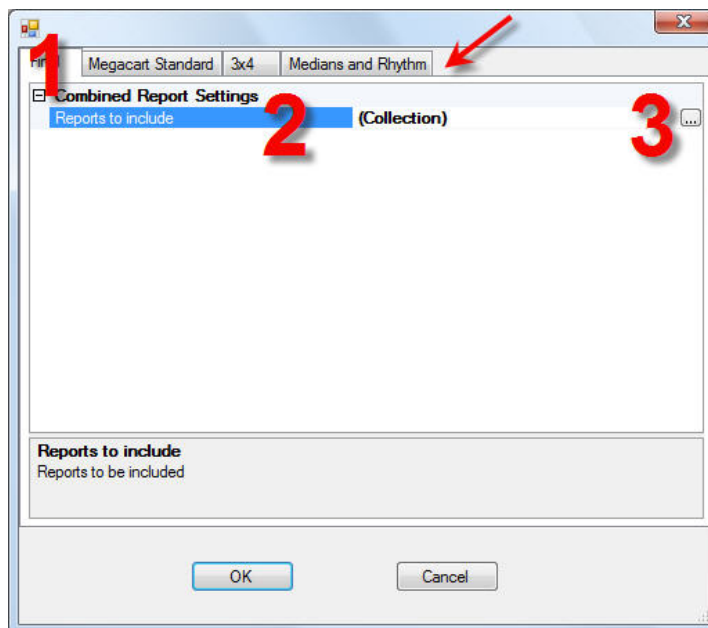
5.2.9 Combined report

The combined report consists of several types of reports that are printed out after each other. Depending on the different reports included, it will be printed in both landscape and portrait format. Which reports to be included can be configured in *Settings*, but it is also possible to make a temporary change and print out different reports. The change is only temporary and as soon as a new examination is opened it will reset to default configuration.

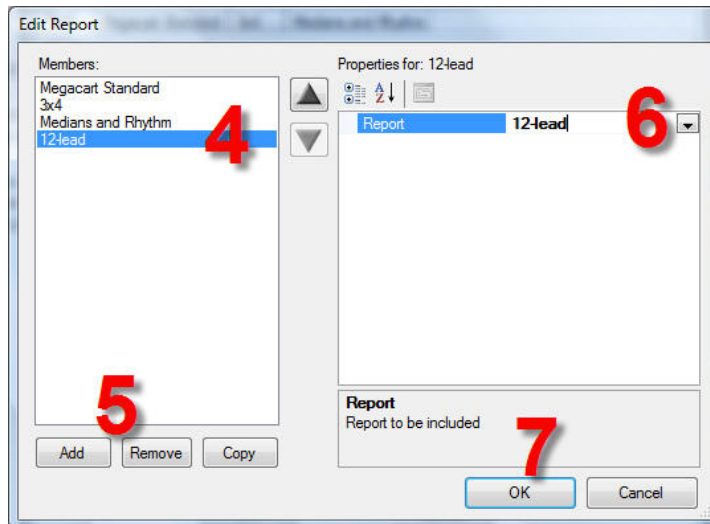
To change the content select *Combined report* from the report drop down menu.



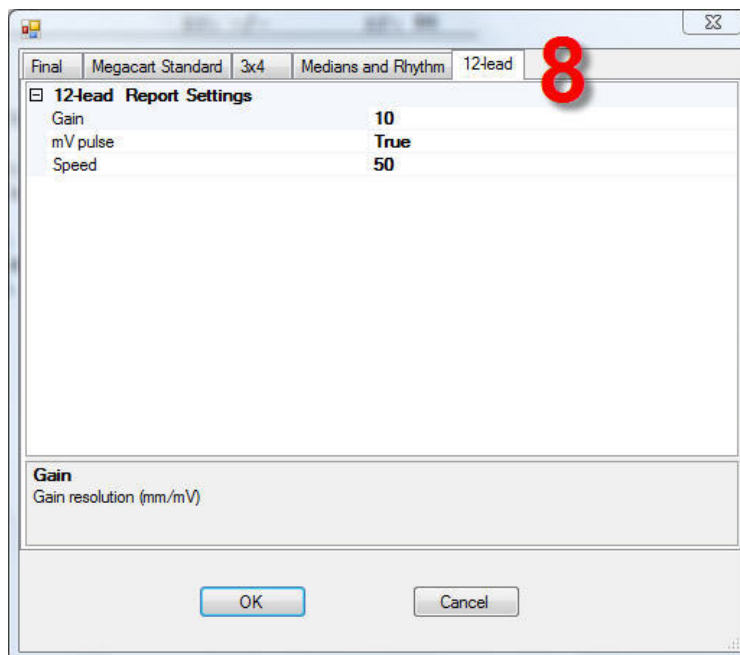
Right click with the mouse somewhere in the report. A pop-up menu opens where the configured reports are displayed as tabs.



1. Click on the sign next to *Combined Report Settings*.
2. Click on *Reports to include*.
3. Click on the list symbol to the right.



4. The list opens and displays the predefined reports.
5. Click on *Add* to add a new report type. (Or highlight a report that shall be excluded and then click on *Remove*).
6. Click on the arrow to the right and highlight a report type in the list that opens.
7. Click on *OK* to include the report.



8. The temporary report window will add a new tab (it will be displayed the next time the window is opened).

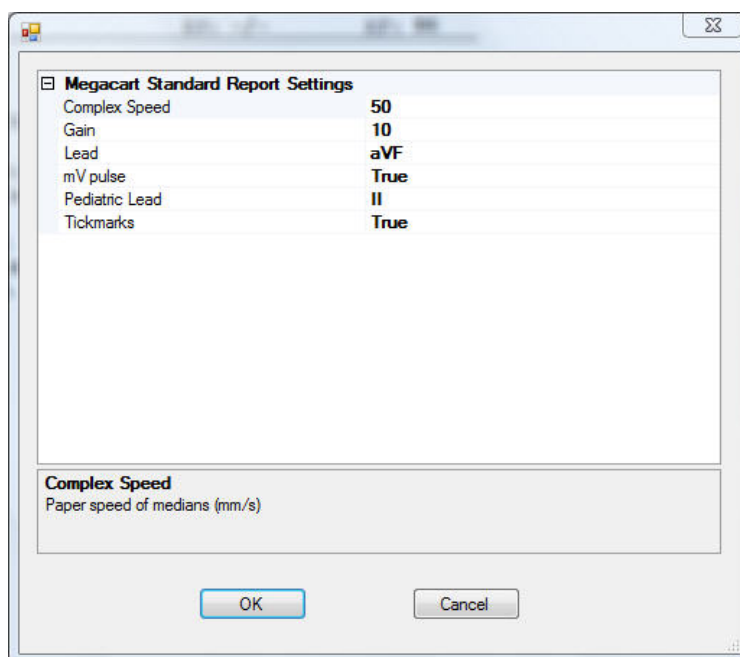
To change the content within a report see section 5.2.10 .

5.2.10 Temporary change of report content

Each report type is predefined. The content and layout of the report can be configured in *Settings*. It is also possible to make a temporary change for the current examination.

To change the content in the report for the current examination follow these steps:

1. Right click with the mouse somewhere inside the report window.
2. A pop-up menu for the selected report opens. See the example below.



Report content pop-up

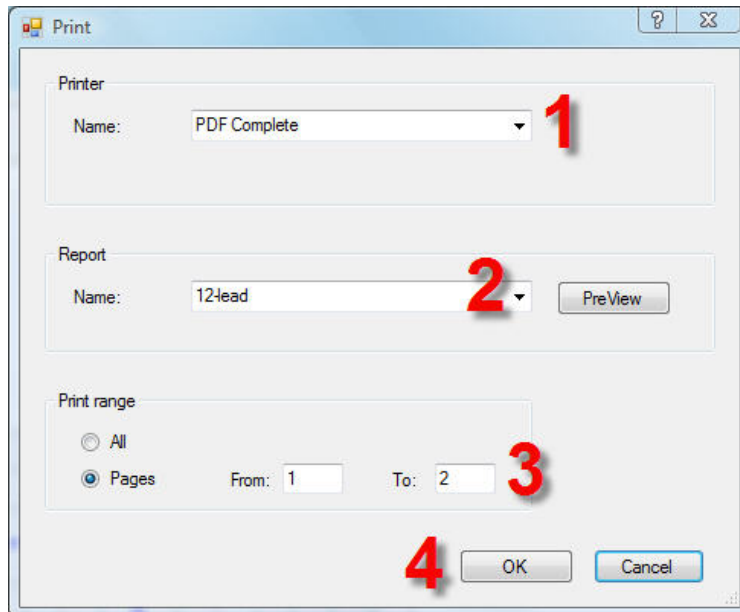
3. Click to the right of the parameter that shall be changed and select an option in the list. The change is only temporary and as soon as a new examination is opened it will reset to default configuration.

Information about how each parameter affects the recording is explained under "Settings" in the System manual.

5.2.11 Temporary change of report printout

The *Print...* function can be activated to make a temporary change for printouts, for instance selecting a different printer.

Select *File* → *Print...* to open the window for temporary change.



1. Select a different printer under *Printer* (the printer must be installed and predefined). The report will be printed out on the selected printer instead of the default printer.
2. Select a different report from the drop down list. Click on *PreView* to see how the selected report will be printed out.
3. Select which pages (for some reports) to print out.
4. Click on *OK* (or *Cancel*).

The change will only affect the current examination and will reset to the default printer on next examination. If a permanent change of default printer is desired it must be configured in *Settings*.

5.3 Beat tab

Under the *Beat* tab it is possible to review all leads and also to make measurements on a representative complex. The following options are available:

Change speed

Click on **50 mm/s** in the menu bar and select the speed to 25, 50, 100 or 200 mm/s.

Change gain

Click on **10mm/mV** in the menu bar and select the gain to 5, 10, 20 or 40 mm/mV.

Show tick marks

☐ **Tickmarks** Show or hide tick marks for QRS onset, QRS offset and ST point.

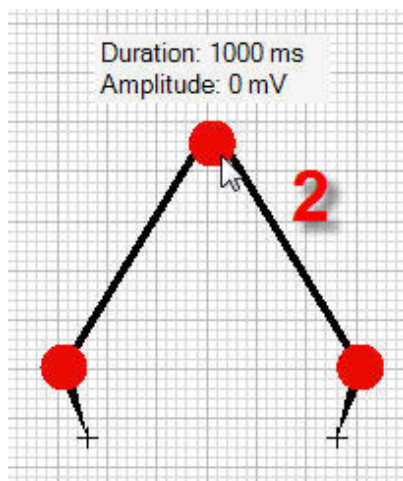
ISO Level

☐ **Iso Level** Show or hide the isoelectric level of 0 mV for which the amplitude will be referenced to at measurements.

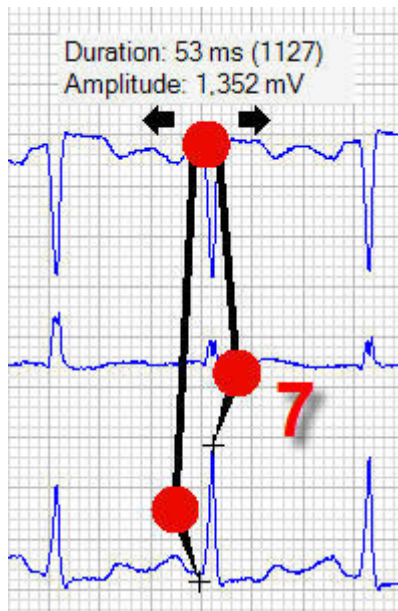
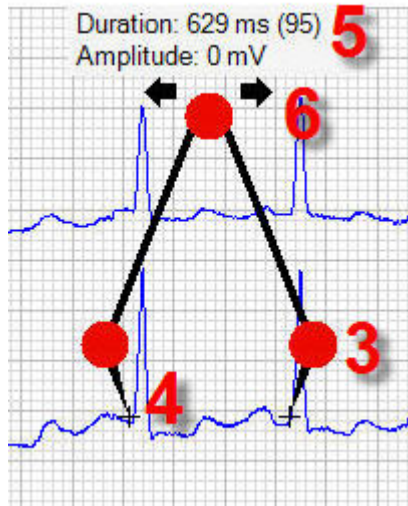
Measure duration/amplitude



To the right in the menu bar there is a box for activating a measurement tool for measuring duration and amplitude on the ECG.

1. Click on **Measure**. A pair of compasses is presented which functions as drag-and-drop.



2. Move the pair of compasses to the desired position by clicking on the left mouse button while pointing on the upper red dot and drag the pair of compasses over the screen.

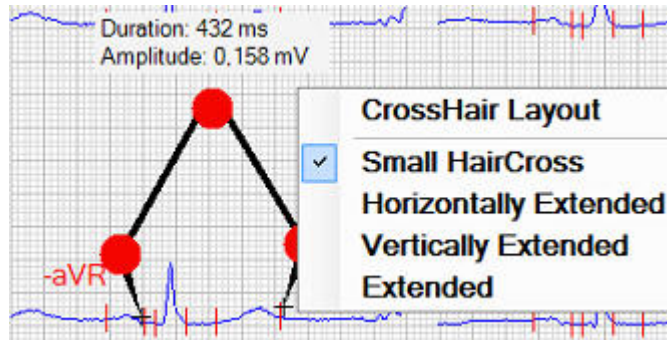


3. Measure the duration by dragging the lower red dots sideways.
4. The measurement values at the top are calculated from the small cross-hairs, and are according to the scale on the screen.
5. The duration is in milliseconds. The heart rate is within brackets (such as 1/ms) when measuring an RR interval.
6. Move the pair of compasses to the next interval by clicking on  or  on the screen. It is also possible to press Ctrl + left/right arrow on the keyboard.
7. Measure the amplitude by dragging the lower red dots up or down. The amplitude is presented in mV at the top.

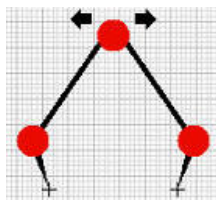
Change the layout of the pair of compasses

The compasses can be presented in various ways.

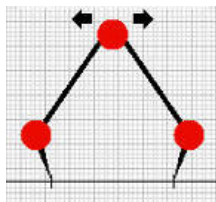
1. Hold the mouse over the upper red dot and right click. A pop-up menu will open.



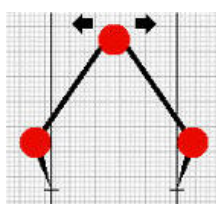
2. Select an alternative by selecting one of the following:



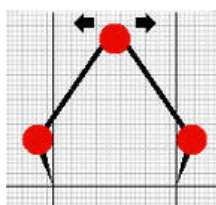
Small HairCross



Horizontally Extended



Vertically Extended



Extended

5.4 Leads tab

Under the *Leads* tab it is possible to review and to make measurements on individual ECG leads. The following options are available:

Change speed

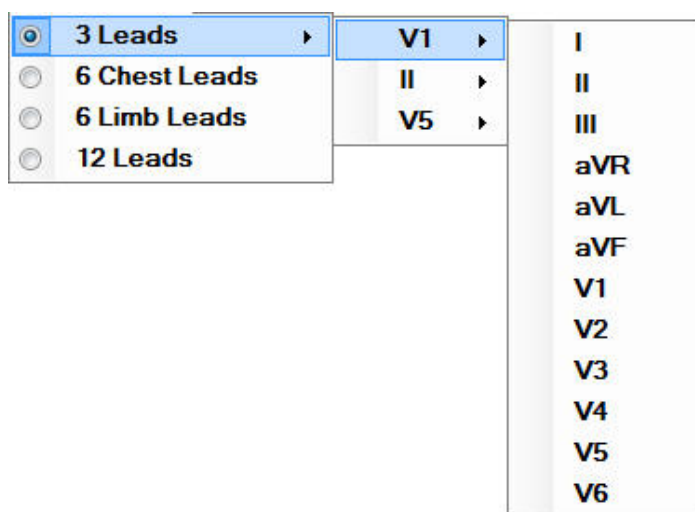
Click on **50 mm/s** in the menu bar and select the speed to 25, 50, 100 or 200 mm/s.

Change gain

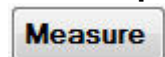
Click on **10mm/mV** in the menu bar and select the gain to 5, 10, 20 or 40 mm/mV.

Change lead

Click on **Leads** in the menu bar and select 3 leads, 6 chest leads, 6 limb leads or 12 leads from the drop down list. If the option of 3 leads is selected it is possible to choose which 3 leads to be displayed.






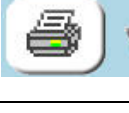



Measure duration/amplitude



See previous section 5.3 on how to measure amplitude and/or duration.

5.5 ECG report commands

The table below shows the commands that are available in the report mode for Resting ECG.

| Function | Icon | Menu item | Fn key |
|--------------------------------------|---|--|---------------|
| Edit patient information |  | <i>File → Patient Info</i> | F2 |
| Print out default report |  | <i>File → Print</i> | F4 |
| Change printout temporarily | | <i>File → Print...</i> | |
| Change report temporarily | | Right hand click inside the report for a pop-up menu | |
| Print the page that is on the screen |  | <i>→Print page</i> | |
| Print the report shown |  | <i>→Print sub report</i> | |
| Preview the report shown | | <i>File → Print Preview</i> | Ctrl + W |
| Save examination |  | <i>File → Save</i> | F5 |
| Exit and return to real time mode |  | <i>File → Real time</i> | F6 |
| Open an examination |  | <i>File → Examinations</i> | F7 |
| Configure the program | | <i>File → Settings</i> | Ctrl+Shift+Up |
| Exit this program | | <i>File → Exit</i> | |

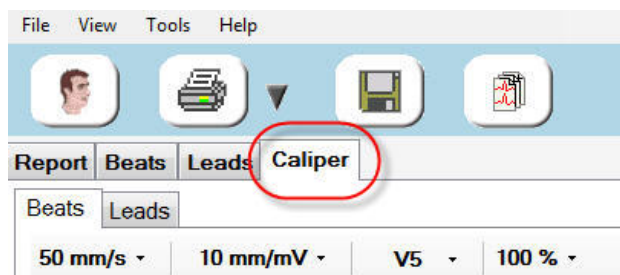
NOTE

Shortcut key commands have a different meaning depending on where in the program they are activated. Commands that are used for entering patient data do not have the same functions as they have in the report mode.

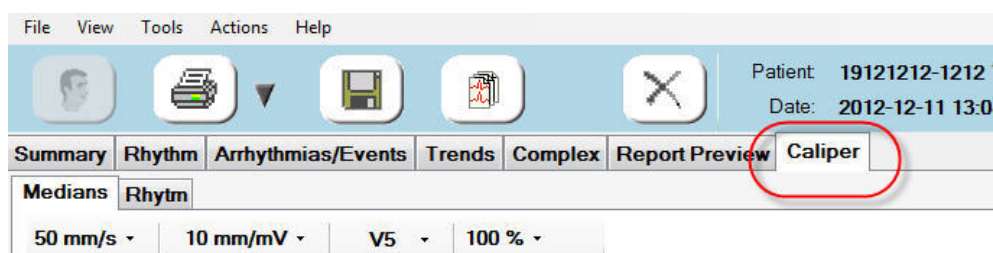
6 Advanced measurement functions

6.1 The Caliper option

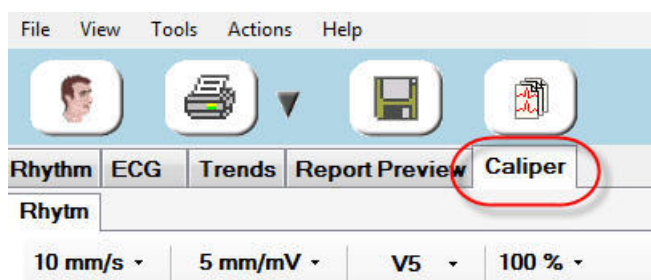
EC Sense and EC View offer the possibility to make advanced measurements on the ECG if the “Caliper” option is installed. The *Caliper* tab will be displayed on the report menu for different types of ECG modes, as illustrated below:



Caliper option in Rest ECG mode



Caliper option in Exercise ECG mode



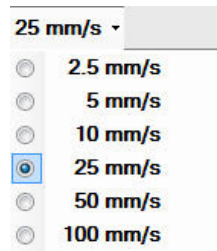
Caliper option in Long ECG mode

6.2 Menus and functions

The following functions are common for *Rest ECG*, *Exercise EKG* and *Long ECG*.

Change speed

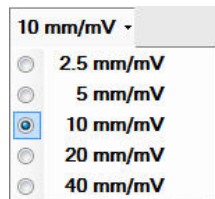
Click on



in the menu bar and select the speed to 2.5, 5, 10, 25, 50 or 100 mm/s.

Change gain

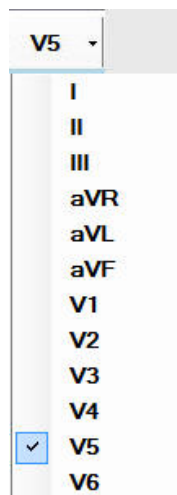
Click on



in the menu bar and select the gain to 2.5, 5, 10, 20 or 40 mm/mV.

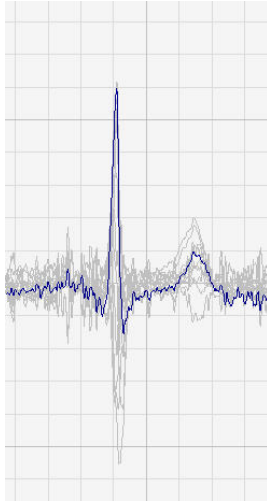
Change lead

Click on



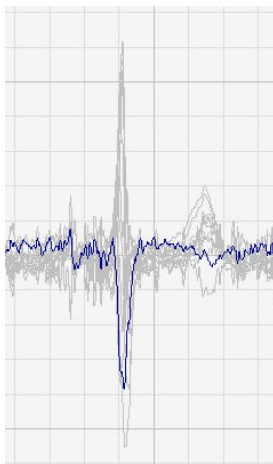
in the menu bar and select the lead.

It is also possible to change lead if you click on the desired lead when the option *Show all leads* is activated.



Example:

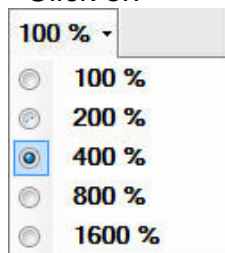
Show all leads is activated and V5 is selected.



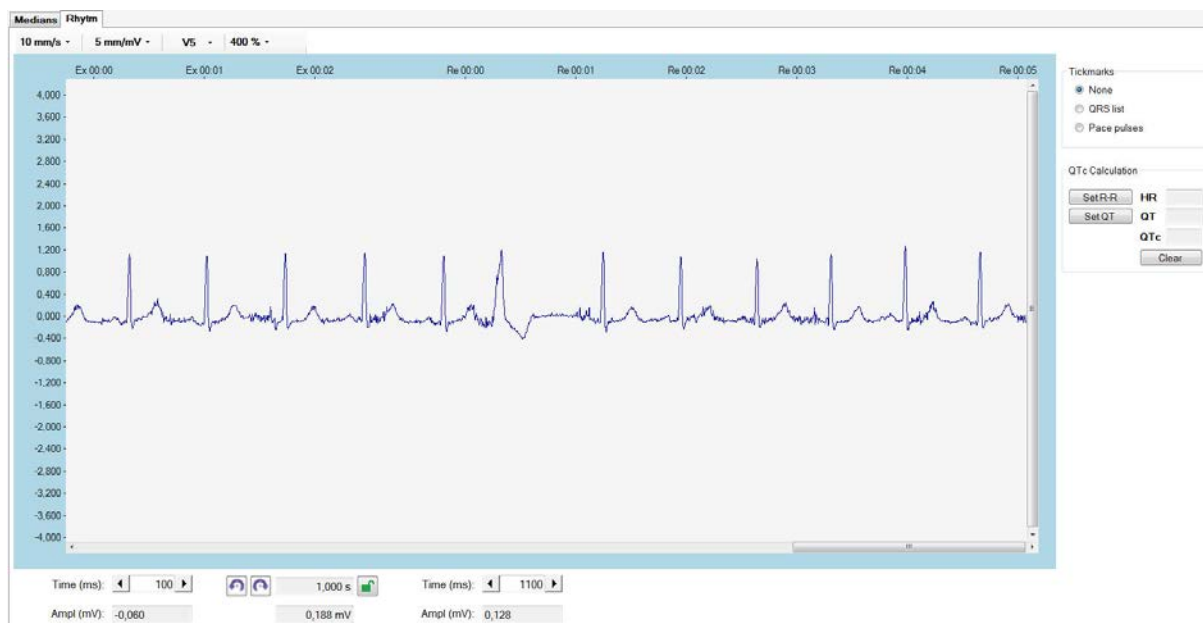
A different lead can be selected by clicking on one of the "grey" traces, in this example V1.

Zoom in/out

Click on



in the menu and select to magnify.

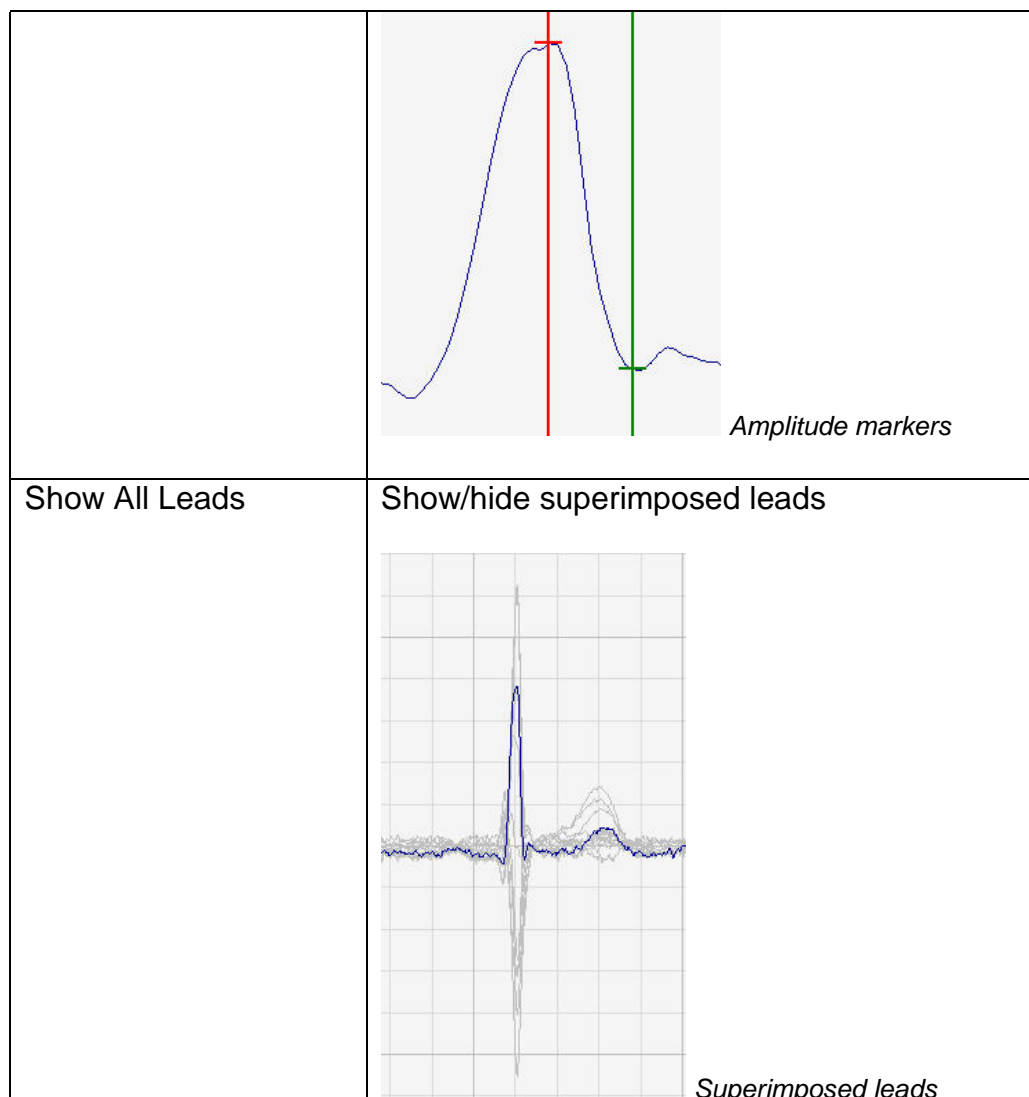


Zoom 400%

Pop-up menu

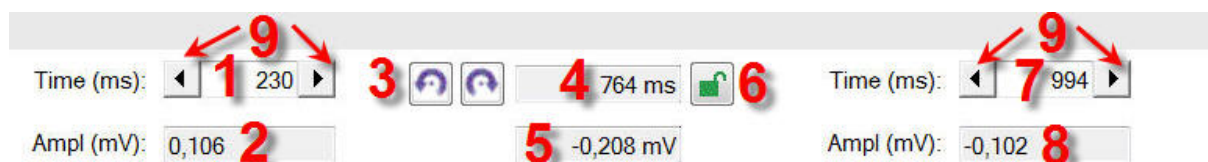
Right click inside the ECG window for a pop-up menu.
The menu offers the following measurement functions:

| Function | Description |
|--------------------------|---|
| Set Left Marker | Place the left marker on a desired location and left click. |
| Set Right Marker | Place the right marker on a desired location and right click. |
| Set Markers on Tickmarks | Sets the markers on the selected tickmarks. (At the first two if there are more than two). |
| Make Markers Visible | Returns to the position where the markers are visible. |
| Show Grid | Select to show or hide the background grid. |
| Show Horizontal Ruler | Show or hide the horizontal bars that mark the amplitude on the trace for the left or right marker. |



Measurement area

The measurement area under the ECG window presents measurement values, and from this menu you can also move the markers.



| No | Description |
|----|---|
| 1 | Presents the absolute time from the left for the left marker. |
| 2 | Presents the amplitude for the left marker. |
| 3 | Click on these to shift the markers one interval to the right/left. This is a useful function for detecting deviations on RR intervals. |

| | |
|---|--|
| 4 | Presents the time difference between the markers. |
| 5 | Presents the amplitude difference between the markers. |
| 6 | Click on the padlock to lock/unlock a set distance between the markers. When locked, both markers are moved simultaneously while maintaining the same difference between them. |
| 7 | Presents the absolute time from the left for the right marker. |
| 8 | Presents the amplitude for the right marker. |
| 9 | Click on the arrows to move the markers forward/backward. |

Drag-and-Drop

It is also possible to move the measurement markers by using the Drag-and-Drop method in the following way:

Place the mouse over the measurement marker, press down the left mouse button and drag the marker in any direction, release button.

6.3 Measurements on Rest ECG

6.3.1 Beats tab

It is possible to work with the measurements independent of each other. The following describes one possible method.

Tickmarks

Under the *Beats* tab the following type of markers can be used for measurements on the ECG. Tickmarks are shown as vertical dotted lines.

| Tickmarks | |
|---------------------------------------|--------|
| <input checked="" type="radio"/> None | |
| <input type="radio"/> P-dur | 144 ms |
| <input type="radio"/> QRS-dur | 108 ms |
| <input type="radio"/> T-dur | -- ms |
| <input type="radio"/> QT | 390 ms |

No markers on the trace

Show markers for P-duration

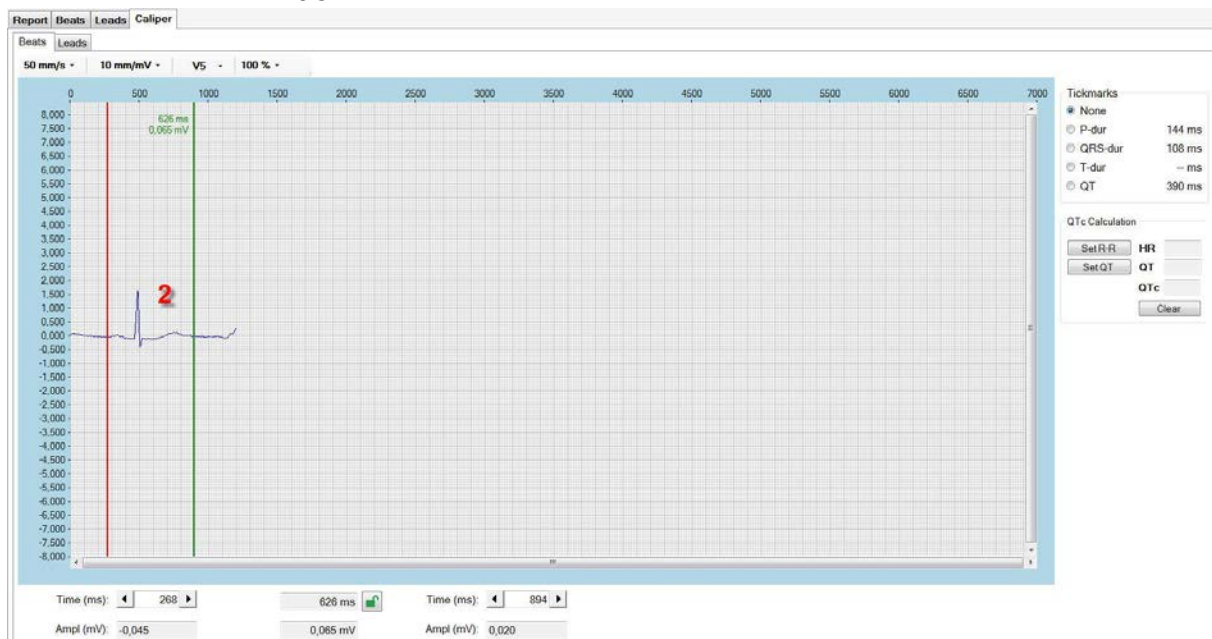
Show markers for QRS-duration

Show markers for T-duration

Show markers for QT interval

Example:

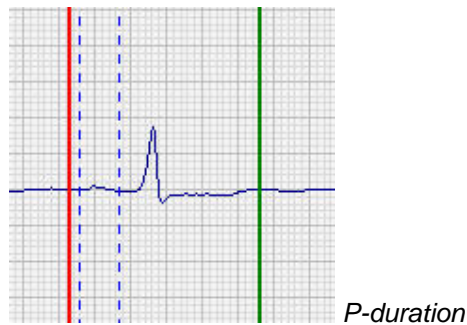
1. Click on the *Caliper* tab.
2. The averaged ECG complex in *Rest ECG* is presented in the window.



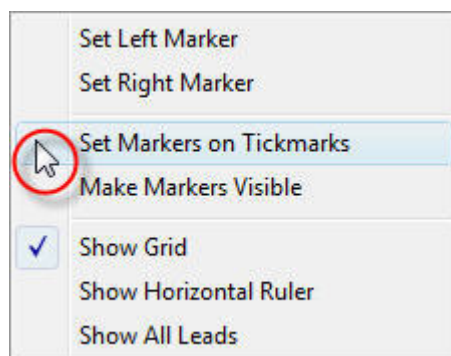
3. Move the markers, if desired, by using the arrows.

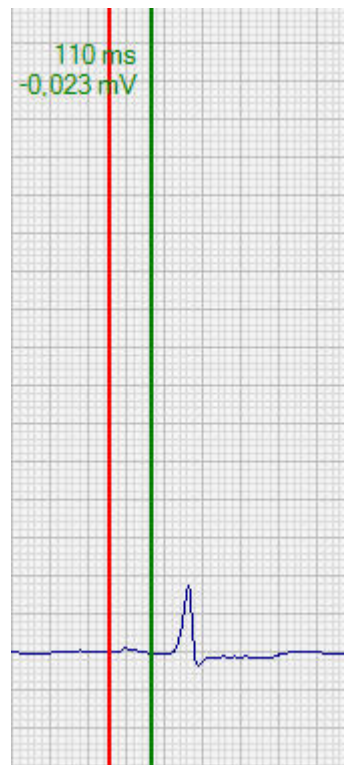
| | | |
|---|--|---|
| Tid (ms): <input type="text" value="232"/> 3 | <input type="text" value="532 ms"/> | Tid (ms): 3 <input type="text" value="764"/> |
| Ampl (mV): <input type="text" value="-0,001"/> | 4 <input type="text" value="0,005 mV"/> | Ampl (mV): <input type="text" value="0,004"/> |

- The difference in amplitude and duration is presented in the middle of the measurement area.
- Click on P-duration to place the tickmarks.



- Right click for a pop-up menu and click on *Set Markers on Tickmarks*.





Markers placed at P-duration

The time for P-duration is presented above the trace as well as in the measurement area.

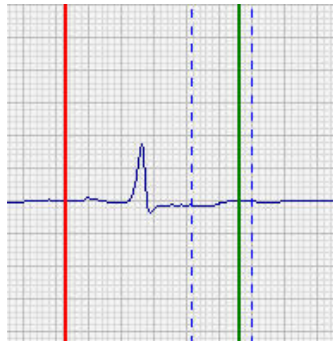
7. Click on QRS-duration to place the tickmarks.



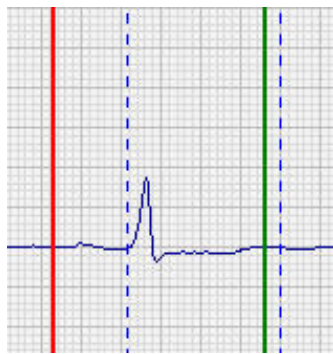
QRS-duration

Carry out each measurement in a similar way as described in step 6 to show the markers on the measurements.

8. Click on T-duration to place the tickmarks.



9. Click on QT to place the tickmarks.



6.3.2 Leads tab

Tickmarks

Under the *Leads* tab the following type of markers can be used for measurements on the ECG.

| Tickmarks | |
|---------------------------------------|----------------------------|
| <input checked="" type="radio"/> None | No markers on the trace |
| <input type="radio"/> QRS list | Set markers on QRS list |
| <input type="radio"/> Pace pulses | Set markers on pace pulses |

Note:

Pace pulses are only visible if the ECG has been registered with pace pulses.

The measurement functions works in the same way as described under the *Beats* tab. See 6.3.1

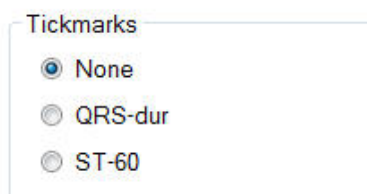
6.4 Measurements on Exercise ECG

6.4.1 Medians tab

It is possible to work with the measurements independent of each other. The following describes one possible method.

Tickmarks

Under the *Medians* tab the following type of markers can be used for measurements on the ECG.



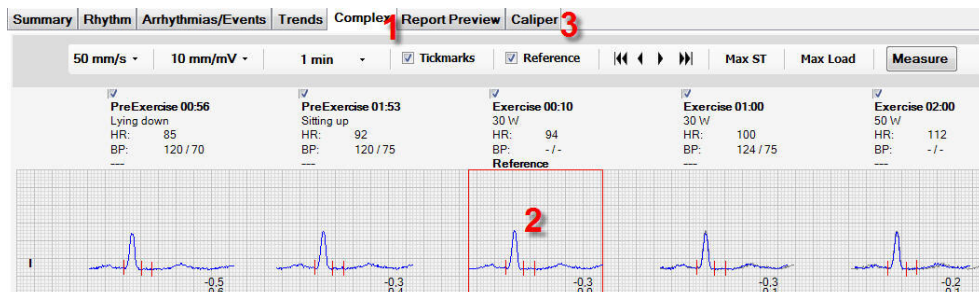
No markers on the trace

Set markers for QRS duration

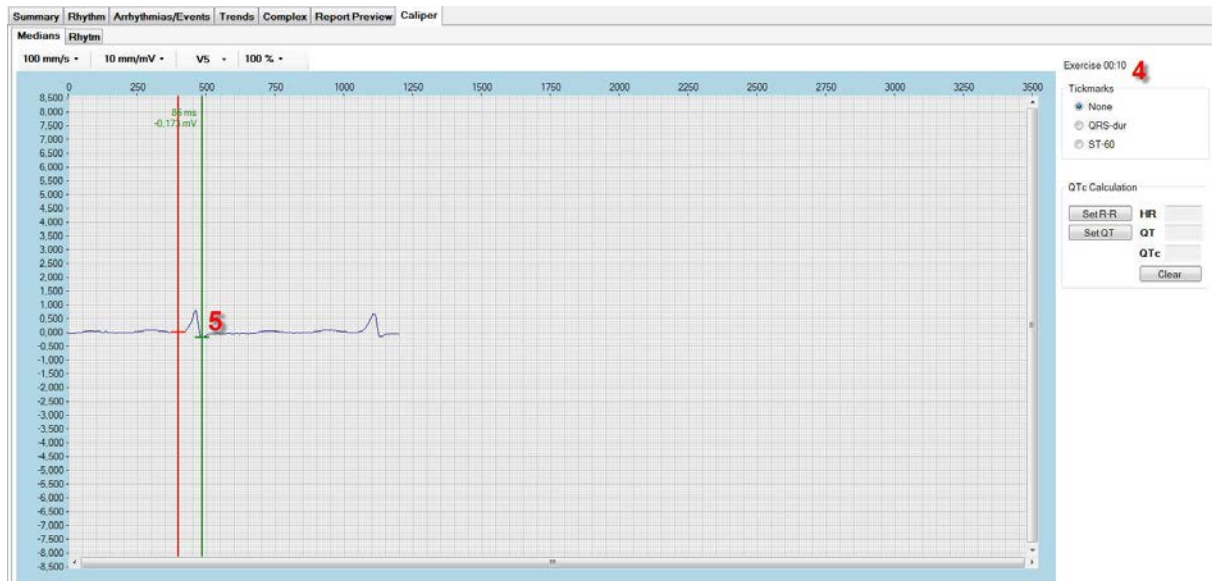
Set markers for ST-60 duration

Example:

1. Click on either *Summary*, *Rhythm*, *Arrhythmias/Events*, *Trends* or *Complex*. In this example, *Complex*.
2. Set the time reference on a desired complex.



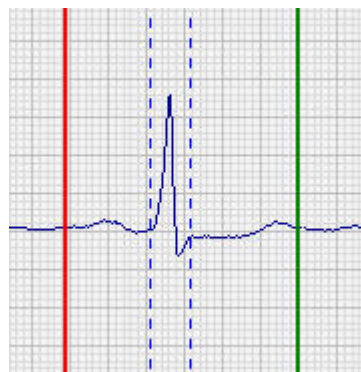
3. Click on the *Caliper* tab.
4. The averaged complex is presented in the ECG window. The time for the selected complex is shown in the upper right corner and corresponds to the selected time reference.
5. The markers are shown on the complex.



6. Move the markers with the arrows or use drag-and-drop by placing the mouse over the marker and drag with the left mouse button.

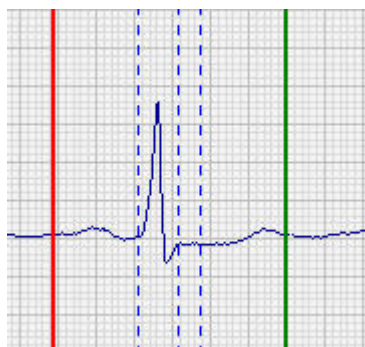


7. The difference in amplitude and duration is presented in the middle of the measurement area.
8. Click on *QRS-dur* to show the markers for the detected QRS.



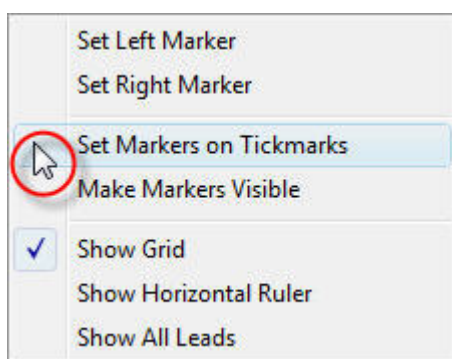
QRS-duration

9. Click on *ST-60* to show the markers for the detected ST interval.

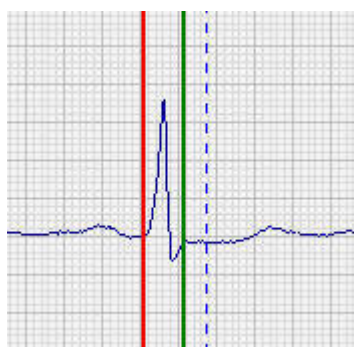


ST-60 markers

10. Right click for a pop-up menu and click on *Set Markers on Tickmarks*.

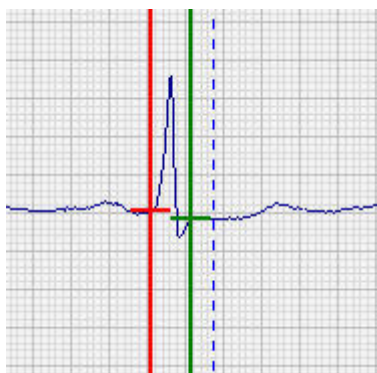


11. The red and green measurement markers are placed on top of the tickmarks. Amplitude and duration is seen above the complex as well as in the measurement area at the bottom.



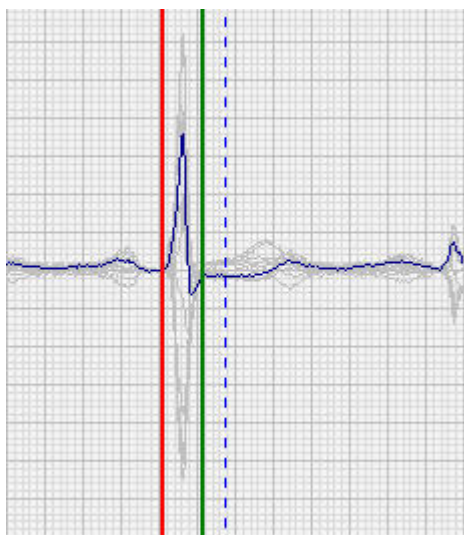
Set Markers on Tickmarks

12. Right click to bring up the pop-up menu and select/deselect *Show Horizontal Ruler*. The horizontal bars indicate the intersection on the trace.



Show Horizontal Ruler

13. Right click to bring up a pop-up menu and select *Show All Leads*. This shows a superimposed mode with all leads.



Show All Leads

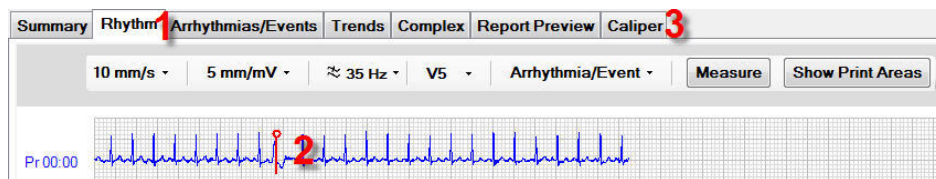
14. To select a different complex click on any of the tabs for *Rhythm*, *Arrhythmias/Events*, *Trends* or *Complex* and place the time reference on the desired complex.

6.4.2 Rhythm tab

The functions under *Rhythm* tab are similar to the functions described under the *Medians* tab.

Example:

1. Click on either *Summary*, *Rhythm*, *Arrhythmias/Events*, *Trends* or *Complex*. In this example, *Rhythm*.
2. Set the time reference by clicking on the desired location in the ECG or trend.



3. Click on the *Caliper* tab.
4. The corresponding time segment is presented in the ECG window.

Tickmarks

Under the *Rhythms* tab the following type of markers can be used for measurements on the ECG.

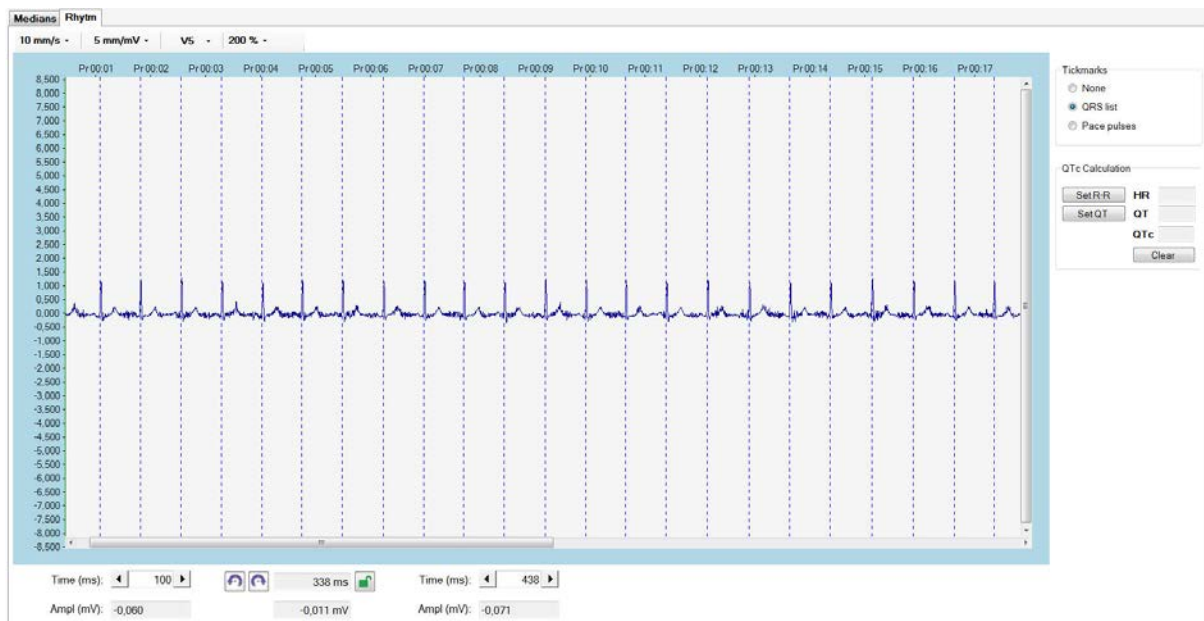
Tickmarks

☒ None
☐ QRS list
☐ Pace pulses

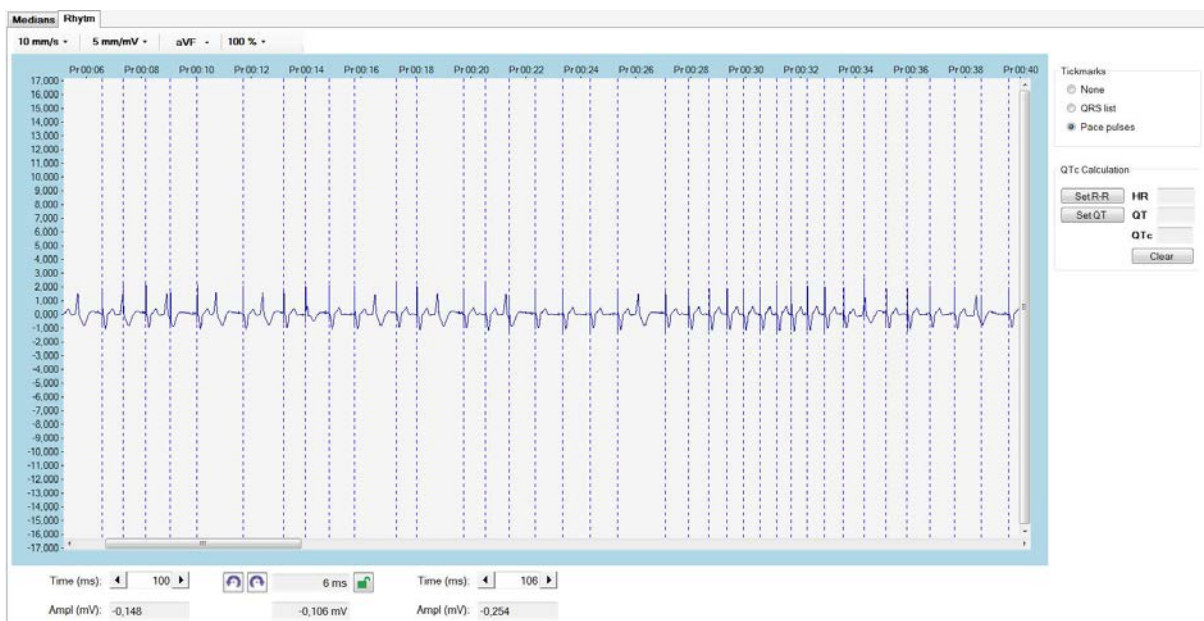
No markers on the trace

Set markers on QRS list

Set markers on pace pulses



QRS list



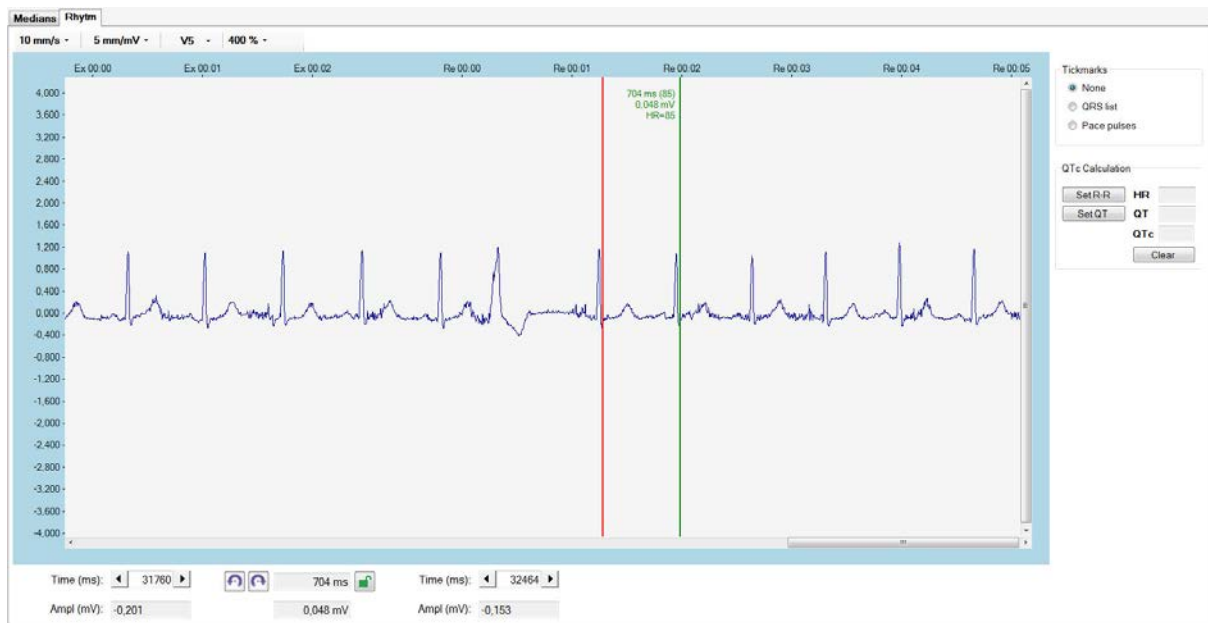
Pace pulses

6.4.3 QTc calculation

To carry out a QTc calculation set the markers on a RR interval and a QT time and click on *Set R-R* and *Set QT*. The markers can be set in any order and the QTc will be automatically calculated when both values are available.

Example:

1. Select an R-R interval by setting the left and right marker.



2. Click on *Set R-R*.
3. The value is shown as:

QTc Calculation

Set R-R

HR

85

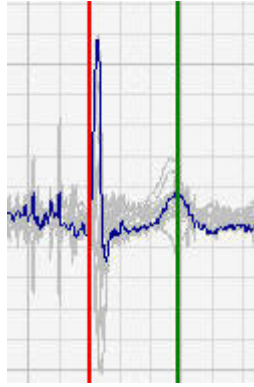
Set QT

QT

QTc

Clear

4. Then select QT with both markers.



5. Click on *Set QT*.
6. The following calculation is presented:

QTc Calculation

Set R-R

Set QT

HR

QT

QTc

85

600

644

Clear

7. Click on *Clear* to delete the calculation and to restart.

6.5 Measurement on Long ECG

6.5.1 Rhythm

The measurements for *Long ECG* are similar to the functions described under the *Rhythm* tab for *Exercise ECG*.

Tickmarks

Under the *Rhythm* tab the following type of markers can be used for measurements on the ECG.

| Tickmarks | |
|---------------------------------------|----------------------------|
| <input checked="" type="radio"/> None | No markers on the trace |
| <input type="radio"/> QRS list | Set markers on QRS list |
| <input type="radio"/> Pace pulses | Set markers on pace pulses |

Example:

1. Click on either the *Rhythm*, *ECG* or *Trends* tab.
2. Set the time reference by clicking on the desired location in the ECG or trend.
3. Refer to section 6.4.2 for general description.
4. For QTc calculation refer to section 6.4.3.

7 Examination data base

7.1 Local and central storage of examinations

In *EC Sense* it is possible to store Resting ECGs and Exercise ECGs on the local PC or in a central storage system. Examinations that are stored on the local PC can be exported to the central storage system at a later time. The user can on the other hand also search and retrieve examinations from the central storage system and import them into *EC Sense*.

The functions for importing and exporting examinations are accessible from the *Examination* data base which opens when clicking on the



icon in the upper menu bar.

A list with all examinations will be presented.

7.1.1 Local examinations

When opening the *Examination* list, all locally stored examinations will be presented in a similar fashion:

| Date | Type | PatientId | LastName | FirstName |
|---------------------|----------|-----------|----------|-----------|
| 2011-05-23 12:06:22 | Rest ECG | 77665544 | Williams | William |
| 2011-05-20 08:39:40 | Exercise | 12233445 | Doe | John |
| 2011-05-19 15:53:38 | Exercise | 66778899 | Johhsson | Mary |
| 2011-05-19 15:23:52 | Exercise | 66778899 | Johhsson | Mary |
| 2011-05-19 14:39:48 | Exercise | 66778899 | Johhsson | Mary |
| 2011-05-19 14:33:57 | Exercise | 55667788 | Smith | James |
| 2011-05-18 16:58:15 | Exercise | 12233445 | Doe | John |
| 2011-05-14 14:24:22 | Exercise | 12233445 | Doe | John |

Diagnosis:
 SINUS TACHYCARDIA
 Poor R wave progression V2-V4
 PROBABLE NORMAL VARIANT

Summary:
 ABNORMAL

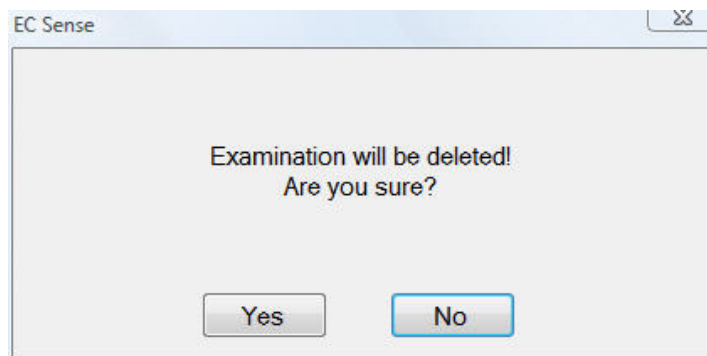
Buttons: Open, Send, Delete, Cancel

The lower window will display the diagnosis and interpretation for the highlighted examination.

Double click on an examination in the list, or click on *Open*, to open the examination in report mode.

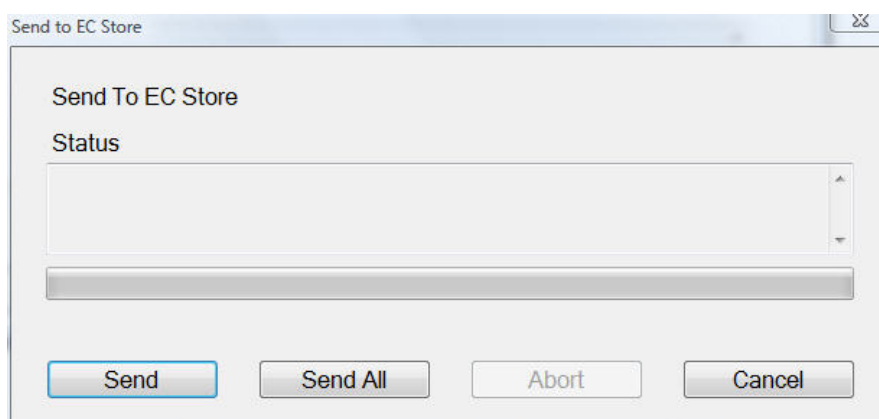
7.1.2 Delete local examinations

Highlight the examination to be deleted and select *Delete*. You will be asked whether you are sure that you want to delete it or not.



7.1.3 Send examinations to the central storage system

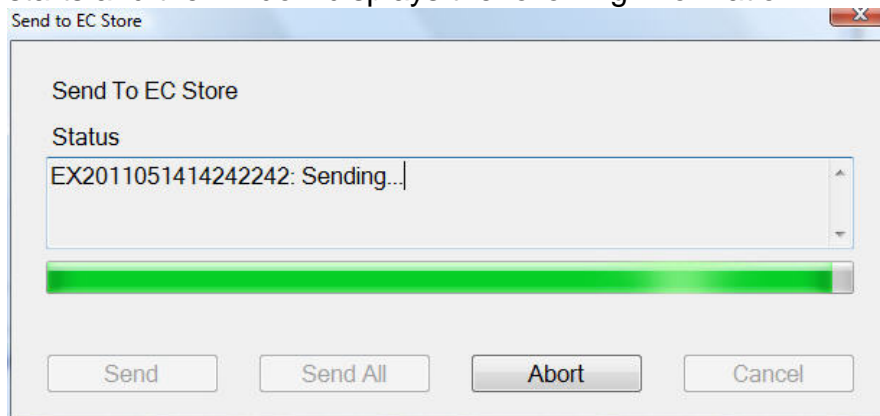
All examinations that have been exported to, and successfully imported into, the central storage system will automatically be deleted from *EC Sense*. Click on the *Send* button to start the transmission to the central storage system. The following window will be displayed:



Click on *Cancel* if you wish to close without sending.

Send highlighted examination

When *Send* is selected, the transmission of the selected examination starts and the window displays the following information:

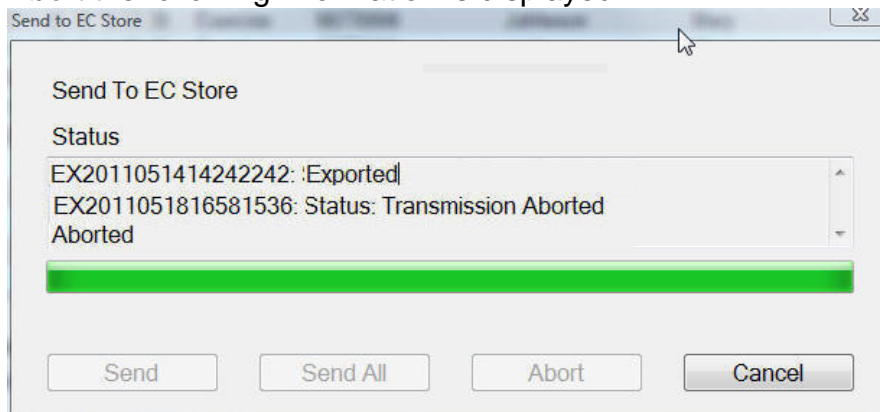


Send all examinations

If *Send all* is selected, all local examinations will be transferred.

Abort transmission

By clicking on *Abort* the transmission will be cancelled as soon as the ongoing transmission of an examination is finished. When clicking on *Abort* the following information is displayed:



This window will be showed until the user confirms by selecting *Cancel*.

7.1.4 Retrieve examinations from the central storage system

Click on the *Central* tab to open the search window.

[illegible]

Enter the patient's ID, if not already filled in (if a current patient is selected that patient's ID number will be filled in). All characters in the patient ID must be entered. The patient ID information can not be changed by the user.

The examination list will be empty until the search is activated with the *Search* button. The *Import* button will be dimmed while the list is empty.

After clicking on *Search*, the list with examinations will be displayed in a similar way:

| Date | Type | PatientId | LastName | FirstName | Status |
|---------------------|----------|-----------|----------|-----------|-------------|
| 2011-05-23 13:01:47 | Exercise | 12233445 | Doe | John | Unconfirmed |
| 2011-05-23 12:57:48 | Rest ECG | 12233445 | Doe | John | Unconfirmed |
| 2011-05-20 08:39:40 | Exercise | 12233445 | Doe | John | Unconfirmed |
| 2011-05-14 14:24:22 | Exercise | 12233445 | Doe | John | Unconfirmed |

The *Import* button can now be activated, and the selected examination can be retrieved to be viewed in the report mode. You can also select an examination by double clicking on it.

An examination that has been retrieved from the central storage system can not be stored again on the local PC. Such examinations can only be viewed and printed out.

When importing examinations from the central storage system to *EC Sense*, the communication with the central storage system will depend on the user's access rights. It might be necessary to log in with user name and password. This will depend on the system administrator of the central storage system.

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