MEDUCORE Standard^2

Monitor/Defibrillator

Instructions for use of devices from software version 3.1

Read these instructions for use before using the product. Ignoring the instructions for use may lead to serious injury or death.

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1 Introduction

1.1 About this document

This document describes all possible versions of the device.

Depending on the version purchased, it may be that you do not have available all the functions, components, and accessories described in this document and shown in the illustrations.

If functions of the device can only be enabled by purchasing a specific option, this document makes this clear by appending "(optional)" and "(only with option XXXX)" to the text.

Illustrations in these instructions for use are for general understanding, and may differ from the actual version. No claims can be brought on the basis of any deviations.

Texts shown in the device display appear in this document in bold. Example: Press the **Charge** function button.

The voice prompts of the device are shown in italics in this document. Example: *Stand clear of the patient*.

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1.2 Explanation of warnings

⚠ DANGER	**Danger!** DANGER indicates a dangerous situation which will result in death or serious injury if not prevented.
⚠ WARNING	**Warning!** WARNING indicates a dangerous situation which may result in death or serious injury if not prevented.
⚠ CAUTION	**Caution!** CAUTION indicates a dangerous situation which may result in minor injury if not prevented.
NOTICE	**Notice!** NOTICE indicates risks which may possibly cause material or environmental damage.
i	Designates useful tips relating to a particular sequence of actions.

1.3 Description of function

The device offers the following monitoring and diagnostic functions:

- 6-lead monitoring ECG: The electrical activity of the heart is derived and displayed. This allows the user to interpret cardiac rhythms and heart rate. To do so, the 6-lead monitoring ECG derives the limb leads according to Einthoven (I, II, III) and according to Goldberger (aVR, aVL, aVF) and displays these in a curve view.
- 12-lead ECG: The electrical activity of the heart is derived and displayed. This allows the user to carry out differentiated ECG diagnosis. The 12-lead ECG derives the following leads for this purpose:
  - Limb leads acc. to Einthoven (I, II, III)
  - Limb leads acc. to Goldberger (aVR, aVL, aVF)
  - Chest wall leads acc. to Wilson (V1 to V6)

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- Pulse oximetry: Pulse oximetry monitoring allows continuous, non-invasive measurement of arterial oxygen saturation with the aid of different pulse oximetry sensors for different application sites. At the same time, a photosensor in the pulse oximetry sensor registers the percentage of oxygenated hemoglobin in the arterial blood (SpO_2) using different light wavelengths. In addition, the pulse oximetry sensor registers pulse rate. The values for SpO_2 and pulse rate are shown in the display numerically, the plethysmogram in the form of a curve.
- Non-invasive blood pressure measurement (NIBP monitoring): NIBP monitoring allows measurement of blood pressure on a limb in adults, children, and infants. Measurement is based on oscillometric blood pressure measurement technology. After the measurement has been carried out, systolic and diastolic blood pressures are shown numerically in the display in mmHg.

The device has the following therapy functions:

- Manual defibrillation and cardioversion: Based on the information displayed by the ECG, the user decides whether it is necessary to deliver a shock. If a shock is necessary, the user can select the shock energy, charge the device for shock delivery, and trigger the shock manually.
- Semi-automatic defibrillation: In AED mode, the device guides the user through resuscitation by means of audio and visual instructions. The device determines the resuscitation sequence. The device automatically carries out an ECG analysis and, if necessary, charges for electric shock delivery. The shock is triggered manually by the user.

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2 Safety

The instructions for use are part of the device. If the instructions for use and the following safety instructions are not followed in their entirety, therapy may fail or be put at risk. This may cause the patient, the user, and bystanders serious or life-threatening injury.

⇒ Follow instructions for use in their entirety.
⇒ Keep the instructions for use accessible and near the device at all times.
⇒ Use the device only for the intended purpose (see "2.1 Intended purpose", page 11).
⇒ Do **not** use the device if it is contra-indicated.
⇒ Follow the instructions for use of the components and accessories.

2.1 Intended purpose

MEDUCORE Standard^2 is used as a mobile external defibrillator with monitoring functions on patients who are exhibiting symptoms of a cardiac arrest or cardiac arrhythmias.
MEDUCORE Standard^2 is also used when measured values of the measuring functions integrated in the device are to be recorded.

Patient target groups

MEDUCORE Standard^2 is suitable for use with emergency patients of any age (exception: semi-automatic defibrillation only from 1 year old upwards).

Intended users

Qualified medical personnel

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Contra-indications

- Defibrillation may not be carried out on patients with a body temperature < 27 °C.
- Defibrillation may not be carried out on patients suffering ventricular tachycardia with a pulse.
- Cardioversion may not be carried out on patients who have overdosed on digitalis.

2.2 Intended areas of application

- Mobile use in emergency medicine or primary care in emergency response
- Transport between hospital rooms and departments
- Transport between hospitals and other premises by ambulance, aircraft, helicopter or ship

2.3 Possible side effects/complications

- Electrostimulation may cause burns, skin irritation and arrhythmias.
- Electrostimulation may damage implanted medical devices or those connected to the patient externally.

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2.4 Exclusions and limitations of the intended purpose

The device has not been approved for the following applications:

- Operation in hyperbaric chambers
- Operation in conjunction with magnetic resonance imaging machines (MRI, MRT, NMR)
- Operation in conjunction with high-frequency electrosurgical equipment
- Electrostimulation in an electrically conductive and damp surroundings
- Electrostimulation in an oxygen-enriched atmosphere with simultaneous presence of combustible materials
- Electrostimulation in an atmosphere with flammable gases

2.5 Requirements on the user

The user must meet the following requirements:

- The user is medically trained and has the necessary technical knowledge and experience in the emergency medical treatment of patients.
- On the basis of this technical knowledge and experience, the user is in a position to perform the tasks assigned to him or her safely, and independently to recognize, assess and avoid potential risks to him or herself, to the patient or to bystanders.
- The user has been trained and has received instruction in the use of the device.
- The user is trained in extended measures to treat emergency patients and is able to use manual mode, cardioversion and interpretation of 12-lead ECGs as a function of the options purchased.

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2.6 Safety information

2.6.1 Qualification

Warning **Risk of injury due to lack of knowledge and failure to follow guidelines!**

Use of the device by users without medical qualifications and training in defibrillation/cardioversion and/or the failure to follow guidelines may result in injury to the patient, user or bystanders.

⇒ Only use the device if the user meets the requirements on the user (see "2.5 Requirements on the user", page 13).

⇒ Only use the device if the user is familiar with defibrillation/ cardioversion and the operation of the device.

⇒ Only use the device if the user is familiar with the enabled options.

⇒ Follow currently applicable guidelines on defibrillation/ cardioversion.

⇒ Observe national and regional provisions on defibrillation/ cardioversion.

⇒ Observe organizational guidelines on defibrillation/ cardioversion.

⇒ Include the patient condition when deciding on treatment.

2.6.2 How to use the device

Warning **Risk of injury if the device, components, and accessories are used in damp or electrically conductive surroundings!**

Using the device, components, and accessories in damp or electrically conductive surroundings may result in an electric shock and injure the patient, user, and bystanders.

⇒ Only connect the device, components, and accessories in dry surroundings.

⇒ Only use the device, components, and accessories in surroundings that are not electrically conductive.

⇒ Keep conductive parts of the electrodes and plug connections away from other conductive parts and the ground.

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Risk of injury due to ingress of liquids!

The device is only protected from water jets according to IP55 when the battery is inserted, the water jet protection for the SD card slot is closed, the cables and the NIBP connecting tube including NIBP cuff are connected. Ingress of liquids and dust may damage the device, components, and accessories.

⇒ Do not immerse the device, components, and accessories in liquids.

⇒ Only operate the device with the battery inserted.

⇒ Always close the water jet protection of the SD card slot.

⇒ Always leave cables connected.

⇒ Leave the NIBP connecting tube including NIBP cuff connected during use.

Risk of injury from malfunctions of the device, the components, and the accessories!

A damaged device, damaged components or damaged accessories may injure the patient, user, and bystanders.

⇒ Only operate the device, components, and accessories if they have no external damage.

⇒ Only operate the device, components, and accessories if the function check has been passed.

⇒ Do not leave the device and patient unsupervised.

⇒ In the event of device failure during resuscitation: Carry out cardiopulmonary resuscitation in accordance with currently applicable guidelines and obtain a replacement device.

⇒ In the event of device failure during a monitoring session: Monitor patient by monitoring breathing and taking pulse and obtain a replacement device if required.

Risk of injury due to device being inaccessible or alarm being hidden!

An inaccessible device or hidden alarm (alarm light, loudspeaker and display) mean that the user may not notice alarms and consequently react belatedly to hazardous situations. This may delay therapy and injure the patient.

⇒ Keep the device accessible at all times.

⇒ Always keep the alarm (alarm light, loudspeaker and display) clear.

⇒ Do not operate the device in a closed bag if this conceals the alarms.

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Risk of injury due to alarm limits which are too high or too low!

Alarm limits which are either too high or too low may prevent the device triggering an alarm, thereby putting the patient at risk.

⇒ Always set alarm limits which have been adapted to the patient.

Risk of injury due to incorrectly set parameters or too few/too many enabled functions in the operator menu!

Incorrectly set parameters or too few/too many enabled functions in the operator menu may result in incorrect settings in the user menu or too limited/too extensive device functions. This may cause critical operating situations and injure the patient.

⇒ The operator menu should only be used by operators familiar with the settings in the operator menu and their impact on the user menu and device functions. Otherwise use the device with factory settings.

⇒ Adapt the device functions to the user's know-how.

⇒ Protect the operator menu with a secure access code (at least one letter and one number).

Risk of injury from incorrectly secured access to functions!

Too simple an access code gives the user access to functions with which he or she is not familiar or in which he or she is not trained. This may cause the patient or the user serious or life-threatening injury.

⇒ Protect functions with a secure access code (at least one letter and one number).

Risk of injury from operating the device, accessories, and components outside the prescribed ambient conditions!

Use of the device, accessories, and components outside the specified ambient conditions may lead to incorrect results to the extent that the device fails, injuring the patient.

⇒ Only operate the device within the prescribed ambient conditions (see "18 Technical data", page 367).

⇒ Allow the device, components, and accessories to acclimatize to operating temperature.

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Disrupted and failed therapy due to incorrect use of disposables!

Reusing and reprocessing disposables might induce unpredictable reactions as a result of aging, embrittlement, wear, thermal stress, and chemical action. This may put the functionality and safety of the device at risk, and cause the patient and user serious or life-threatening injury.

⇒ Do not reuse disposables.

⇒ Do not subject disposables to hygienic reprocessing.

Risk of injury from using third-party accessories!

Accessories which have not been approved by WEINMANN Emergency may result in explosions, electric shocks, incorrect monitoring, impaired functions and a negative impact on interference immunity and interference emission or lead to material damage and injure the patient.

⇒ Only use accessories which have been approved by WEINMANN Emergency (see "17.2 Accessories and other parts", page 360).

Delay in treatment due to overly loud audio output!

When the defibrillator is used in conjunction with devices with audio output (e.g. alarm tones, voice prompts), overly loud audio output from one device may drown out audio output from the other device and thus delay treatment.

⇒ When using multiple devices with audio output at the same time, set the volume on the devices to the same level.

Risk of injury and treatment delay due to imperceptible alarm signals!

Alarm signals which are quieter than the ambient noise level prevent alarm situations from being detected. This may result in delayed treatment and thus in injury to the patient.

⇒ Always set device volume to be louder than ambient noise level.

⇒ Do not stack devices.

Therapy at risk due to inadequate patient monitoring!

If the patient and the device are not observed and monitored during therapy, delayed response by medical personnel to alarms and faults may result in severe or life-threatening injury to the patient and incorrect therapy.

⇒ Continuously observe and monitor the patient and device during therapy.

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Disrupted or failed therapy due to modifications to the design of the device or accessories!
Modifications to the design of the device may result in disrupted or failed therapy. This may cause serious or life-threatening injury to the patient.
⇒ Do not make any modifications to the design of the device, components or accessories.

Risk of injury and delayed treatment from connecting the device, the components, and the accessories to several patients!
Connecting the device to several patients simultaneously may lead to measured values and shock delivery being incorrectly assigned. This may injure the patient.
⇒ Only connect the device, components, and accessories to one patient.

2.6.3 Power information

Danger **Risk of injury due to electric shock when the device is opened!**
The device contains a shock capacitor. Opening the device leads to severe injuries or death from electric shock.
⇒ Do not open the device.
⇒ The device should only be opened by WEINMANN Emergency or by technicians authorized by WEINMANN Emergency.
⇒ Measures such as repairs and maintenance should only be carried out by the manufacturer or by a technician expressly authorized by it.

Warning **Risk of injury due to electric shock when connecting an incorrect power supply unit and charger to line power!**
The power supply unit and charger contains a safety device to prevent electric shock. The use of an unsuitable power supply unit and charger may result in injury to the user.
⇒ Only operate the device on line power using the power supply unit and charger recommended by WEINMANN Emergency.

Risk of injury due to missing, discharged or defective battery!
A missing, discharged or defective battery impedes the therapy functions.
⇒ Carry out a function check before each use in order to check the battery.
⇒ Always have a charged, ready-to-use spare battery on hand.

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No therapy due to extended storage of the battery without recharging!

Storing the battery for an extended period of time without recharging may result in the rapid shutdown of and irreparable damage to the battery.

⇒ When the battery is stored in the device without a power supply: Charge battery every 3 months (see "15.2 Storing the battery", page 355).

⇒ If the battery is not stored in the device: Charge batteries with serial numbers < 20,000 every 5 months and batteries with serial numbers ≥ 20,000 every 9 months (see "15.2 Storing the battery", page 355).

Risk of injury from damaged power supply unit and charger!

When used in emergency vehicles, the power supply unit and charger may be damaged and fail to charge the battery properly. This may injure the patient.

⇒ Do not use the power supply unit and charger in emergency vehicles.

⇒ Use the power supply unit and charger only in indoor spaces.

⇒ Observe the technical data for the power supply unit and charger (see "18.6 Power supply unit and charger", page 371).

Disrupted or failed therapy due to removal of the battery during shock delivery!

Removing the battery during shock delivery may cause damage to the device and thus put therapy at risk.

⇒ Always leave the battery in the device while the device is delivering a shock.

Risk of injury due to inaccessible power plug!

An obstructed power plug cannot be pulled out in an emergency and may thus result in injury.

⇒ Keep the power plug and line power accessible at all times.

Risk of injury due to using the charging station in damp or electrically conductive surroundings!

Using the charging station in damp or electrically conductive surroundings or outside indoor areas may lead to electric shock and injure the user.

⇒ Only use the charging station in dry surroundings.

⇒ Only use the charging station in surroundings that are not electrically conductive.

⇒ Protect the charging station from ingress of liquids.

⇒ Only use the charging station indoors.

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Impaired readiness for use as a result of a defective power cord or defective power supply unit and charger!

A defective power cord or a defective power supply unit and charger prevent the battery charging in the charging station and thus the readiness of devices operated with the battery.

⇒ Check the power cord and the power supply unit and charger regularly.

Risk of injury from electric shock!

The contacts in the battery compartment of the charging station are live. Touching the contacts may lead to electric shock and injure the user.

⇒ Do not touch the contacts in the battery compartment of the charging station.

Caution **Risk of injury from touching the contacts in the battery compartment and the patient at the same time!**

The contacts in the battery compartment are live. Touching the contacts and the patient at the same time may injure the user or the patient.

⇒ Only operate the device with the battery inserted.

Risk of injury due to trailing power cord!

Trailing power cords are a trip hazard, which may hinder operation and cause injuries.

⇒ During operation with line power, position the power cord so that it does not present a hindrance.

⇒ During 12 V operation, position the power cord so that it does not present a hindrance.

Risk of injury as a result of falsified measurement results when the line filter is not set correctly!

An incorrectly set line filter may falsify the measurement results of the ECG and lead to misinterpretations. This may injure the patient.

⇒ Adapt the line filter to suit the regional power supply network.

⇒ When assessing the ECG, take account of an activated line filter.

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2.6.4 Defibrillation/cardioversion

Warning **Risk of injury due to sparks during defibrillation/cardioversion in combination with oxygen/flammable gases and combustible materials!**

During defibrillation/cardioversion in an oxygen-enriched atmosphere/an atmosphere containing flammable gases and in the presence of combustible materials (e.g. textiles), sparks generated by defibrillation/cardioversion may cause explosion and fire which may injure the patient, user or bystanders.

⇒ When treating patients with oxygen masks, nasal tubes or nasal cannulas: Switch off the oxygen supply or place the inhalation points at least 1 meter away from the patient during defibrillation, and ensure that the flow of the oxygen/air mixture can escape away from the torso.

⇒ When treating patients with a bag-valve mask: Leave the bag-valve mask securely in place on the patient tube or place it at least 1 meter away from the patient, and ensure that the flow of the oxygen/air mixture can escape away from the torso.

⇒ When connecting patients to a ventilator: Ensure that the flow of the oxygen/air mixture coming from the exhalation valve can escape away from the torso.

⇒ When carrying out defibrillation/cardioversion in cramped spaces with an oxygen-enriched atmosphere, ensure that there is adequate ventilation.

Risk of injury due to missing battery!

Operation with line power without a battery prevents the device being fully ready for use as the shock capacitor in the device cannot charge. This prevents shock delivery and delays treatment.

⇒ Only operate the device with the battery inserted.

Risk of injury due to unsuitable AED analysis algorithm in children below one year of age!

The device's AED analysis algorithm is not designed for children below one year of age and may result in injury to the child.

⇒ Do not use AED mode on children below one year of age.

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Risk of injury during resuscitation due to incorrect settings in the operator menu!

Incorrect settings in the operator menu may result in undesirable effects during resuscitation as well as injure the patient.

⇒ Only allow persons with specialist knowledge of the latest resuscitation recommendations to make settings in the operator menu.

⇒ If you are unaware of the most recent recommendations for resuscitation: Use the factory settings.

Delay in treatment due to movement artifacts during ECG analysis!

Movement artifacts may falsify the ECG analysis in AED mode and the ECG in manual mode. They may result in the user or the device interpreting the ECG incorrectly, delaying treatment.

During cardiac rhythm analysis:

⇒ Keep the patient still.

⇒ Stand clear of the patient.

⇒ Do not carry out chest compressions.

⇒ Do not ventilate the patient.

⇒ Do not transport the patient.

Risk of injury and delay in treatment due to incorrectly attached defibrillation electrodes!

Incorrectly attached defibrillation electrodes may falsify the ECG and result in the user triggering an unnecessary shock, not triggering a necessary shock or in unsuccessful defibrillation due to incorrect interpretation of an ECG.

⇒ Attach the defibrillation electrodes correctly as per the instructions for use.

⇒ Always place defibrillation electrodes together on only one person.

⇒ Prevent contact with the defibrillation electrodes.

⇒ Keep the defibrillation electrodes away from other electrodes and parts in contact with the patient.

Risk of injury due to air/moisture between defibrillation electrodes and the patient's skin!

Air (e.g. in the case of hirsute patients) or moisture between the defibrillation electrodes and the patient's skin prevent correct shock delivery and may result in burns to the skin and unsuccessful defibrillation/cardioversion.

⇒ Remove hair from hirsute patients.

⇒ Rub the patient's skin dry.

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⇒ Wipe down oily skin with an alcohol pad.
⇒ Press the defibrillation electrodes on firmly.

Risk of injury due to air/moisture between the paddles and the patient's skin!

Air (e.g. in the case of hirsute patients) or moisture between the paddles and the patient's skin prevent correct shock delivery and may result in burns to the skin and unsuccessful defibrillation/ cardioversion.

⇒ Remove hair from hirsute patients.
⇒ Rub the patient's skin dry.
⇒ Wipe down oily skin with an alcohol pad.
⇒ Always use electrode gel with paddles.
⇒ Always press paddles on firmly with a contact pressure of about 8 kg.

Risk of injury due to non-functional defibrillation electrodes!

Non-functional defibrillation electrodes may result in injury and in unsuccessful defibrillation/cardioversion.

⇒ Only use defibrillation electrodes with undamaged packaging.
⇒ Do not use defibrillation electrodes with a dried-on layer of gel, damage or detached protective film.
⇒ Replace damaged defibrillation electrodes.
⇒ Observe the expiry date of the defibrillation electrodes and, if necessary, replace the defibrillation electrodes.
⇒ Dispose of defibrillation electrodes after use and do not reuse them.
⇒ Only use defibrillation electrodes approved by WEINMANN Emergency for the device.

Risk of injury due to incorrect handling of electrode gel!

Incorrect handling of electrode gel may lead to electric shock, to ineffective shock delivery, and to burns, injuring the patient, user, and bystanders.

⇒ Always use electrode gel with paddles.
⇒ Do not allow any electrode gel to get between the surface of the electrode and the handle in order to prevent electric shock.
⇒ Do not use too much electrode gel to prevent a gel bridge and thus burns on the chest.
⇒ Do not use too little electrode gel to keep the resistance to the patient low for effective shock delivery and to prevent burns on the chest.

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Risk of injury and delay in treatment due to implanted cardiac pacemakers!

Pulses from implanted cardiac pacemakers may affect the detection of cardiac rhythms which can be defibrillated, delaying treatment. Carrying out defibrillation on patients with implanted cardiac pacemakers may irreversibly damage the myocardium.

⇒ Position defibrillation electrodes at least 8 cm away from cardiac pacemakers.

⇒ Consider alternative positions (e.g. anterior-lateral, anterior-posterior) for the defibrillation electrodes.

Risk of injury due to shock being delivered at the wrong time during cardioversion!

A cardioversion carried out at the wrong time may lead to cardiac arrhythmias and cause the patient severe or life-threatening injury.

⇒ Check whether the ECG is stable.

⇒ Check whether the device is detecting and marking R waves correctly in the ECG.

Risk of injury due to ECG misinterpretation if ECG is derived from the defibrillation electrodes!

If the ECG is derived from the defibrillation electrodes, the device shows a non-diagnostic ECG curve. This ECG curve is designed to detect shockable cardiac rhythms and is not suitable for differential diagnosis. This may result in ECG misinterpretation, and thus in injury to the patient.

⇒ Do not use ECGs derived from defibrillation electrodes for differential diagnosis.

Failure of therapy due to defibrillation electrodes accidentally coming loose during shock delivery!

Defibrillation electrodes accidentally coming loose during shock delivery may lead to damage to the device and thus to the failure of treatment. This may injure the patient.

⇒ Ensure that the defibrillation electrodes are always connected to the device during shock delivery.

Malfunction or failure of other electrical devices due to delivery of shock energy!

Charging and then delivery of shock energy may impair the function of other electrical devices or damage devices connected to the patient or located in the vicinity of the defibrillator. This may injure the patient.

⇒ Disconnect from the patient any electrical devices without defibrillation protection.

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⇒ After using the defibrillator, check the function of electrical devices in its vicinity.
⇒ Maintain separation distances between the defibrillator and portable and mobile high-frequency communications devices.

Caution **Delay in treatment due to simultaneous voice prompts from defibrillator and ventilator!**

If the defibrillator in AED mode is used in conjunction with a ventilator (MEDUMAT Easy CPR) which also guides the user through CPR by means of voice prompts, the simultaneous voice prompts from the defibrillator and ventilator may confuse the user and delay treatment.

⇒ When using the defibrillator in AED mode and a ventilator at the same time: Switch off the ventilator voice prompts.

Risk of injury due to incorrectly selected size of defibrillation electrodes!

If the wrong size of defibrillation electrodes is selected, this may result in sub-optimal defibrillation results or in burns.

⇒ Select the correct size of defibrillation electrodes in line with currently applicable guidelines and not based on the weight specifications given on the packaging.

2.6.5 Pulse oximetry monitoring

Warning **Risk of injury due to incorrect use of the pulse oximetry sensor!**

Incorrect use of the pulse oximetry sensor may falsify measurement results and lead to patient injury.

⇒ Keep the pulse oximetry sensor away from strong electromagnetic sources (e.g. electrosurgical devices).
⇒ Do not use the pulse oximetry sensor in areas subject to X-ray (e.g. with MRI devices).
⇒ Keep the pulse oximetry sensor away from strong and fluctuating ambient light (including infrared and UV light). If necessary: Cover the pulse oximetry sensor.
⇒ Avoid strong movement of the pulse oximetry sensor. If necessary: To relieve strain, loop the pulse oximetry sensor cable and the pulse oximetry sensor connecting cable and fix to the patient with a plaster.
⇒ Do not attach the pulse oximetry sensor to a limb on which there is already an NIBP cuff or catheter port.

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⇒ Keep the pulse oximetry sensor away from nail polish and artificial fingernails.
⇒ Keep the pulse oximetry sensor away from intravascular dyes.
⇒ Be aware of deviations from the measurement result with a high proportion of dysfunctional hemoglobins.
⇒ Be aware of deviations from the measurement result in the case of severe anemia, venous pulsation and high total bilirubin values.
⇒ Be aware of deviations in pulse rate with an intra-aortic balloon pump or certain arrhythmias.
If necessary: Compare the pulse rate with the heart rate determined by ECG monitoring.
⇒ Be aware of deviations from the measurement result during defibrillation/cardioversion.
⇒ Only use undamaged pulse oximetry sensors.
⇒ Only use the pulse oximetry sensors and pulse oximetry sensor connecting cables quoted in the scope of supply and in the accessories.

Risk of injury from unsuitable pulse oximetry monitoring in children with a body weight of less than 10 kg!

The device's pulse oximetry monitoring is not designed for children with a body weight of less than 10 kg and may result in injury to the child.
⇒ Do not use pulse oximetry monitoring in children with a body weight of less than 10 kg.

2.6.6 6-lead ECG monitoring/12-lead ECG recording and assessment

Warning **Risk of injury from incorrect, expired or damaged ECG electrodes!**

Incorrect, expired or damaged ECG electrodes impair the quality of the ECG signal and falsify measurement results. This may injure the patient.
⇒ Use ECG electrodes approved by WEINMANN Emergency. If this is not possible: Only use ECG electrodes which satisfy all of the points listed here.
⇒ Only use AAMI EC 12-certified ECG electrodes.
⇒ Only use high-quality ECG electrodes.
⇒ Observe the expiry date of the ECG electrodes and, if necessary, replace the ECG electrodes.

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⇒ Only use ECG electrodes with undamaged packaging.
⇒ Do not use ECG electrodes with a dried-out layer of gel layer, damage or detached protective film.
⇒ Do not remove ECG electrodes from the packaging until immediately before the session.
⇒ Replace ECG electrodes damaged during the session.
⇒ Do not use ECG electrodes for defibrillation/cardioversion.
⇒ Dispose of ECG electrodes after use and do not reuse them.

Risk of injury from using the 6-lead ECG for differential diagnosis!

The ECG curve of the 6-lead ECG is not suitable for differential diagnosis (e.g. diagnosis of cardiac infarction). This may result in ECG misinterpretation, and thus in injury to the patient.
⇒ Do not use the 6-lead ECG for differential diagnosis.
⇒ For differential diagnosis, use the 12-lead ECG option of the device or use a different 12-lead ECG device.

Risk of injury and delay in treatment due to implanted cardiac pacemakers!

In the case of patients with cardiac pacemakers, the device detects the pacemaker pulses and suppresses the heart rate display and heart rate alarms. This may result in injury to the patient.
⇒ Monitor patients with pacemakers very closely.

Risk of injury and delay in treatment due to implanted cardiac pacemakers!

On patients with cardiac pacemakers, heart rate displays may count pacemaker pulses during a cardiac arrest or in the case of some cardiac arrhythmias. This may result in injury to the patient.
⇒ Do not rely entirely on the device's alarm signals.
⇒ Monitor patients with pacemakers very closely.
⇒ See information on suppressing pacemaker pulses (see "18.10 6-lead ECG monitoring/12-lead ECG recording and assessment", page 375).

Risk of injury due to ECG malfunction in the vicinity of electrosurgical devices!

ECG functions may be affected by electrosurgical devices and result in injury to the patient.
⇒ Only use approved ECG cables.

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Risk of injury due to delayed delivery!

The user can deliver a 12-lead ECG to a teleconsultation service for further diagnosis. Delivering a 12-lead ECG is purely to obtain a second opinion, and does not replace adequately trained specialists at the session location. Specialist staff at the session location are responsible for treatment within the scope of their training and in accordance with the specifications of the operator. If the 12-lead ECG reaches the teleconsultation service very late or not at all for technical reasons, delayed treatment may result in a potentially life-threatening situation. The operator is responsible for ensuring that the necessary configuration for 12-lead ECG delivery has been carried out correctly.

⇒ When configuring e-mail delivery 12-lead ECG: Test e-mail delivery.

⇒ If the IT infrastructure permits it: Configure several networks for various devices or session locations so that if one network is unavailable, it is possible to select another network.

⇒ Check the configuration of the networks at regular intervals and update them if necessary.

⇒ Ensure that the e-mail addresses are correct and complete.

⇒ Check e-mail addresses at regular intervals and update them if necessary.

Caution **Risk of injury from burns during defibrillation/cardioversion!**

ECG cables without defibrillation protection may result in injury to the patient.

⇒ Only use approved ECG cables.

Therapy put at risk by incorrectly set low-pass filter for the 12-lead ECG!

An incorrectly set low-pass filter may lead to incorrect assessment of the 12-lead ECG and injure the patient.

⇒ Select a suitable low-pass filter (50 Hz or 150 Hz).

⇒ When assessing the 12-lead ECG, take account of an activated low-pass filter.

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2.6.7 Non-invasive blood pressure measurement (NIBP monitoring)

Caution **Risk of injury if NIBP cuff selected or put on incorrectly!**

An NIBP cuff selected or put on incorrectly may interrupt the blood supply or falsify measurement results due to excessive contact pressure. This may result in injury to the patient.

⇒ Always use the NIBP cuff best suited to the patient's limb. Selecting the right NIBP cuff is the key to ensuring a good-quality measured value.

⇒ Attach the NIBP cuff level with the heart.

⇒ Attach the NIBP cuff so that the blood supply is not stopped.

⇒ Avoid moving the NIBP cuff during NIBP measurement.

⇒ When NIBP measurement is for an extended period: Check the position of the NIBP cuff regularly and, if necessary, reposition the NIBP cuff.

⇒ Repeat the NIBP measurement if measurement results are implausible. If the repeat measurement is still implausible, select an alternative method.

⇒ Do not bend or crush the NIBP cuff tube or the NIBP connecting tube.

⇒ Do not attach the NIBP cuff to a limb with poor circulation.

⇒ Do not attach the NIBP cuff to a limb with an intravenous infusion.

⇒ Do not attach the NIBP cuff to a limb on which there is already a pulse oximetry sensor or another monitoring device.

⇒ Do not attach the NIBP cuff to a limb with a shunt.

⇒ Do not attach the NIBP cuff to a limb with open wounds or burns.

⇒ In the case of patients who have undergone a mastectomy, do not attach the NIBP cuff to the affected side. In the case of patients who have undergone double mastectomies, attach the NIBP cuff to the non-dominant arm.

⇒ Only use an undamaged NIBP cuff.

⇒ Only use the NIBP cuffs and NIBP connecting tubes quoted in the scope of supply and in the accessories.

⇒ Follow the instructions for use of the NIBP cuff.

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Risk of injury from falsified measured values during non-invasive blood pressure measurement!

Cardiac rhythm disorders, arteriosclerosis, reduced perfusion, diabetes, pregnancy, pre-eclampsia, arrhythmias (in newborns up to 28 days), kidney problems, shaking, shivering or the use of a cardiac pacemaker may impair the ability of the non-invasive blood pressure measuring module to record correct measured values. Evidence of the safety and efficacy of non-invasive blood pressure measurement has not been obtained for patient groups with these characteristics. This may injure the patient.

⇒ Include the status of these patient groups when evaluating the measured values of non-invasive blood pressure measurement.

⇒ Only use non-invasive blood pressure measurement on patient groups for whom evidence of the safety and efficacy of non-invasive blood pressure measurement has been provided.

Risk of injury from overly frequent measurements!

Overly frequent measurements may lead to circulation problems and patient injury.

⇒ Select the measurement intervals to guarantee sufficient perfusion.

⇒ With extended NIBP measurements, check the position of the NIBP cuff regularly and, if necessary, reposition it.

2.6.8 Printing

Warning **Risk of injury due to electric shock when the printer is touched!**

The printer's USB port is intended only for service purposes. A connection between the printer and another device via the USB port may lead to an electric shock if the printer is touched. This may injure the patient or the user.

⇒ Do not connect the printer to another device via the USB port.

⇒ Only use the USB port for service purposes.

Risk of injury from electric shock when charging the printer battery in the printer!

If the power supply unit and charger is defective, charging the printer battery in the printer may lead to an electric shock if the printer is touched. This may injure the patient or the user.

⇒ Only charge the printer battery in the charging station for the printer battery or the quadruple charging station for the printer battery.

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⇒ Only use the power supply unit and charger for the printer battery for charging the printer battery in the charging station for the printer battery.
⇒ Do not use the power supply unit and charger in the patient's vicinity.

Caution **Malfunction or failure of the printer due to electromagnetic radiation in airplane mode!**
Electromagnetic radiation in airplane mode may lead to special characters appearing in the printout or to failure of the printer.
⇒ Do not use the printer in airplane mode.

Delayed therapy due to unsuitable printer paper!
Unsuitable printer paper may lead to poor print quality on the printout or to paper jams and delay treatment.
⇒ Only use printer paper approved by WEINMANN Emergency. If this is not possible: Only use printer paper which satisfies the specifications listed (see "18.8 Printer and printer paper", page 372).
⇒ Do not used printer paper where the paper is glued to the roll.
⇒ Use printer paper that has an end marking.

Delayed therapy due to incorrect handling of printer paper!
Incorrect handling of the printer paper may lead to poor print quality on the printout and delay treatment.
⇒ To prevent the inks on the printer paper fading, do not use chemicals or oil.
⇒ Do not expose printer paper to significant heat, moisture or sunlight (see "18.8 Printer and printer paper", page 372).
⇒ Keep printer paper away from sharp or hard objects (e.g. fingernails or metal) in order not to scratch the printer paper.
⇒ Store printer paper in a cool, dry, dark place.
⇒ Do not use chemical adhesive.
⇒ Keep printer paper away from plastics which emit vapors.
⇒ Always use clean printer paper.

Malfunction or failure of the printer due to external influences and incorrect use!
The printer may be damaged by external influences and incorrect use.
⇒ Always use the printer in the printer case.
⇒ Do not drop the printer.
⇒ Do not expose the printer to severe shocks.
⇒ Do not expose the printer to direct sunlight or similar conditions.

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⇒ Keep the paper compartment closed during the printing process.
⇒ Switch off the printer when it is not in use.
⇒ Keep the printer away from powerful electromagnetic sources.
⇒ Keep all the openings of the printer closed during printing.
⇒ Only use the products quoted in the cleaning and disinfection plan (see "8.7 Cleaning and disinfection plan", page 240).

2.6.9 Electromag1netic compatibility

Warning **Risk of injury from mutual influence of medical electrical devices!**

Medical electrical devices which are operated directly next to or on top of one other may cause mutual interference to functionality and thus patient injury.
⇒ Do not stack the device with other medical electrical devices.
⇒ Do not operate the device in the direct vicinity of other medical electrical devices (exception: Combinations of devices approved for MEDUCORE Standard^2 on the portable units from WEINMANN Emergency).
⇒ If stacking or operation in the immediate vicinity cannot be avoided: Closely monitor the functioning of all affected medical electrical devices and do not use if functions are disrupted.

Risk of injury from overly powerful high-frequency interference signals or electromagnetic fields!

Overly strong high-frequency interference signals from portable high-frequency communications equipment (e.g. radios) or electromagnetic fields may lead to incorrect analysis, incorrect measurement results, and incorrect alarms, and thus impair the functioning of the device and injure the patient.
⇒ Maintain separation distances (see "18.17 Electromagnetic compatibility (EMC)", page 382).
⇒ With portable high-frequency communications devices, maintain a minimum distance of 30 cm from the device, components, and accessories.

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Delay in treatment due to power supply network disruption!
Disruptions to the power supply network may cause visible disruptions to the ECG. This may lead to incorrect measurement results and alarms and in AED mode, lead to shock delivery at the wrong time. This may delay therapy and injure the patient.
⇒ If there is major disruption to the power supply network, only operate the device with a battery.

2.7 General instructions

- If third-party items are used, functional failures and restricted fitness for use may result. Biocompatibility requirements may also not be met. Please note that in such cases, any warranty claim and liability will be voided if neither the accessories recommended in the instructions for use nor original replacement parts are used. Third-party items may increase radiation output or reduce interference immunity.
- The manufacturer, WEINMANN Emergency, guarantees the compatibility of the device and of all components or accessories connected to the patient prior to the session. Have modifications to the device or accessories (exception: software update) carried out only by the manufacturer, WEINMANN Emergency, or by a technician expressly authorized by it. Do not use any articles from third parties.
- Follow the section on hygienic reprocessing in order to avoid infection or bacterial contamination (see "8 Hygienic reprocessing", page 230).
- As the user, always stay in the immediate vicinity of the device and the patient.
- Risks due to software errors have been minimized by means of extensive qualification measures.
- This device's software contains code which is subject to the General Public License (GPL). We will send you the source code and the GPL on request.

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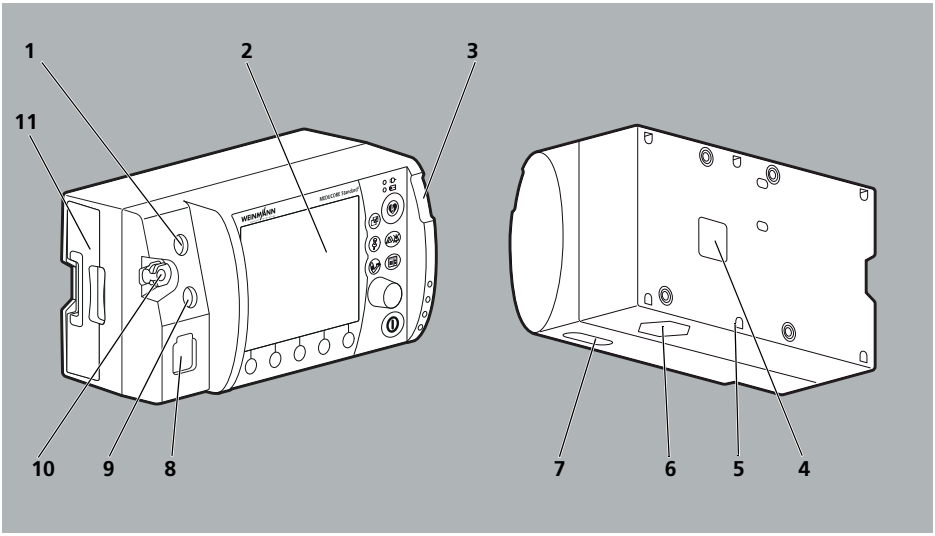
3 Description

3.1 Overview



3-1 Device

No.	Designation	Description
1	ECG connection for ECG cable	Connects the device to an ECG cable.
2	Display	Displays settings and current values (see "3.4 Symbols in the display", page 54).
3	Alarm light	Indicates high-priority alarms visually.
4	Power supply connection	Connects the device to the power supply.
5	Security seal	Indicates whether the device has been opened without authorization.
6	Loudspeaker	Emits audible voice prompts, alarms and heart rate tones/pulse tones.
7	SD card slot	Takes an SD card.

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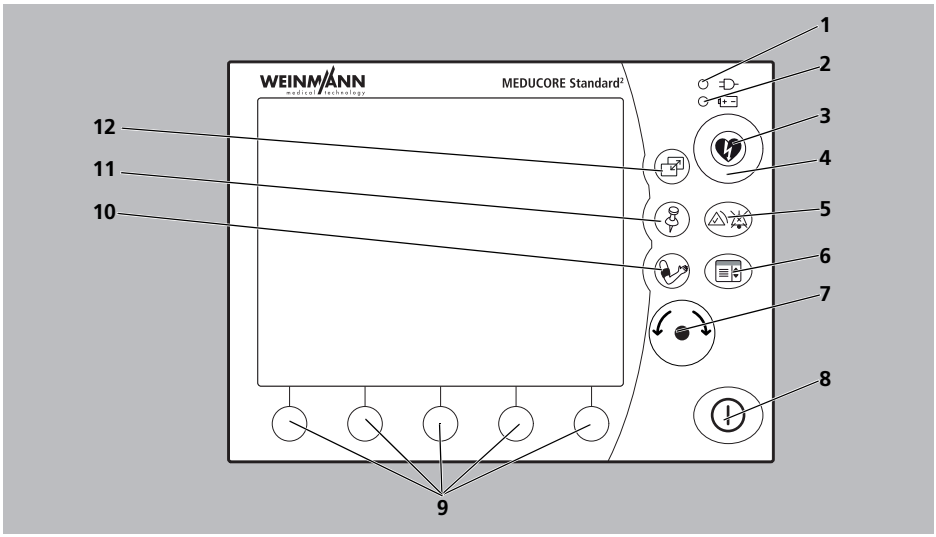
No.	Designation	Description
8	Pad connection for master cable	Connects the device to one of the following components via the master cable: • Defibrillation electrodes • Paddles • Function test resistor
9	SpO_2 port for pulse oximetry sensor connecting cable	Connects the device to a pulse oximetry sensor via the pulse oximetry sensor connecting cable.
10	NIBP connection for NIBP connecting tube	Connects the device to an NIBP cuff via the NIBP connecting tube.
11	Battery compartment with battery	Houses the battery.

3.2 Control panel



3-2 Control panel

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No.	Designation	Description
1	Line power indicator	Indicates that the device is being supplied by line power.
2	Battery status indicator	• Green light on: The battery is full or is not being charged because it is outside charging temperature range. • Green light flashing: The battery is being charged. • Red light on: The battery is defective or not in the device. • No light: The device is not connected to line power.
3	Shock button	Triggers an electric shock for defibrillation/ cardioversion.
4	Shock standby indicator	Red light flashes when the device is ready to deliver a shock.
5	Alarm button	• Pauses audio alarm output for a certain length of time. • Mutes audio alarm output. • Cancels audio alarm output. • Deactivates muting of audio alarm output and alarm cancellation.
6	Menu button	• In the start menu: Provides access to the operator menu. • In a mode: Provides access to the user menu. • In the button function test during the function check: Cancels the button function test.
7	Navigation knob	• Allows values to be selected (turn). • Confirms selected values (press). • In a mode: Provides access to the application menu (press).
8	On/Off button	• With device switched off: Press briefly to switch the device on. • With device switched on: Press and hold to switch the device off.
9	Function buttons	• Provide access to the mode shown in the display. • Activate/deactivate the functions shown in the display.
10	NIBP button	• Activates NIBP function mode (press NIBP button < 2 s). • Starts an NIBP measurement (press NIBP button for > 2 s).

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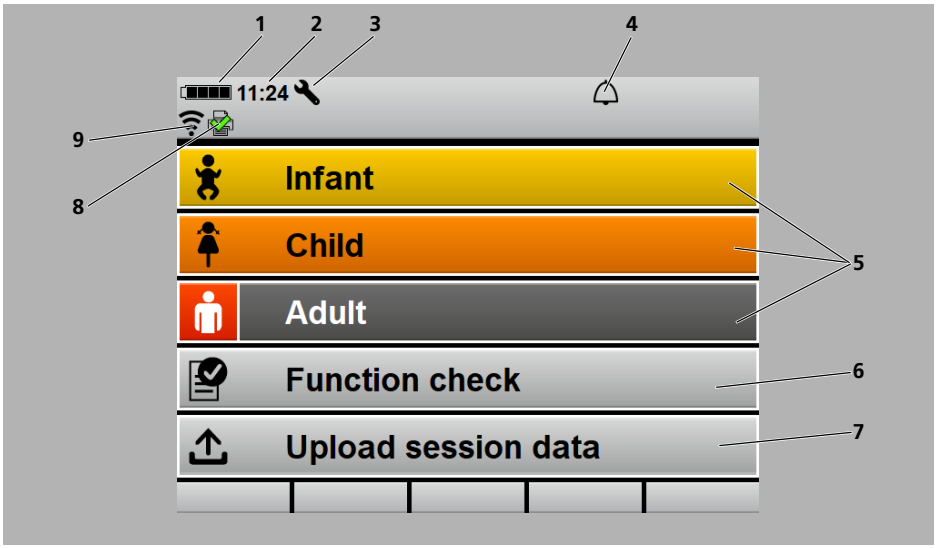
No.	Designation	Description
11	Event button	Opens the events list.
12	View button	Switches between the following views: • Parameter view • Curve view Switches between the following views (only in 12-lead ECG function mode): • 1-curve view • 3-curve view • 6-curve view

3.3 Display

3.3.1 Start menu



3-3 Start menu display

No.	Designation	Description
1	Battery status	Displays the charge level of the battery.
2	Time	Displays the time.
3	Service reminder (if activated)	Displayed when the service interval is ≤ 30 days.

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No.	Designation	Description
4	Alarm indicator	Indicates the status of audio alarm output: • Audio alarm output active • Audio alarm output muted/paused • Audio alarm output canceled
5	Patient groups	Starts the device with the presets specific to the patient groups.
6	Function check	Provides access to the function check.
7	Upload session data (only with Upload session data option)	Allows device session data to be uploaded to WEINMANN Connect.
8	Printer symbol (only with Printing option)	Indicates whether the printer is connected to the device.
9	WiFi symbol	• Indicates whether the default network can be reached. • Displays the signal strength of the WiFi connection: The more bars displayed, the stronger the signal.

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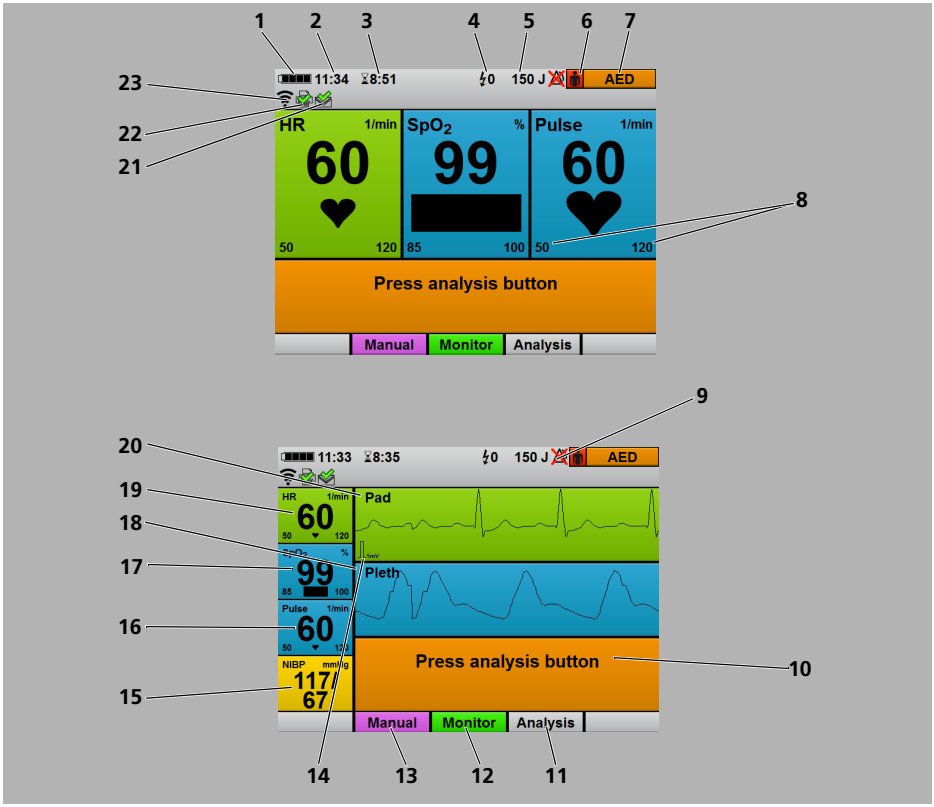
3.3.2 AED mode



3-4 Display in AED mode: Parameter view (top) and curve view (bottom)

No.	Designation	Description
1	Battery status	Displays the charge level of the battery.
2	Time	Displays the time.
3	Session duration	Displays the duration of the current session.
4	Number of shocks delivered	Displays the number of shocks delivered during the current session.
5	Shock energy	Displays the shock energy selected for the next shock.

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No.	Designation	Description
6	Patient group	Displays the selected patient group: • Adult • Child
7	Mode indicator	Indicates the mode currently selected.
8	Alarm limits	Displays the set alarm limits.
9	Alarm off indicator	Indicates whether alarm output is deactivated in AED mode.
10	AED instructions	Give instructions on carrying out CPR.
11	Analysis	• Allows you to start a cardiac rhythm analysis manually. • Only displayed if Start analysis automatically is deactivated in the operator menu (see "13.3 AED settings", page 310).
12	Monitor mode	Provides access to monitor mode.
13	Manual mode (only with Manual defibrillation option)	Provides access to manual mode.
14	ECG calibration mark	Displays the section corresponding to 1 mV of the ECG signal.
15	NIBP	Displays blood pressure.
16	Pulse	Displays pulse rate.
17	SpO_2	Displays oxygen saturation.
18	Center curve field	Displays the plethysmogram.
19	HR	Displays heart rate.
20	Top curve field	Displays the ECG lead (Pad, II).
21	Upload symbol	• Indicates that e-mail delivery 12-lead ECG has been started (only with E-mail delivery 12-lead ECG option). • Indicates whether the last e-mail delivery started was successful (only with E-mail delivery 12-lead ECG option). • Indicates whether the function check has been uploaded to WEINMANN Connect successfully. • Indicates whether the session data have been uploaded to WEINMANN Connect successfully (only with Upload session data option). • Indicates whether the service data have been uploaded to WEINMANN Emergency successfully.
22	Printer symbol (only with Printing option)	Indicates whether the printer is connected to the device.

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No.	Designation	Description
23	WiFi symbol	• Indicates whether the default network can be reached. • Displays the signal strength of the WiFi connection: The more bars displayed, the stronger the signal.

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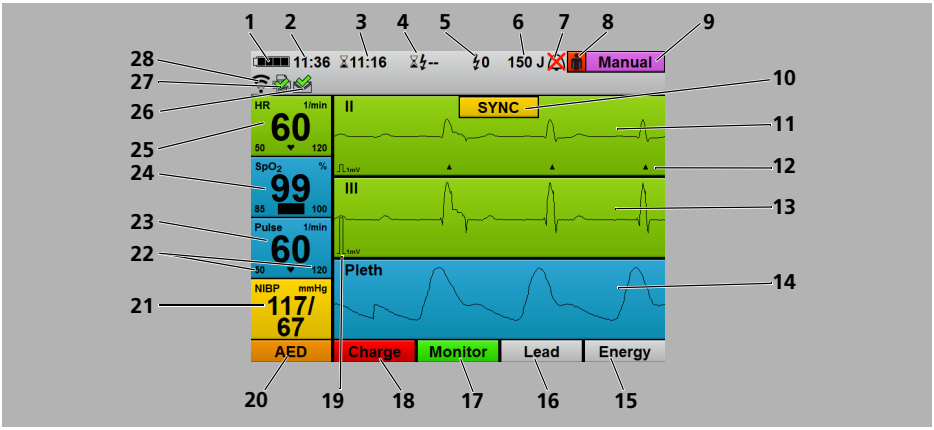
3.3.3 Manual mode (only with Manual defibrillation option)



3-5 Display in manual mode

No.	Designation	Description
1	Battery status	Displays the charge level of the battery.
2	Time	Displays the time.
3	Session duration	Displays the duration of the current session.
4	Operating time since last shock delivery	Displays device operating time since the last shock delivery.
5	Number of shocks delivered	Displays the number of shocks delivered during the current session.
6	Shock energy	Displays the shock energy selected for the next shock.
7	Alarm indicator	Indicates the status of audio alarm output: • Audio alarm output active • Audio alarm output muted/paused • Audio alarm output canceled
8	Patient group	Displays the selected patient group: • Adult • Child • Infant
9	Mode indicator	Indicates the mode currently selected.
10	SYNC (only with Cardioversion option)	Indicates that delivery of the following shock will be synchronized with the R wave.

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No.	Designation	Description
11	Top curve field	Displays the ECG lead via the defibrillation electrodes/ paddles (Pad, II).
12	R wave marking (only with Cardioversion option)	Marks the R waves detected by the device in the ECG if **SYNC** has been activated in the application menu.
13	Center curve field	Displays the selected ECG lead: • I, II, III, aVR, aVL or aVF • V1 to V6 (only with 12-lead ECG extension cable and only with 12-lead ECG option)
14	Bottom curve field	Displays the plethysmogram.
15	Energy	Allows shock energy to be adjusted.
16	ECG lead selection	Allows switching between the ECG leads displayed in the center curve field: • Limb leads acc. to Einthoven (I, II, III) • Limb leads acc. to Goldberger (aVR, aVL, aVF) • Chest wall leads acc. to Wilson (V1 to V6) (only with 12-lead ECG extension cable and only with 12-lead ECG option)
17	Monitor mode	Provides access to monitor mode.
18	Charge	Charges the shock capacitor.
19	ECG calibration mark	Displays the section corresponding to 1 mV of the ECG signal.
20	AED mode	Provides access to AED mode.
21	NIBP	Displays blood pressure.
22	Alarm limits	Displays the set alarm limits.
23	Pulse	Displays pulse rate.
24	SpO_2	Displays oxygen saturation.
25	HR	Displays heart rate.
26	Upload symbol	• Indicates that e-mail delivery 12-lead ECG has been started (only with E-mail delivery 12-lead ECG option). • Indicates whether the last e-mail delivery started was successful (only with E-mail delivery 12-lead ECG option). • Indicates whether the function check has been uploaded to WEINMANN Connect successfully. • Indicates whether the session data have been uploaded to WEINMANN Connect successfully (only with Upload session data option). • Indicates whether the service data have been uploaded to WEINMANN Emergency successfully.

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No.	Designation	Description
27	Printer symbol (only with Printing option)	Indicates whether the printer is connected to the device.
28	WiFi symbol	• Indicates whether the default network can be reached. • Displays the signal strength of the WiFi connection: The more bars displayed, the stronger the signal.

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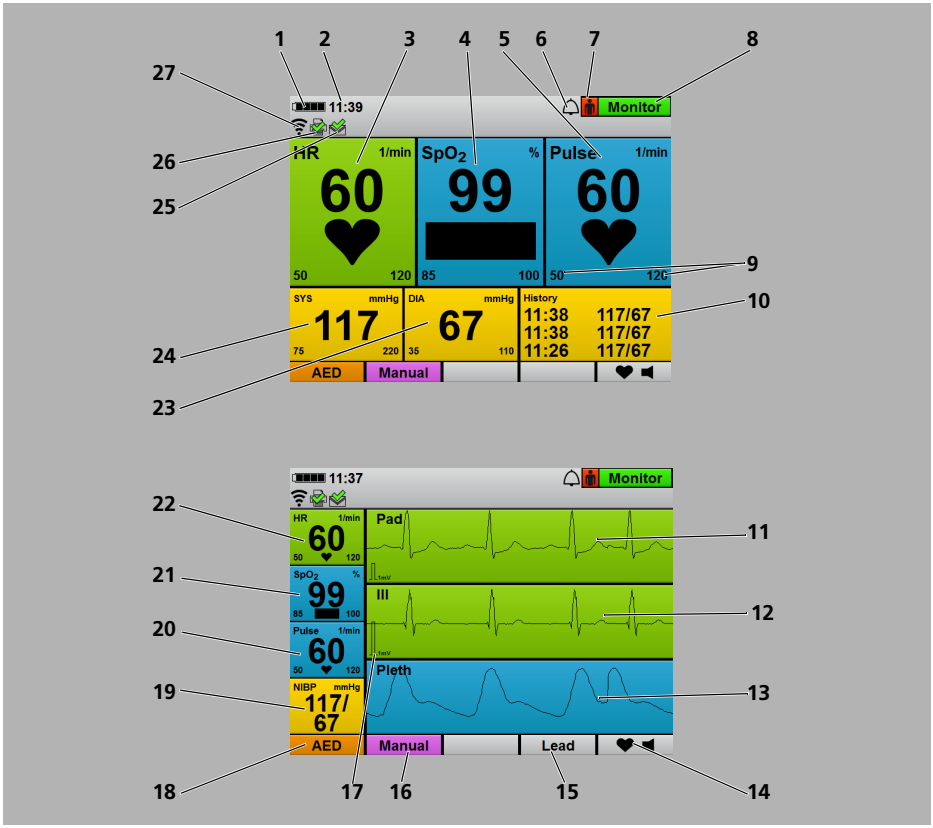
3.3.4 Monitor mode



3-6 Display in monitor mode: Parameter view (top) and curve view (bottom)

No.	Designation	Description
1	Battery status	Displays the charge level of the battery.
2	Time	Displays the time.
3	HR	Displays heart rate.
4	SpO_2	Displays oxygen saturation.
5	Pulse	Displays pulse rate.

No.	Designation	Description
6	Alarm indicator	Indicates the status of audio alarm output: • Audio alarm output active • Audio alarm output muted/paused • Audio alarm output canceled
7	Patient group	Displays the selected patient group: • Adult • Child • Infant
8	Mode indicator	Indicates the mode currently selected.
9	Alarm limits	Displays the set alarm limits.
10	History	Shows the time and values of the last three NIBP measurements.
11	Top curve field	Displays the ECG lead via the defibrillation electrodes/ paddles (Pad, II).
12	Center curve field	Displays the selected ECG lead: • I, II, III, aVR, aVL or aVF • V1 to V6 (only with 12-lead ECG extension cable and only with 12-lead ECG option)
13	Bottom curve field	Displays the plethysmogram.
14	Heart rate tone/pulse tone	Switches the heart rate tone/pulse tone on and off.
15	ECG lead selection	Allows switching between the ECG leads displayed in the center curve field: • Limb leads acc. to Einthoven (I, II, III) • Limb leads acc. to Goldberger (aVR, aVL, aVF) • Chest wall leads acc. to Wilson (V1 to V6) (only with 12-lead ECG extension cable and only with 12-lead ECG option)
16	Manual mode (only with Manual defibrillation option)	Provides access to manual mode.
17	ECG calibration mark	Displays the section corresponding to 1 mV of the ECG signal.
18	AED mode	Provides access to AED mode.
19	NIBP	Displays blood pressure.
20	Pulse	Displays pulse rate.
21	SpO_2	Displays oxygen saturation.
22	HR	Displays heart rate.
23	DIA	Displays the diastolic measured value for an NIBP measurement.
24	SYS	Displays the systolic measured value for an NIBP measurement.

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No.	Designation	Description
25	Upload symbol	• Indicates that e-mail delivery 12-lead ECG has been started (only with E-mail delivery 12-lead ECG option). • Indicates whether the last e-mail delivery started was successful (only with E-mail delivery 12-lead ECG option). • Indicates whether the function check has been uploaded to WEINMANN Connect successfully. • Indicates whether the session data have been uploaded to WEINMANN Connect successfully (only with Upload session data option). • Indicates whether the service data have been uploaded to WEINMANN Emergency successfully.
26	Printer symbol (only with Printing option)	Indicates whether the printer is connected to the device.
27	WiFi symbol	• Indicates whether the default network can be reached. • Displays the signal strength of the WiFi connection: The more bars displayed, the stronger the signal.

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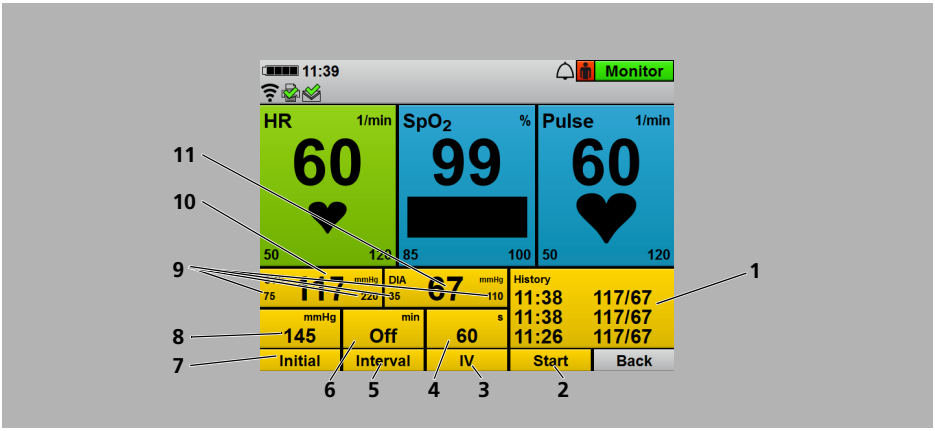
3.3.5 NIBP function mode



3-7 Display in monitor mode with NIBP function mode superimposed

No.	Designation	Description
1	History	Shows the time and values of the last three NIBP measurements.
2	Start/Stop	• Starts or stops an NIBP measurement. • Starts or stops an interval measurement. • Stops venous stasis.
3	IV	Starts venous stasis.
4	Duration of venous stasis	Displays the time for which the NIBP cuff is maintaining venous stasis.
5	Interval	• Specifies whether the NIBP measurement is an individual NIBP measurement or an interval measurement. • Specifies the time between two consecutive NIBP measurements for interval measurement.
6	Interval duration	Displays the time between two consecutive NIBP measurements for interval measurement.
7	Initial	Allows initial NIBP cuff pressure to be changed.
8	Initial cuff pressure	Displays the pressure to which the device will inflate the NIBP cuff at the next NIBP measurement.
9	Alarm limits	Displays the alarm limits for systolic and diastolic measured values.

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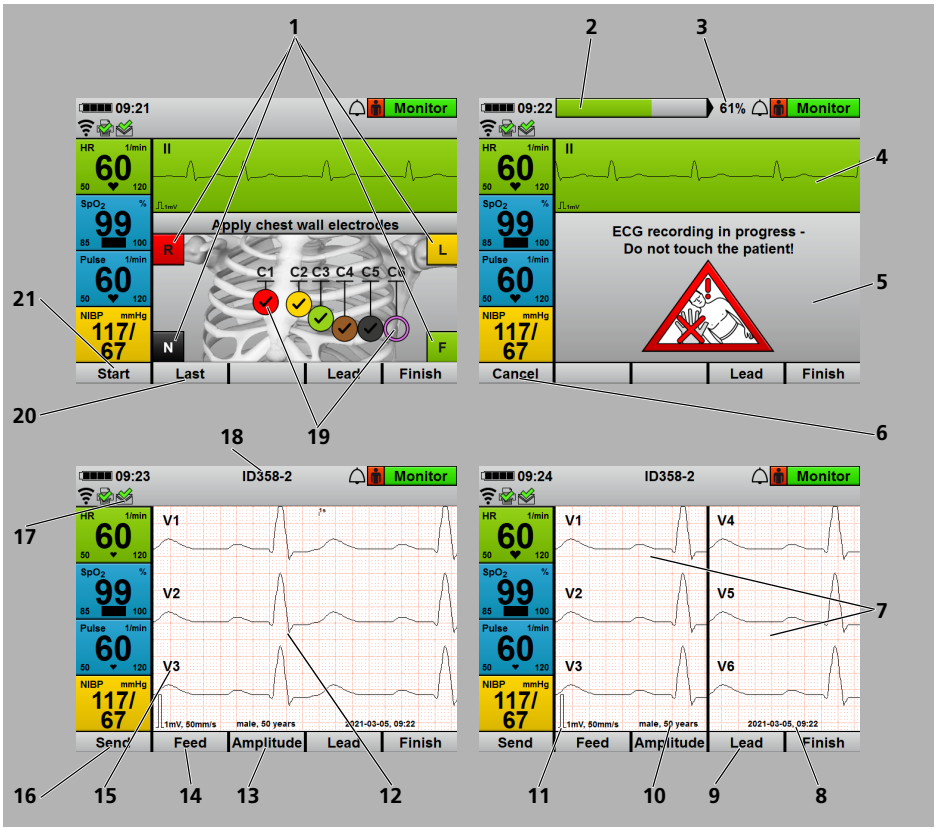
No.	Designation	Description
10	SYS	Displays the systolic measured value for an NIBP measurement.
11	DIA	Displays the diastolic measured value for an NIBP measurement.

3.3.6 12-lead ECG function mode (only with 12-lead ECG option)



3-8 Display in monitor mode with superimposed 12-lead ECG function mode

No.	Designation	Description
1	Limb electrodes	Indicates that the limb electrodes are connected. The names of the limb electrodes change depending on the set electrode marking (ERC or AHA) (see "13.10 12-lead ECG settings (only with 12-lead ECG option)", page 335).
2	Progress display	Indicates how far the 12-lead ECG has already recorded.
3	Progress display in percent	Indicates how many percent of the 12-lead ECG has already been recorded.
4	Top curve field	Displays the selected ECG lead: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
5	Instruction field	Gives instructions on what to do.
6	Cancel	Cancels a 12-lead ECG recording.
7	6-curve view	Displays 6 ECG leads simultaneously.
8	Date/time	Displays the date and time of the 12-lead ECG recording.
9	ECG lead selection	Allows you to switch between ECG leads: • Limb leads acc. to Einthoven (I, II, III) • Limb leads acc. to Goldberger (aVR, aVL, aVF) • Chest wall leads acc. to Wilson (V1 to V6)
10	Patient data	Display the age and gender of the patient.
11	ECG calibration mark	Displays the section corresponding to 1 mV of the ECG signal.
12	3-curve view	Displays 3 ECG leads simultaneously.
13	Amplitude scaling	Here you can set the amplification of the ECG signal and thus the height of the ECG curve.
14	Feed rate	Here you can set the feed rate of the ECG curve display and so change the time resolution.
15	ECG lead	Displays the selected ECG lead: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
16	E-mail delivery (only with E-mail delivery 12-lead ECG option)	Here you can deliver the 12-lead ECG by e-mail.
17	Upload symbol (only with E-mail delivery 12-lead ECG option)	• Indicates that e-mail delivery 12-lead ECG has been started. • Indicates whether the last e-mail delivery started was successful.
18	Patient ID	Displays the ID of the 12-lead ECG recorded. This ID also appears in the PDF and in the printout and allows the 12-lead ECG to be identified.

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No.	Designation	Description
19	Chest wall electrodes	Indicates whether the chest wall electrodes are connected. The names of the chest wall electrodes change depending on which electrode marking is set (ERC or AHA) (see "13.10 12-lead ECG settings (only with 12-lead ECG option)", page 335). Connected chest wall electrodes are indicated by a check mark.
20	Last 12-lead ECG recording	Here you can call up the last 12-lead ECG of the current session.
21	Start	Starts the 12-lead ECG recording.

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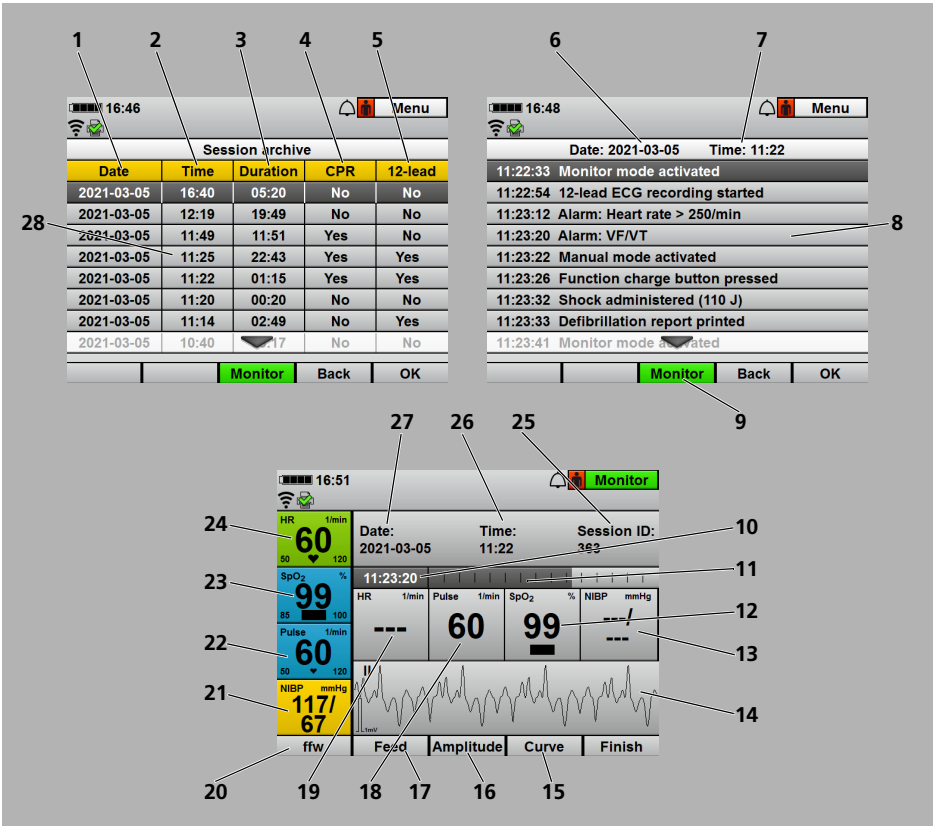
3.3.7 Replay view (only with Replay view option)



3-9 Display in replay view

No.	Designation	Description
1	Date	Displays the date on which the session took place.
2	Time	Displays the time at which the session began.
3	Duration	Displays the duration of the session.
4	CPR	Indicates whether the session involved resuscitation. Resuscitation took place if a shock was delivered or a resuscitation mode (AED mode or manual mode) was activated for > 2 min.
5	12-lead	Indicates whether one or more 12-lead ECGs were recorded during the session.

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No.	Designation	Description
6	Date	Displays the date on which the session took place.
7	Time	Displays the time at which the session began.
8	Events	Displays events during a session.
9	Monitor mode	• Provides access to monitor mode. • Depending on the mode from which the session archive was opened, other function buttons may be possible.
10	Recording point	Displays the exact time at which a momentary recording in an event took place.
11	Scroll bar	Indicates how far time was fast-forwarded within an event.
12	NIBP	Displays blood pressure at the time of recording.
13	SpO_2	Displays oxygen saturation at the time of recording.
14	Bottom curve field	Displays the selected ECG lead or plethysmogram at the time of recording: • I, II, III, aVR, aVL or aVF • ECG lead via the defibrillation electrodes/paddles (Pad, II)
15	Curve	Allows you to select the ECG lead or plethysmogram at the time of recording.
16	Amplitude scaling	Allows you to set the amplification of the ECG signal and thus the height of the ECG curve.
17	Feed rate	Allows you to set the feed rate of the ECG curve display and so change the time resolution.
18	Pulse	Displays pulse rate at the time of recording.
19	HR	Displays heart rate at the time of recording.
20	Scroll speed	Allows you to select the resolution of scrolling.
21	NIBP	Displays current blood pressure.
22	Pulse	Displays current pulse rate.
23	SpO_2	Displays current oxygen saturation.
24	HR	Displays current heart rate.
25	Session ID:	Displays the session ID.
26	Time:	Displays the time at which the session began.
27	Date:	Displays the date on which the session took place.
28	Session archive	Displays a list of all the device sessions.

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3.4 Symbols in the display

Symbol	Designation	Description
	Battery status symbol	Battery status (see "3.5 Battery and battery status indicator", page 57)
	Printer symbol (only with Printing option)	Printer connected
		No printer connected
	Upload symbol: Only displayed if a 12-lead ECG has already been delivered in the current session (only with E-mail delivery 12-lead ECG option) or when data have been uploaded.	• Last e-mail delivery 12-lead ECG successful (only with E-mail delivery 12-lead ECG option) • Function check uploaded to WEINMANN Connect successfully • Session data uploaded to WEINMANN Connect successfully (only with Upload session data option) • Service data uploaded to WEINMANN Emergency successfully
		Symbol moves: • Sending e-mail with 12-lead ECG (only with E-mail delivery 12-lead ECG option) • Uploading data to WEINMANN Connect
		• Last e-mail delivery failed (only with E-mail delivery 12-lead ECG option) • Upload to WEINMANN Connect failed
	WiFi symbol	• Indicates whether the default network can be reached. • Displays the signal strength of the WiFi connection: The more bars displayed, the stronger the signal.
	Airplane mode symbol	Indicates that all wireless connections are switched off.

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Symbol	Designation	Description
	Alarm symbol	Audio alarm output active
		Audio alarm output canceled
		Audio alarm output paused for the time set in the operator menu
		Audio alarm output muted with no time limit
		Alarm output deactivated in AED mode
	Patient group symbol	Infant patient group
		Child patient group
		Adult patient group
	Heart rate tone/pulse tone function button	Heart rate tone/pulse tone on
		Heart rate tone/pulse tone off
	Function check symbols	Displays access to the function check.
		Requirements for function check met
		Requirements for function check not met
		Fault found during function check
		Follow instructions for use
		Service due in ≤ 30 days or service interval exceeded

Symbol	Designation	Description
	Heart symbol	• In the **HR** parameter field: Flashes at the measured heart rate. • In the **Pulse** parameter field: Flashes at the measured pulse rate.
	R wave marking (only with cardioversion option and only in manual mode)	Marks the R waves detected by the device for cardioversion.
	Signal bar	Indicates the signal quality of SpO_2 measurement.
	You may now touch the patient (in AED mode with the **Pictograms in parameter view** menu item activated (see "13.3 AED settings", page 310))	You may now touch the patient
	Stand clear of the patient: • In AED mode with the **Pictograms in parameter view** menu item activated (see "13.3 AED settings", page 310) • In 12-lead ECG function mode (only with 12-lead ECG option)	Stand clear of the patient
	Progress display of 12-lead ECG (only with 12-lead ECG option)	Indicates how far the 12-lead ECG has already recorded.
	Progress display of shock capacitor charging	Indicates how far the shock capacitor has already been charged.
	Symbol for venous stasis	Indicates that venous stasis has been carried out.
	Timeline (only with Replay view option)	Displays the duration of an event in replay view.
	Upload session data (only with Upload session data option)	Displays access to session data upload.

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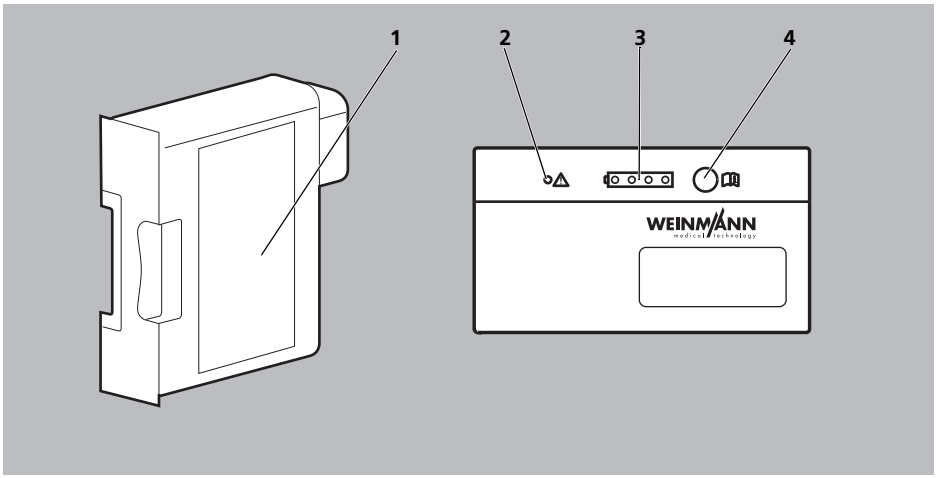
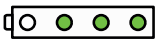
Symbol	Designation	Description
	Service reminder	Service due in ≤ 30 days or service interval exceeded.

3.5 Battery and battery status indicator



3-10 Battery and battery status indicator

No.	Designation	Description
1	Battery	Supplies power to the device.
2	Fault indicator (red)	On if the battery is defective.
3	Status LEDs (green)	Indicate battery status.
4	Status button	Activated by pressing the status LEDs.

Status indicator on the battery	Status indicator on the device display	Meaning
		Battery status > 90 %
		Battery status approx. 60 % - 90 %
		Battery status approx. 40 % - 60 %

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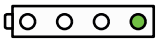
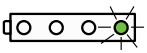
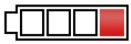
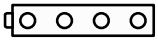
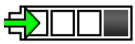
Status indicator on the battery	Status indicator on the device display	Meaning
		Battery status approx. 10 % - 40 %
		Battery status < 10 % In the display: • The last remaining segment in the battery status symbol is red. • **Battery weak** appears in the display. • In AED mode, the device outputs: *Battery weak*.
		Battery is deeply discharged. Charge battery in the device for 24 h. After 24 hours: • Green LED is on: Battery fully charged and ready for use • Red LED or no LED on: Battery defective. Replace battery.
		Battery is empty **Battery empty** appears in the display and in AED mode, the device outputs: *Battery empty*. The device can be used for about another 15 minutes.
		Battery is defective. Replace battery.
		• Battery is defective. **or** • No battery. **or** • Battery not at suitable temperature.
		Green arrow: Battery charging

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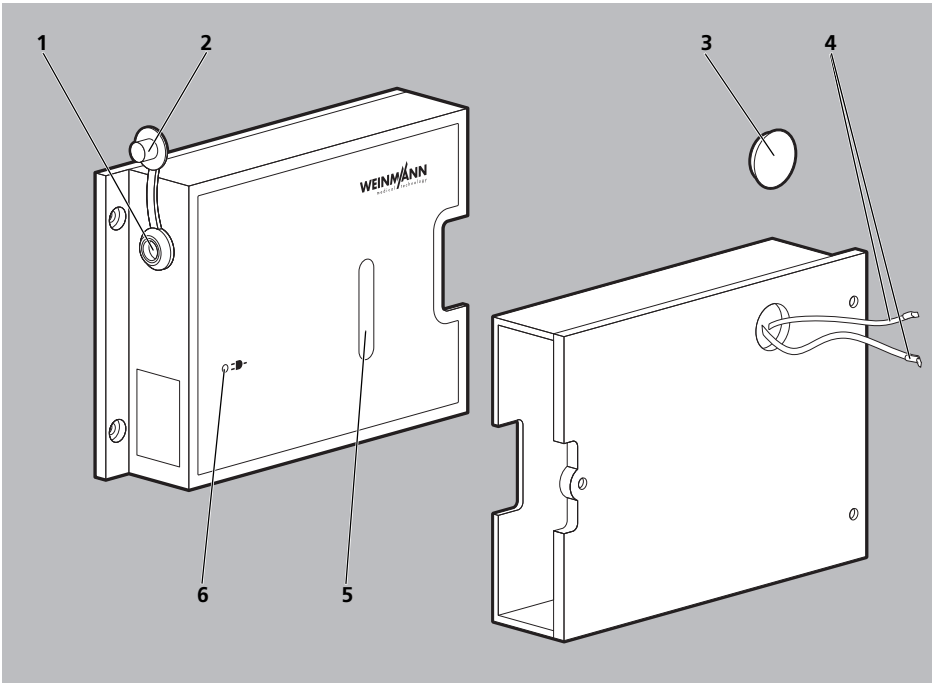
3.6 Charging station



3-11 Charging station

No.	Designation	Description
1	Line power connection	Connects the charging station to line power.
2	Cap	Seals off the line power connection.
3	Cover cap	Covers the 12 V supply cable.
4	12 V supply cable	Connects the charging station to the 12 V on-board power supply in an emergency vehicle.
5	Window for viewing battery status indicator	Allows the battery status indicator to be viewed.
6	Line power indicator	Indicates that the charging station is connected to line power.

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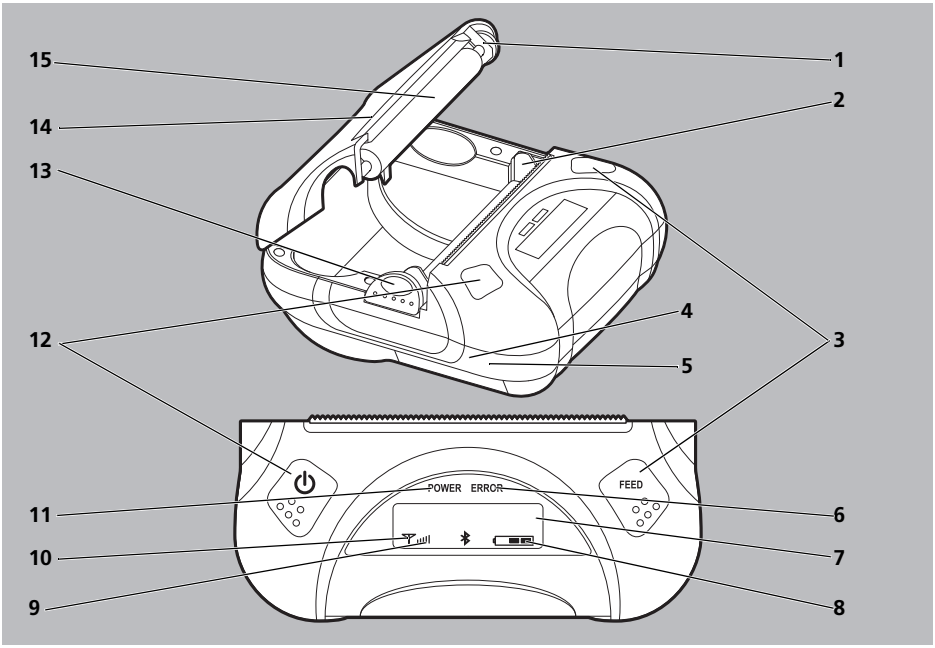
3.7 Printer and printer display



3-12 Printer and printer display

No.	Designation	Description
1	Feed mechanism	Drives the feed roller.
2	Print head	Prints the printer paper.
3	Feed button (FEED)	Press and hold: Feeds the printer paper.
4	USB port (hidden)	For service purposes only.
5	Charging interface (hidden)	Not in use.
6	Error indicator (ERROR)	• Flashes when an error has occurred. • Flashes red during switching on/switching off.
7	LCD display	Indicates printer status.
8	Battery status indicator	Indicates the status of the printer battery.
9	Strength indicator	Indicates the strength of the connection.
10	Connection indicator	Indicates that a connection has been set up between the printer and the device.

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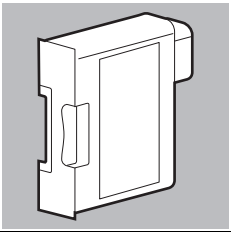
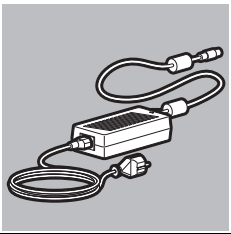
No.	Designation	Description
11	Status indicator (POWER)	• Flashes when the printer is switched on. • Green on when the printer is switched on and ready to use.
12	On/Off button	• Press and hold (> 5 s): Switches the printer on or off. • Press briefly (< 5 s): When the printer is switched on, displays the printer's MAC address.
13	Latch to release paper compartment cover	Opens the paper compartment.
14	Paper compartment cover	Protects the paper compartment.
15	Feed roller	Feeds the paper forwards.

3.8 Components and accessories

3.8.1 Power information

Accessory	Designation	Description
	Accu-Pack battery	Supplies power to the device when it is operating.
	Power supply unit and charger	Supplies the device or the charging station with power.

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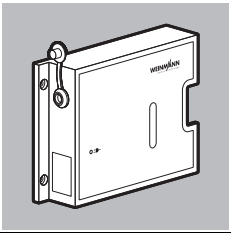
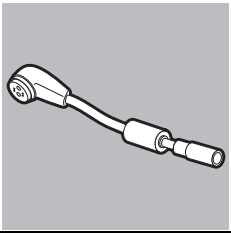
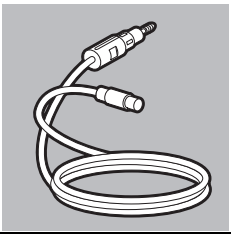
Accessory	Designation	Description
	Charging station for battery WM 45045	Allows external battery charging.
	Charging adapter	Connects the power supply connection on the device to the power supply unit and charger or to the adapter cable for 12 V on-board power supply/circular connector.
	Adapter cable for 12 V on-board power supply/circular connector	Connects the device to the 12 V on-board power supply of a vehicle via the charging adapter.

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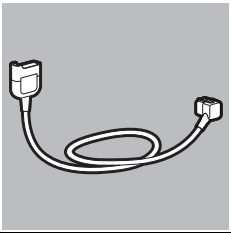
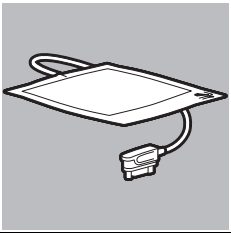
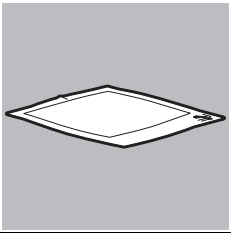
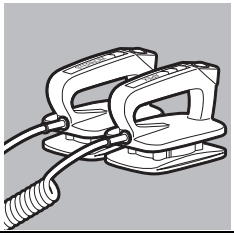
3.8.2 Defibrillation/cardioversion

Accessory	Designation	Description
	MCS2-Connect master cable	Connects the following parts to the device: • Defibrillation electrodes • Paddles • Function test resistor
	MCS2-Softpads defibrillation electrodes for adults	• Conduct electrocardiograms to the device and shock energy to the patient. • Connected to the master cable via the Pad connector. • Allow defibrillation/ cardioversion of adults.
	MCS2-Softpads defibrillation electrodes for children	• Conduct electrocardiograms to the device and shock energy to the patient. • Connected to the master cable via the Pad connector. • Allow defibrillation/ cardioversion of children.
	MCS2-Hardpads paddles	• Conduct electrocardiograms to the device and shock energy to the patient. • Connected to the master cable via the Pad connector. • Allow defibrillation/ cardioversion of adults and children.

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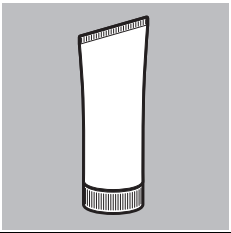
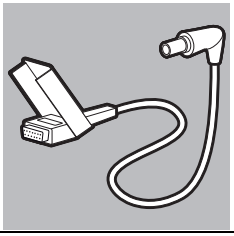
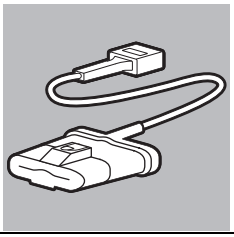
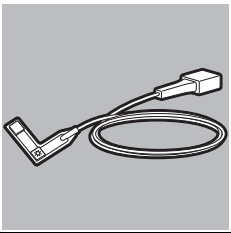
Accessory	Designation	Description
	Electrode gel	Improves electrical conductivity between the paddles and the patient's skin.

3.8.3 Pulse oximetry monitoring

Accessory	Designation	Description
	MCS2-Adapt pulse oximetry sensor connecting cable	Connects the pulse oximetry sensor to the device via the SpO_2 connector.
	MCS2-SoftTip pulse oximetry sensor	• Measures oxygen saturation. • Available in various sizes (see "17.2 Accessories and other parts", page 360).
	MCS2-Wrap pulse oximetry sensor	Measures oxygen saturation.

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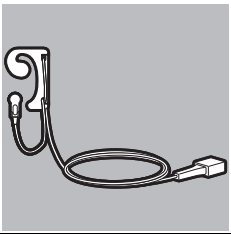
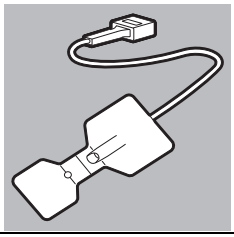
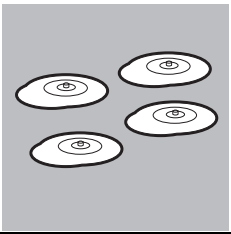
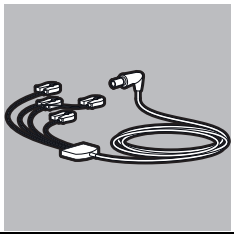
Accessory	Designation	Description
	MCS2-Earclip pulse oximetry sensor with ear clip	Measures oxygen saturation.
	MCS2-Wrap pulse oximetry sensor (disposable)	• Measures oxygen saturation. • Available in various sizes (see "17.2 Accessories and other parts", page 360).

3.8.4 6-lead ECG monitoring/12-lead ECG recording and assessment

Accessory	Designation	Description
	ECG electrodes for adults and children	Derive electrocardiograms.
	MCS2-Line ECG cable	• Conducts electrocardiograms to the device via the ECG connector. • Can only be used for 6-lead ECG monitoring. • Available in various versions (see "17.2 Accessories and other parts", page 360).

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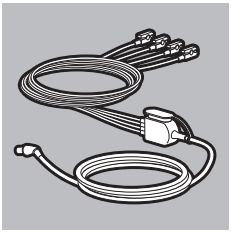
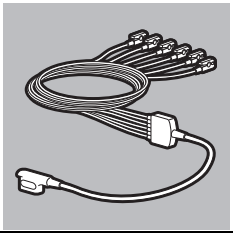
Accessory	Designation	Description
	MCS2-Line ECG cable with connection for MCS2-Line 12-lead ECG extension cable	• Conducts electrocardiograms to the device via the ECG connector. • Can be used for 6-lead ECG monitoring and 12-lead ECG recording and assessment. • Optionally connects the 12-lead ECG extension cable to the device (only with 12-lead ECG option). • Available in various versions (see "17.2 Accessories and other parts", page 360).
	MCS2-Line 12-lead ECG extension cable (only with 12-lead ECG option)	• Conducts electrocardiograms to the device. • Allows a 12-lead ECG to be derived. • Available in various versions (see "17.2 Accessories and other parts", page 360).

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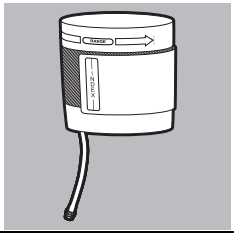
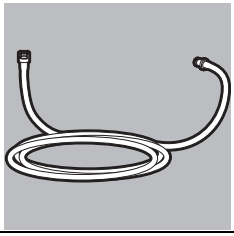
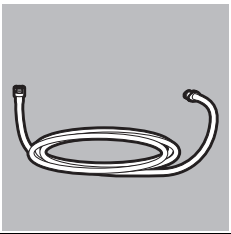
3.8.5 Non-invasive blood pressure measurement (NIBP monitoring)

Accessory	Designation	Description
	NIBP cuff	• Measures blood pressure. • Available in various sizes and versions (see "17.2 Accessories and other parts", page 360).
	NIBP connecting tube	Connects the NIBP cuff to the device.
	Adapter tube for connecting NIBP disposable cuffs for newborns	Connects NIBP cuffs for newborns (disposable).

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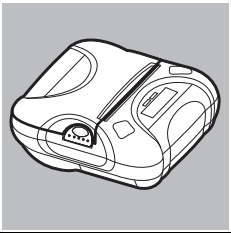
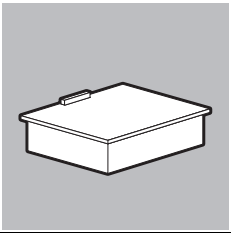
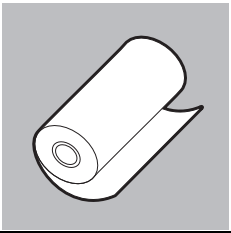
3.8.6 Printing

Accessory	Designation	Description
	Printer	• Allows different ECGs and reports to be printed (see "6.16 Printing ECGs and reports (only with Printing option)", page 196). • May only be used in the vicinity of the patient if it is in the printer case.
	Printer battery	• Supplies power to the printer when it is operating. • May only be used in the vicinity of the patient if it is in the printer case.
	Printer case	• Protects the printer from damage and contamination. • Allows the printer to be transported.
	Printer paper	Allows different ECGs and reports to be printed (see "6.16 Printing ECGs and reports (only with Printing option)", page 196).

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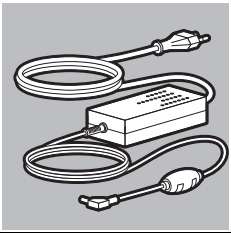
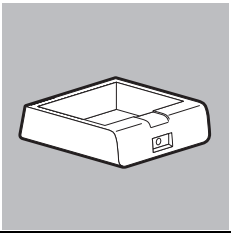
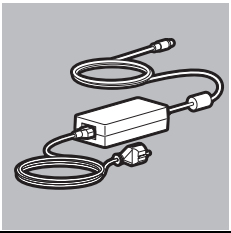
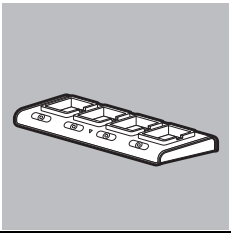
Accessory	Designation	Description
	Power supply unit and charger for charging station for printer battery	• Charges the printer battery in the charging station for the printer battery (see "4.7.1 Charging the printer battery", page 94). • Not suitable for use in the vicinity of the patient.
	Charging station for the printer battery	• Allows a printer battery to be charged (see "4.7.1 Charging the printer battery", page 94). • Not suitable for use in the vicinity of the patient.
	Power supply unit and charger for quadruple charging station for the printer battery	• Charges the printer battery in the quadruple charging station for the printer battery (see "4.7.1 Charging the printer battery", page 94). • Not suitable for use in the vicinity of the patient.
	Quadruple charging station for the printer battery	• Allows 4 printer batteries to be charged simultaneously (see "4.7.1 Charging the printer battery", page 94). • Not suitable for use in the vicinity of the patient.

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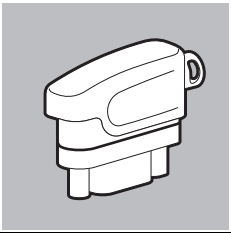
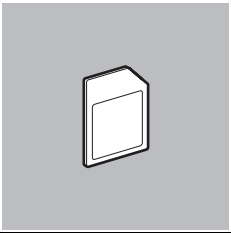
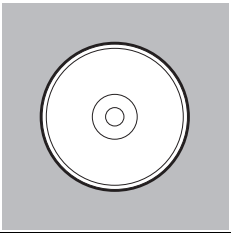
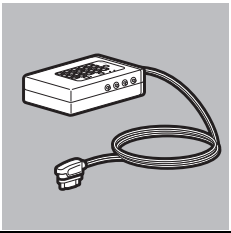
3.8.7 Miscellaneous

Accessory	Designation	Description
	Function test resistor	Allows a device function check to be carried out.
	SD card	Records session data and service data.
	DEFIview PC software	Facilitates the read-out and analysis of session data.
	ECG simulator	• For training purposes and for demonstrating the device. • Allows ECGs to be simulated. • Available in various versions (see "17.2 Accessories and other parts", page 360). • Not suitable for use in the vicinity of the patient.

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3.9 Transport options

In order to transport the device, carry accessories, provide a power supply for charging, and attach to a wall mounting, you can mount the device on one of the following portable units:

- LIFE-BASE 1 NG XS
- LIFE-BASE 1 NG XL
- LIFE-BASE 3 NG
- LIFE-BASE 4 NG

You can also transport the device in one of the following protective transport bags:

- MCS2-Bag protective transport bag
- MCS2-Bag protective transport bag, large

Protective transport bags cannot be attached to a wall mounting.

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3.10 Options

You can tailor the range of functions on the device to your needs using the options. You can enable these options using a device-specific enable code (see "12.1 Enabling options", page 290). The following options are available:

Option	Description	Parts required/conditions
Manual defibrillation	This option enables manual mode.	-
Cardioversion	This option allows cardioversion to be carried out in manual mode.	Manual defibrillation option enabled and activated
Printing	This option allows various reports and printouts to be printed: • Function check report • Live printout • Defibrillation report • 12-lead ECG printout (only with 12-lead ECG option) • Replay printout (only with Replay view option) • Session report	• Printer • Printer paper • Printer battery • Charging station for printer battery with power supply unit and charger • Printer case
12-lead ECG	This option enables 12-lead ECG.	• ECG cable with connection for 12-lead ECG extension cable • 12-lead ECG extension cable
E-mail delivery 12-lead ECG	This option allows you to deliver a 12-lead ECG to an e-mail address.	• 12-lead ECG option enabled and activated • Network connected to the Internet • Device registered with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298)

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Option	Description	Parts required/conditions
Replay view	This option allows an event to be reproduced and analyzed on the device.	-
Bluetooth® data transmission	This option allows data to be made available to a compatible system for digital patient data recording via the Bluetooth® interface.	Compatible system for digital patient data recording with Bluetooth® interface
Upload session data	This option allows session data to be uploaded to WEINMANN Connect.	• Network connected to the Internet • Device registered with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298)

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4 Preparation

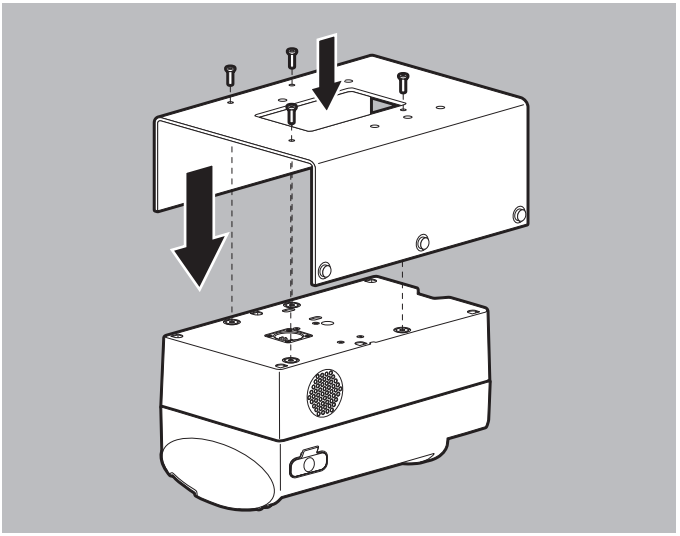
4.1 Mounting the device

4.1.1 Mounting the device in the protective transport bag

Required auxiliary equipment

Phillips screwdriver, size PH1

1. Place the device on a smooth, firm surface with the control panel membrane facing down.



2. Put the retaining plate on the device.
   When doing so, please note: The holes of device and retaining plate must line up.
3. Screw the device to the retaining plate using screws.
4. Place the protective transport bag with its back on a level, firm surface.
5. If the protective transport bag is closed: Release the magnetic catch of the protective transport bag and open the viewing window.

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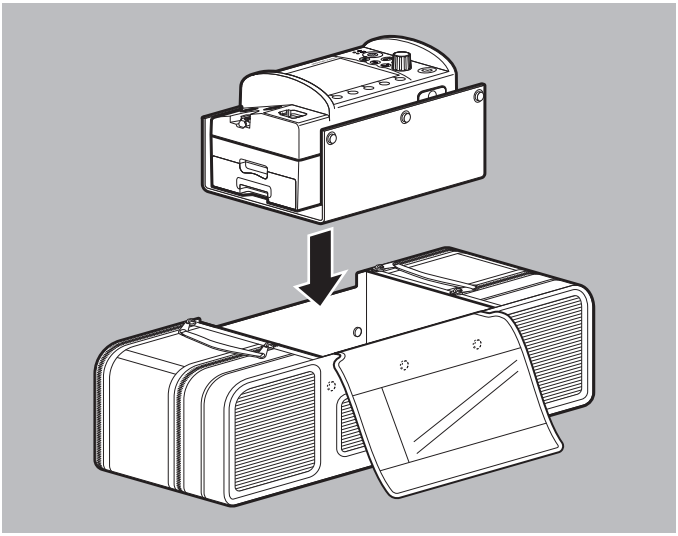
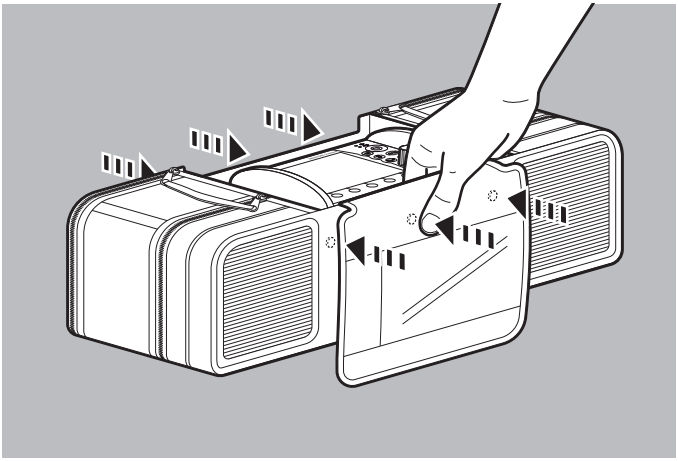


6. Introduce the device on the retaining plate into the protective transport bag from above until the snap fasteners on the protective transport bag and the retaining plate line up.



7. Use both hands simultaneously to push opposing snap fasteners together until you hear them engage.

Result The device is mounted in the protective transport bag.

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4.1.2 Mounting the device on the portable unit

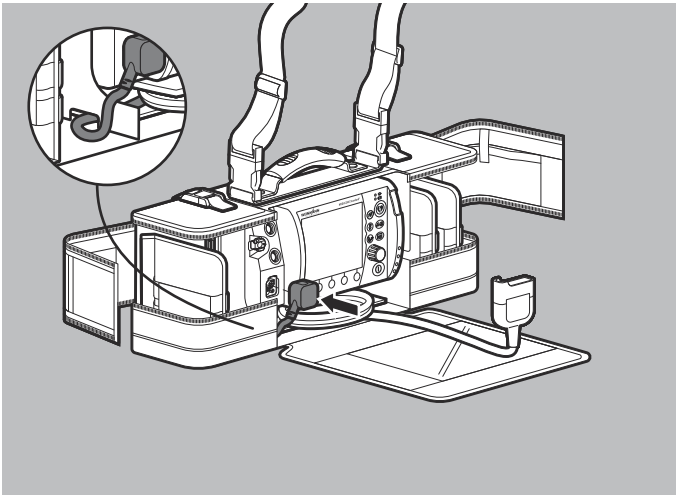
Follow the instructions for use of the portable unit.

4.2 Stowing components and accessories

4.2.1 Stowing components and accessories in the protective transport bag

Requirement The device is mounted in the protective transport bag (see "4.1.1 Mounting the device in the protective transport bag", page 74).

1. Release the magnetic catch of the protective transport bag and open the viewing window.
2. Open the side compartments.
3. If there is a divider in the left-hand side compartment: Remove the divider.



4. Guide the master cable through the opening between the left-hand side compartment and the device compartment of the protective transport bag.
5. Connect the master cable connector to the Pad connection for master cable on the device.

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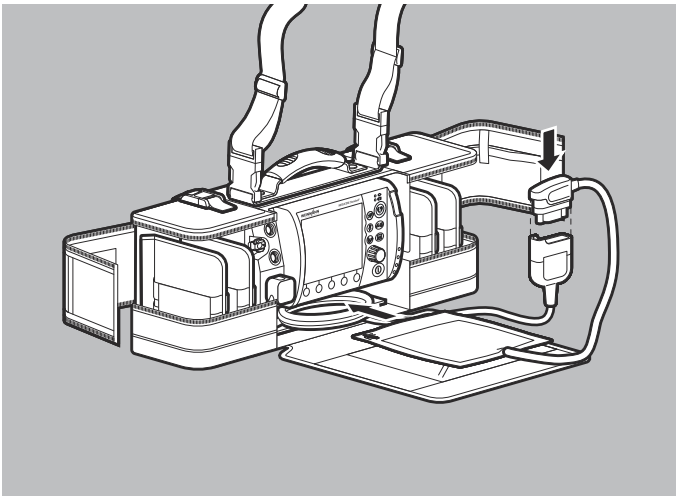
6. Put the divider back into the left-hand side compartment.



7. When using defibrillation electrodes: Attach the Pad connector of the defibrillation electrodes to the master cable.
   When doing so, please note: The Pad connector must be plugged in firmly.
8. Wind up the master cable and stow under the device with the defibrillation electrodes.

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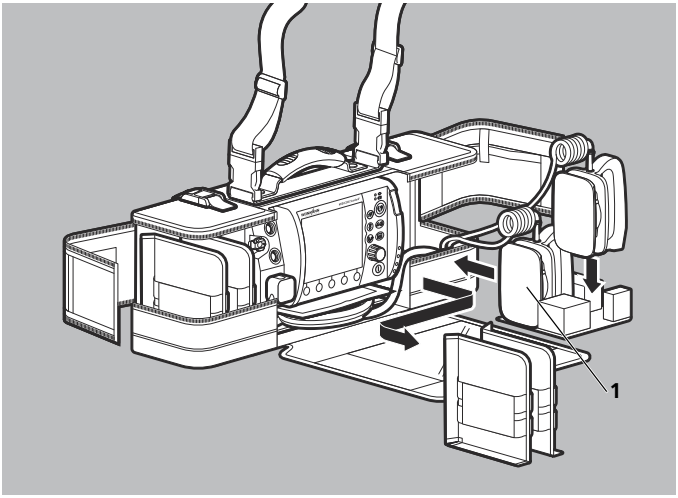

9. When using paddles: Remove dividers from the side compartment.
   When doing so, please note: The paddles can only be stowed in the large versions of the protective transport bag and the protective bags for the portable units.
10. Insert the insert for accommodating paddles in the side compartment.
11. Insert the paddles one after the other.
    When doing so, please note:
    - The cables for the paddles must point upwards.
    - The paddle on the left (**1**) must be inserted first.

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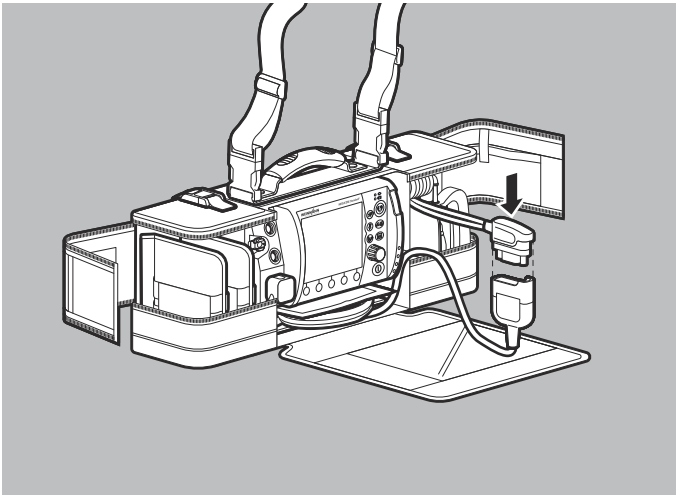

12. Connect the Pad connector of the paddles to the master cable. When doing so, please note: The Pad connector must be plugged in firmly.
13. Route the master cable in the groove between the device compartment and the side compartment of the protective transport bag.
14. Wind up the master cable and stow under the device.

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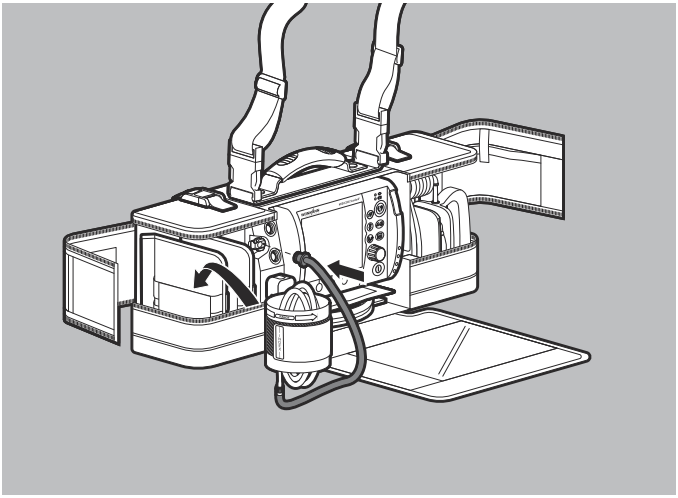

15. Connect the NIBP connecting tube to the device and the NIBP cuff (see “6.12.1 Preparing non-invasive blood pressure measurement (NIBP measurement)”, page 182).
16. Wind up the NIBP connecting tube and the tube for the NIBP cuff and surround them with the NIBP cuff.
17. Stow the NIBP cuff with the tubes inside in the side compartment.

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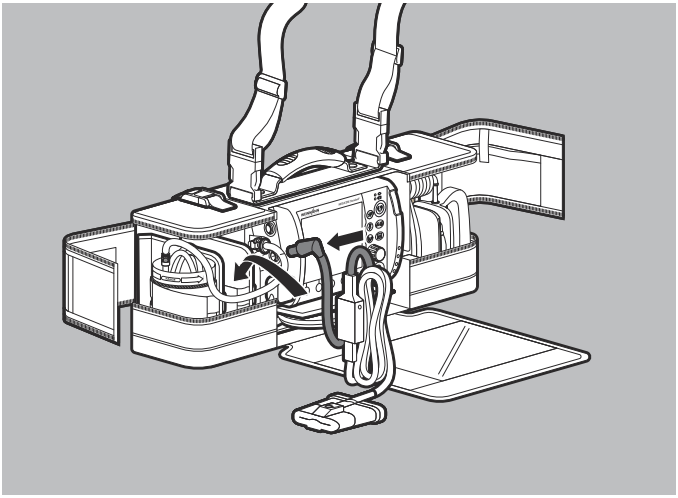

18. Connect the pulse oximetry sensor connecting cable to the device and to the pulse oximetry sensor (see "6.9.1 Preparing pulse oximetry monitoring", page 157).
    When doing so, please note: MCS2-SoftTip pulse oximetry sensors which have been turned inside out during hygienic reprocessing must be turned the right way out again.
19. Wind up the pulse oximetry sensor connecting cable and the cable for the pulse oximetry sensor and stow them in the side compartment.

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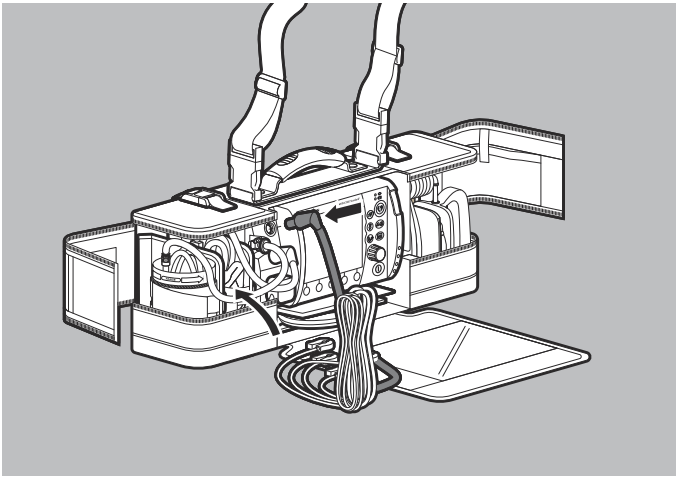

20. Connect the selected ECG cable to the device (see "6.10.1 Preparing 6-lead ECG monitoring", page 164).
21. Wind up the ECG cable and stow it in the side compartment.
22. Stow ECG electrodes in their pack in the side compartment.
23. If a printer is in use (only with Printing option): Stow the printer case in the protective transport bag.

    Alternatively:

    Mount the printer case on the protective transport bag (see "4.7.5 Mounting the printer case on the protective transport bag or the protective bag of the portable unit", page 101).
24. Stow further components and accessories in the side compartments.
    When doing so, please note:
    - Components and accessories must be stowed so that they do not interfere with one another when removed.
    - Components and accessories must be stowed so that the viewing window and the side compartments can be closed easily and securely.
25. Close side compartments and viewing window.

Result Components and accessories are stowed in the protective transport bag.

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4.2.2 Stowing components and accessories on the portable unit

Follow the instructions for use of the portable unit.

4.3 Connecting a power supply

⚠ WARNING

Risk of injury due to missing battery!
Operation with line power without a battery prevents the device being fully ready for use as the shock capacitor in the device cannot charge. This prevents shock delivery and delays the patient's treatment.
⇒ Only operate the device with the battery inserted.

1. Check battery status (see "3.5 Battery and battery status indicator", page 57).
2. If necessary: Charge battery (see "4.4.2 Charging the battery in the device", page 86).

⚠ WARNING

Risk of injury from battery being incorrectly inserted!
An incorrectly inserted battery may lead to device failure and thus injure the patient.
⇒ Always push the battery into the battery compartment until you hear it engage and it is flush with the housing.

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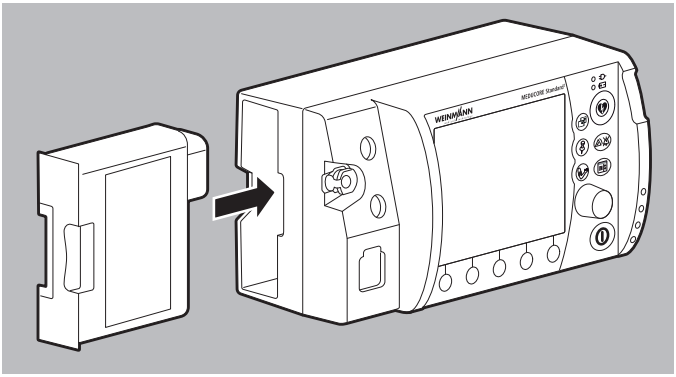
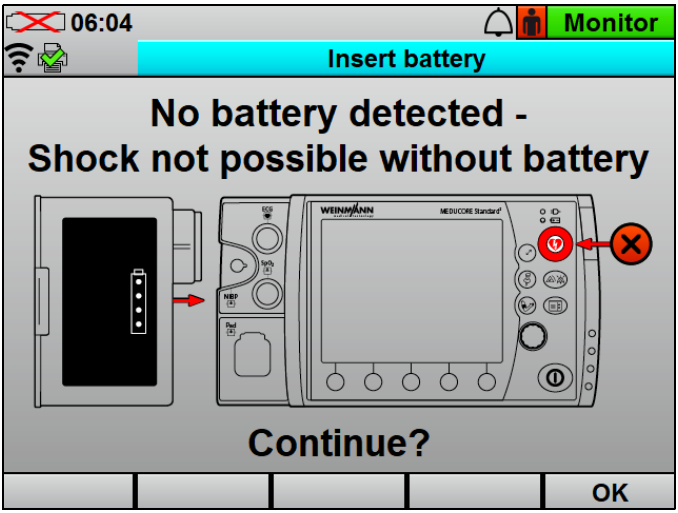


3. Slide the fully charged battery into the battery compartment until you hear it engage.
   When doing so, please note: If the battery is not inserted properly, or not inserted at all, defibrillation/cardioversion is not possible and the following message appears:



4. If necessary:
   When operating on the portable unit, suspend the portable unit in a wall mounting with a charging interface.

   Alternatively:

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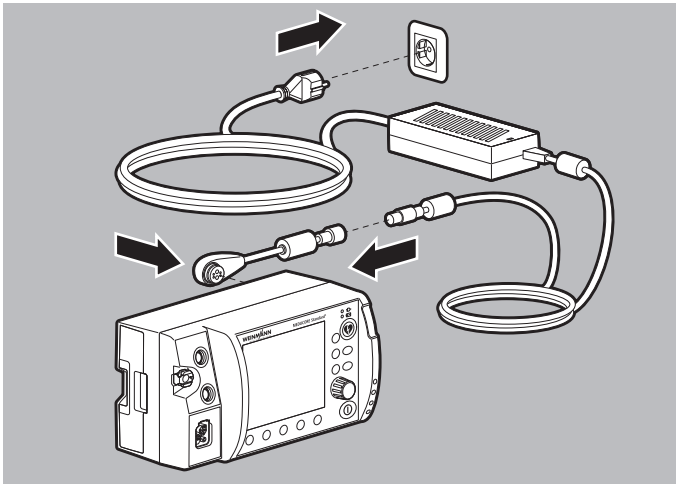
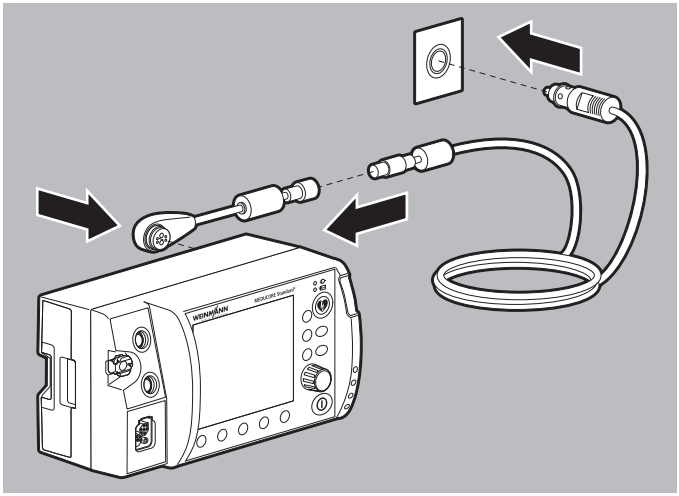


Connect the device to line power using the charging adapter and power supply unit and charger.

Alternatively:



Connect the device to a 12 V on-board power supply with the charging adapter and the adapter cable for 12 V on-board power supply/circular connector.

Result The power supply is connected.

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4.4 Using the battery

4.4.1 General instructions

- Always operate the device with a battery.
- Note the methods of storing the battery and the charging intervals for extended storage (see "15.2 Storing the battery", page 355).
- The intended lifetime of the battery is 2 years.
  Recommendation: Replace the battery after 2 years. If battery operating time has substantially dropped before then, replace the battery earlier.
- If you receive a replacement battery, you need to charge it fully before the first use.

4.4.2 Charging the battery in the device

Requirement

- The portable unit is suspended in a wall mounting with a charging interface.

  Alternatively:

  The device is connected to line power with the charging adapter and power supply unit and charger.

  Alternatively:

  The device is connected to a 12 V on-board power supply with the charging adapter and the adapter cable for 12 V on-board power supply/circular connector.

1. Insert battery into the battery compartment.
   When doing so, please note:
   - Charging starts automatically if the following conditions are met:

Specification	Description
External voltage	12 V to 15.1 V
Battery status	< 95 % charged
Battery temperature	Between 0 °C and 45 °C

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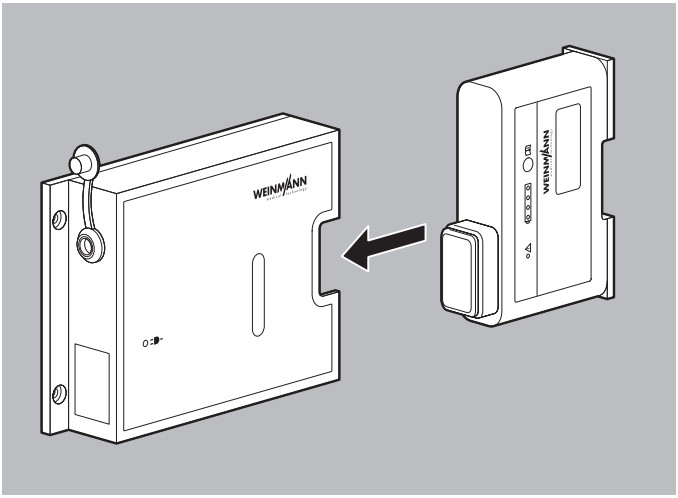
- If the device is switched on, the green arrow appears in the battery status symbol in the display (example:) and the battery status indicator on the device flashes green.
- If the device is switched off, only the battery status indicator flashes green.
- The device remains fully ready for use.

If the battery is deeply discharged and you charge it in the device, the battery status indicator is red for a short period of time. It goes out again as battery status progresses.

2. When the battery status indicator is green and/or the symbol appears in the display: Disconnect the device from the charging interface or from the power supply unit and charger.

Result The battery is fully charged.

4.4.3 Charging the battery in the charging station



1. Push the battery into the charging station until you hear it engage.
   Charging starts automatically if the following conditions are met:
   - External voltage of at least 12 V to 15.1 V connected

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- Battery not fully charged (< 95 % charge)
- Battery temperature between 0 °C and 45 °C

The battery status LEDs flash green during the charging process.

2. Once the status LEDs go permanently green: Release the battery latch and take the battery out of the charging station.

Result The battery is fully charged.

4.4.4 Changing the battery

Requirement The replacement battery is fully charged.

1. If the device is not connected to line power: Switch off the device (see "6.2 Switching the device off", page 119).
2. Take battery out of the battery compartment.

⚠ WARNING

Risk of injury from battery being incorrectly inserted!
An incorrectly inserted battery may lead to device failure and thus injure the patient.
⇒ Always push the battery into the battery compartment until you hear it engage and it is flush with the housing.

3. Slide the replacement battery into the battery compartment until you hear it engage.
4. If necessary: Switch on the device (see "6.1 Switching on the device", page 118).
   The symbol  appears in the display.

Result The battery is changed.

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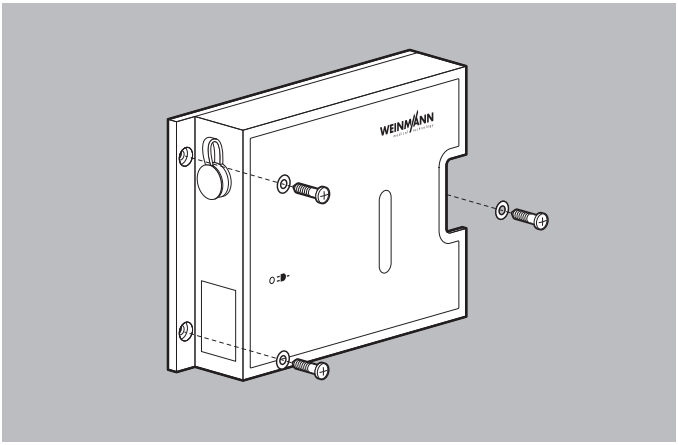
4.5 Using the charging station

4.5.1 Mounting the charging station on the wall

⚠ CAUTION

Risk of injury from incorrectly mounted charging station!
If a charging station is mounted incorrectly, the charging station may come off the wall or the battery may fall out.
⇒ Position and attach the charging station correctly.



1. Position the charging station with its rear on a wall so that the compartment for inserting the battery is facing the right or left-hand side.
2. Screw the charging station firmly to the wall using 3 screws and 3 plain washers (maximum screw-in depth 6 mm). When doing so, please note: The screws must be firmly tightened.

Result The charging station is firmly attached to the wall.

4.5.2 Operating the charging station on a mobile basis

1. Glue the rubber feet to the rear of the charging station.
2. Place the charging station with the rear on a level surface.

Result The charging station is used on a mobile basis (e.g. as a desktop device).

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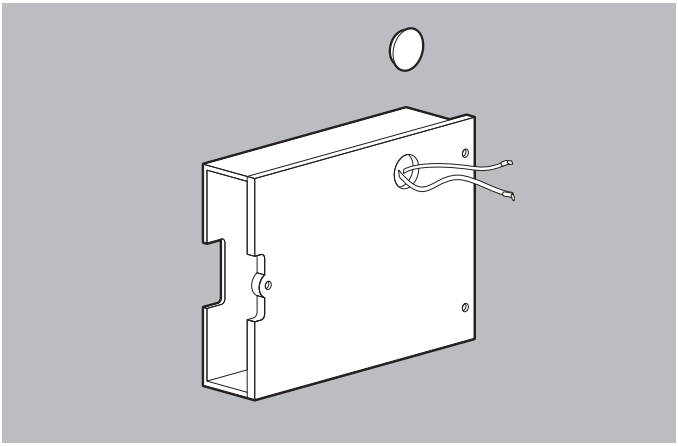
4.5.3 Connecting the charging station to line power

1. Remove the protective cap from the line power connection.
2. Connect power supply unit and charger WM 28937 to the line power connection.
3. Connect the power supply unit and charger to line power.

Result The charging station is connected to line power. The line power indicator on the charging station is green.

4.5.4 Connecting the charging station to a 12 V on-board power supply



1. Remove the protective cap on the rear of the charging station.
2. Take the 12 V supply cable out of the charging station.
3. Remove the electrical insulation.
4. Seal off the cable openings with liquid adhesive to stop the 12 V supply cable slipping back into the charging station and to stop dirt or water penetrating the charging station.

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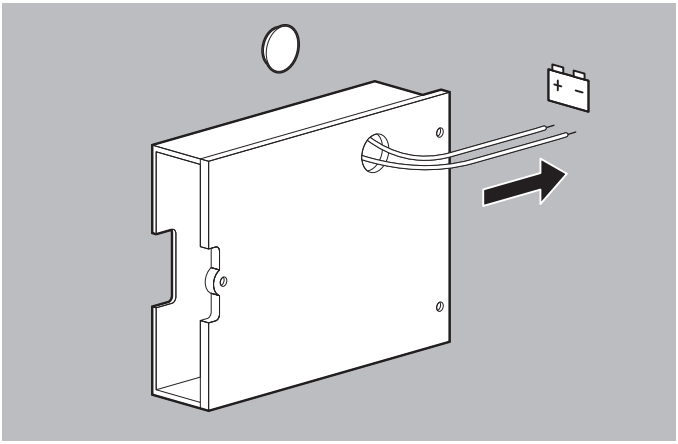

5. Connect the red wire of the 12 V supply cable to the positive terminal of the 12 V on-board power supply in the vehicle.
6. Connect the black wire of the 12 V supply cable to the negative terminal of the 12 V on-board power supply in the vehicle.

Result The charging station is connected to the 12 V on-board power supply in the vehicle. The line power indicator of the charging station is green.

4.5.5 Charging the battery in the charging station

1. Charge the battery in the charging station (see "4.4.3 Charging the battery in the charging station", page 87).

Result The battery is fully charged.

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4.6 Using an SD card

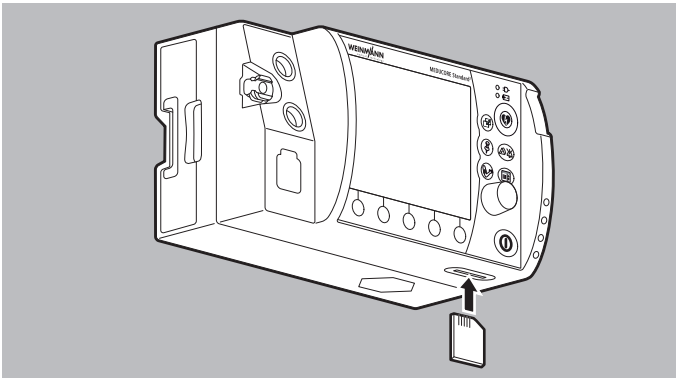
NOTICE

Loss of data due to incorrect SD card!
Functionality may be restricted or data may be lost in the case of SD cards not ordered via WEINMANN Emergency.
⇒ Only use SD cards approved by WEINMANN Emergency for use with this device.
⇒ Do not use the SD card for third-party files.

4.6.1 Inserting an SD card

The device has only a limited internal memory. To record session data over an extended period of time, you must insert an SD card:

1. Open the water jet protection of the SD card slot.



2. Push the SD card into the SD card slot until you hear it engage. When doing so, please note: The beveled corner of the SD card must be at the front on the right during insertion.
3. Close the water jet protection to protect the device from ingress of dust and water.

Result The SD card is inserted in the device and ready for use.

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4.6.2 Removing the SD card

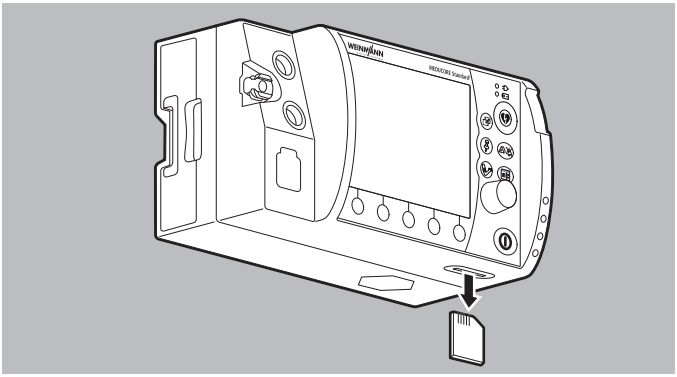
Requirement There is an SD card in the SD card slot.

1. Open the water jet protection of the SD card slot.

⚠ CAUTION

Incorrect use may result in loss of data!
If you remove the SD card while data is being written to it, data may be lost or the SD card damaged.
⇒ Only remove the SD card with the device switched off.

2. Briefly push in the SD card.
   The SD card is ejected slightly.



3. Remove the SD card.
4. Close the water jet protection to protect the device from ingress of dust and water.

Result The SD card is removed.

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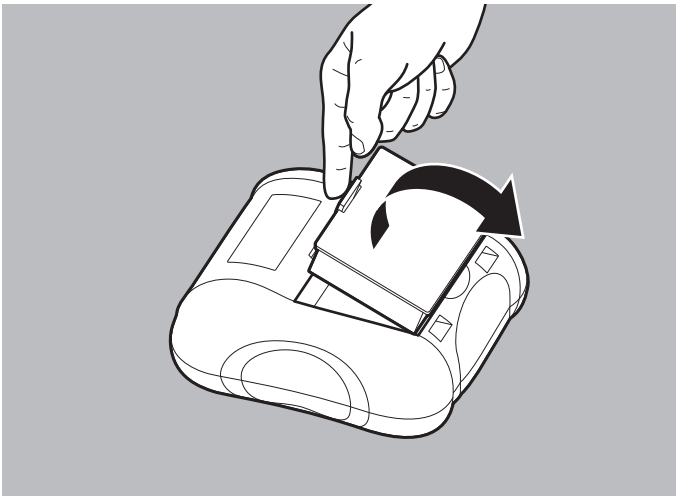
4.7 Preparing printer (only with Printing option)

4.7.1 Charging the printer battery

Requirement

- The printer has been removed from the printer case.
- The printer is switched off.

1. Turn over the printer.



2. Release the printer battery latch.
3. Remove the printer battery from the printer.

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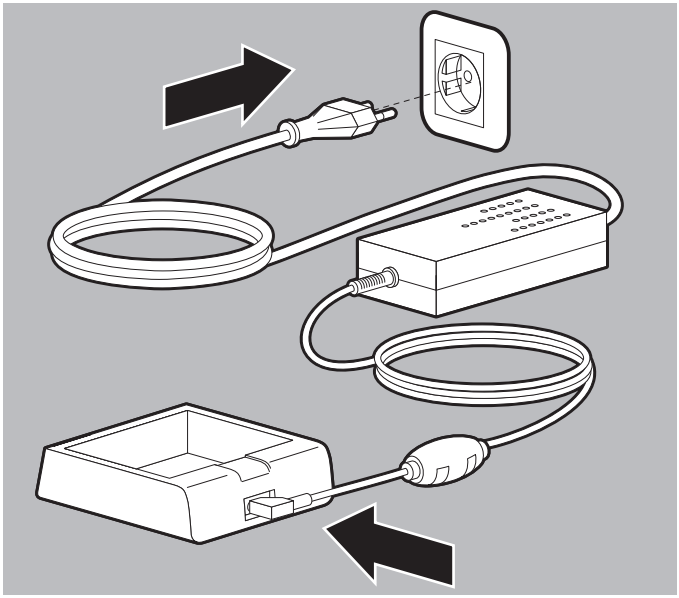
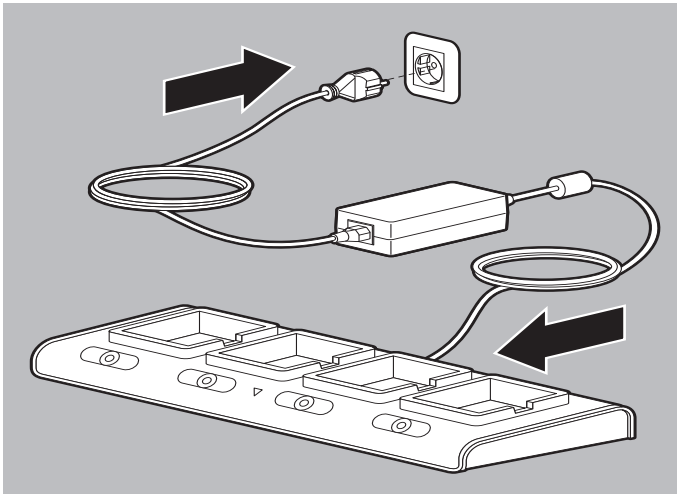


4. Connect the charging station for the printer battery to line power.

Alternatively:



Connect the quadruple charging station for the printer battery to line power.

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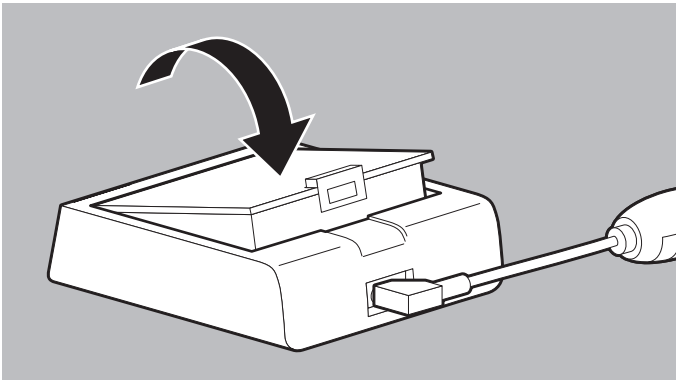
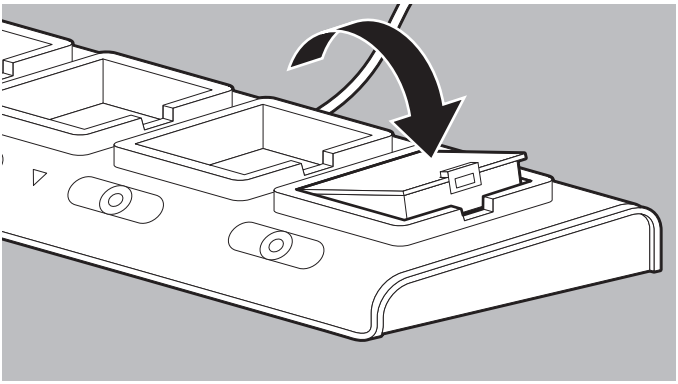


5. Insert the printer battery in the charging station for the printer battery until you hear it engage.

Alternatively:



Insert the printer battery in the quadruple charging station for the printer battery until you hear it engage.
When doing so, please note:

- The printer battery and the charging stations heat up during charging.
- With the charging station for the printer battery: The LED on the power supply unit and charger is red when the battery is being charged.
- On the quadruple charging station for the printer battery: The CHARGING-LED is red when the battery is being charged.

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6. When the LED on the power supply unit and charger is green: Take the printer battery out of the charging station for the printer battery.

   Alternatively:

   If the FULL CHARGED LED is green: Take the printer battery out of the quadruple charging station for the printer battery.

Result The printer battery is fully charged.

4.7.2 Inserting the printer battery

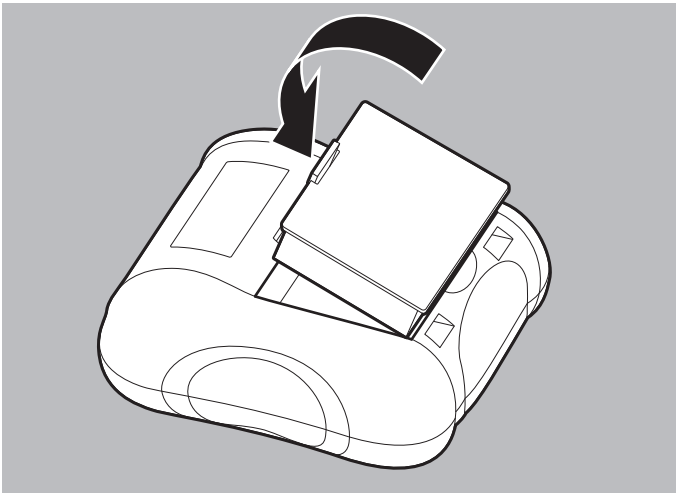
Requirement

- The printer battery is fully charged (see "4.7.1 Charging the printer battery", page 94).
- The printer is switched off.

⚠ WARNING

Risk of injury from electric shock when simultaneously touching a printer and the patient!
Simultaneously touching a printer and the patient may lead to an electric shock and injure the patient.
⇒ Stand clear of the patient if the printer is out of its case.

1. Turn over the printer.



2. Insert the printer battery in the battery compartment of the printer until you hear it engage.

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3. Set the printer the right way up.

Result The printer battery is inserted in the printer.

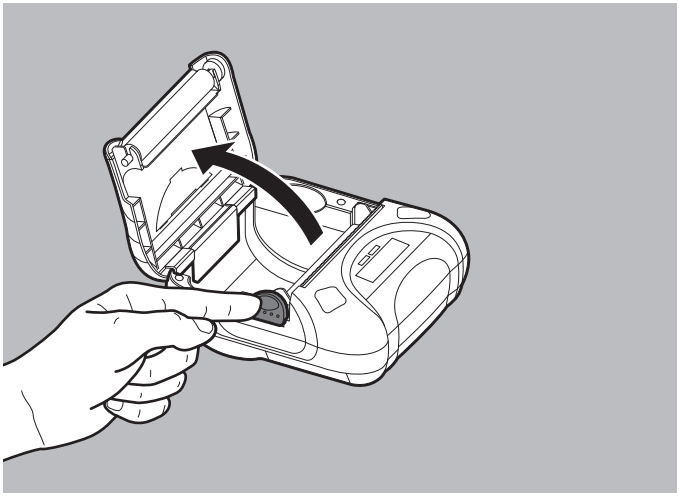
4.7.3 Inserting printer paper

Requirement

- The printer is not printing.
- The printer paper provided by WEINMANN Emergency is in use.
- The printer has been removed from the printer case.

⚠ WARNING

Risk of injury from electric shock when simultaneously touching a printer and the patient!
Simultaneously touching a printer and the patient may lead to an electric shock and injure the patient.
⇒ Stand clear of the patient if the printer is out of its case.



1. Push down the latch to release the paper compartment cover.
2. Open the paper compartment cover.

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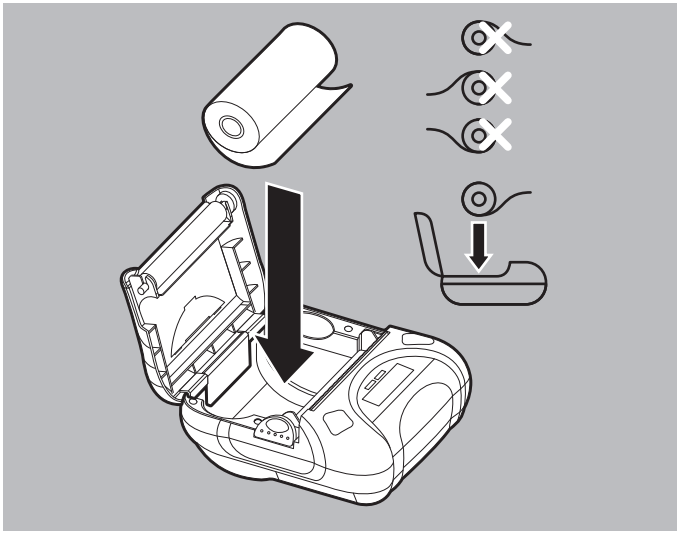
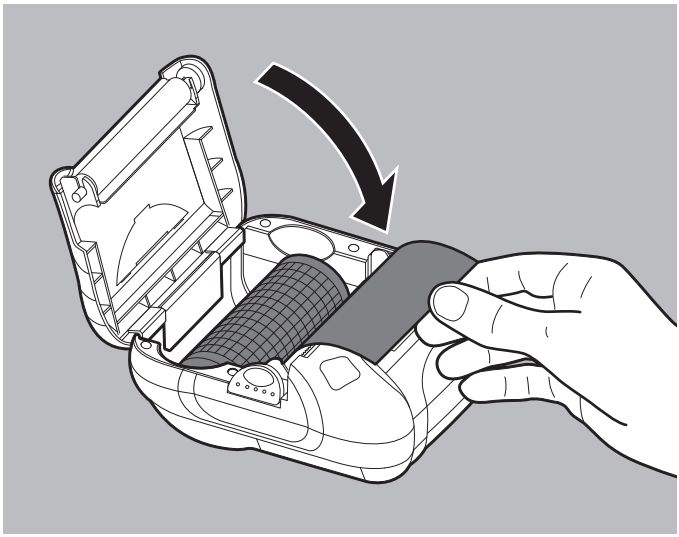


3. Insert printer paper in the paper compartment.
   The start of the printer paper must be at the bottom of the printer.



4. Guide the printer paper over the tear-off edge.
5. Close the paper compartment cover.

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6. Press and hold the feed button (FEED) on the printer for a few seconds to feed printer paper about another 10 cm.

Result The printer paper is inserted.

4.7.4 Stowing the printer in the printer case

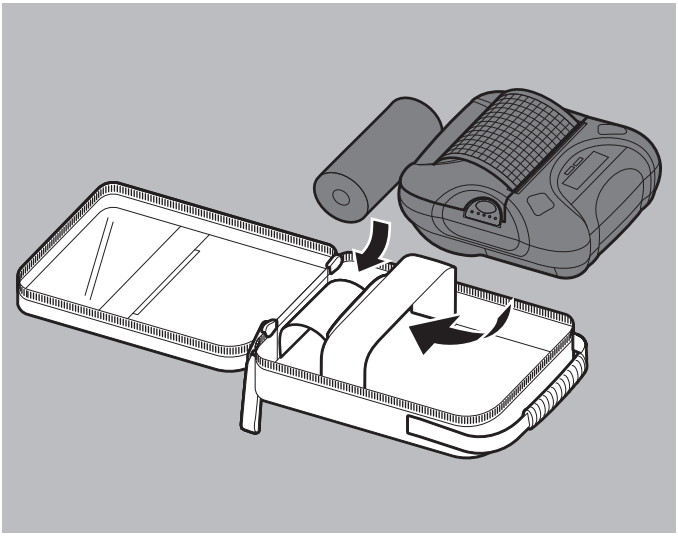
Requirement

- The printer battery is inserted (see "4.7.2 Inserting the printer battery", page 97).
- The printer paper is inserted (see "4.7.3 Inserting printer paper", page 98).

⚠ WARNING

Risk of injury from contaminated printer!
A contaminated printer cannot be subjected to complete hygienic reprocessing. This may injure the patient and the user.
⇒ Only ever use the printer in the printer case.

1. Open the zip on the printer case.



2. Stow the printer in the holder provided for it in the printer case.
3. If required: Stow spare printer paper in the holder provided for it in the printer case.

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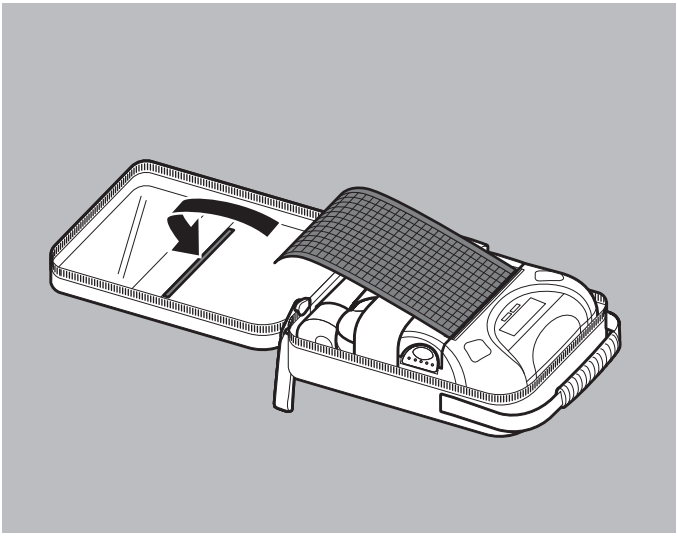

4. Guide printer paper through the slot in the printer case to the outside.
5. Close the zip on the printer case.

Result The printer is stowed in the printer case ready for printing.

4.7.5 Mounting the printer case on the protective transport bag or the protective bag of the portable unit

Requirement

- The printer battery is inserted (see "4.7.2 Inserting the printer battery", page 97).
- The printer paper is inserted (see "4.7.3 Inserting printer paper", page 98).
- The printer is stowed in the printer case (see "4.7.4 Stowing the printer in the printer case", page 100).
- A protective transport bag with a side holder for a printer case is being used.

  Alternatively:

  A protective bag of the portable unit with a side holder for a printer case is being used.

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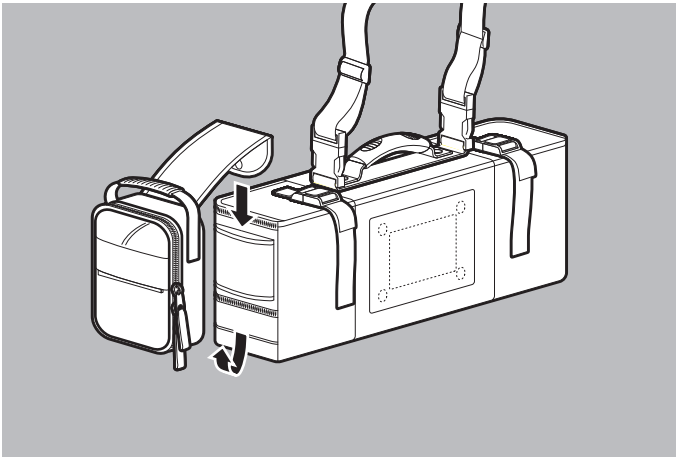

1. Push the tab of the printer case through the side holder on a protective transport bag or a protective bag of the portable unit.
   When doing so, please note: Not all protective bags for the portable unit have a tab for mounting the printer case. For these portable units, the printer needs to be stowed in the accessories bag of the portable unit.

Result The printer case is mounted on the protective transport bag or a protective bag of the portable unit.

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5 Function check

⚠ WARNING

Disrupted or failed therapy due to defective device, defective components or defective accessories!
Using defective devices, defective components or defective accessories may result in malfunctions of the device, the components, and the accessories. This may cause the patient and the user serious or life-threatening injury.
⇒ Carry out a complete function check prior to every use (see "5.2 Carrying out a function check", page 104).
⇒ Only operate the device, components, and accessories if they have no external damage.
⇒ Replace illegible or damaged labels.
⇒ Only use devices, components, and accessories which have passed the function check.
⇒ Have defective devices repaired.
⇒ Have defective components and defective accessories repaired, or replace them.
⇒ Observe the applicable intervals for function check and service.

After being switched on, the device carries out an automatic function check which checks that all the key functions are working.

The device also offers a step-by-step guide to carrying out a function check (see "5.2 Carrying out a function check", page 104).

When the device is switched on, permanent test routines are active in the background which alert the user to malfunctions via an alarm.

The correct functioning of some components cannot be checked with the support of software. In such cases, users must assess functionality themselves (e.g. external damage to the device, functionality of the ECG cable or the NIBP cuff).

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5.1 Intervals

Part concerned	Interval
Device including accessories	• Before every use • After every hygienic reprocessing • After every repair • After every software update

5.2 Carrying out a function check

Requirement

- The device is disconnected from the patient.
- A battery with a battery status of at least 1 LED is inserted in the device.

  Alternatively:

  The display shows at least battery status  .
- The SD card is in the SD card slot.
- The master cable is connected.
- The pulse oximetry sensor connecting cable with pulse oximetry sensor is connected.

1. Check the following parts for external damage:
   - Device
   - Defibrillation electrode packaging
   - Master cable
   - Paddles
   - ECG cable
   - Pulse oximetry sensor connecting cable
   - Pulse oximetry sensor
   - NIBP connecting tube
   - NIBP cuff
   - Printer

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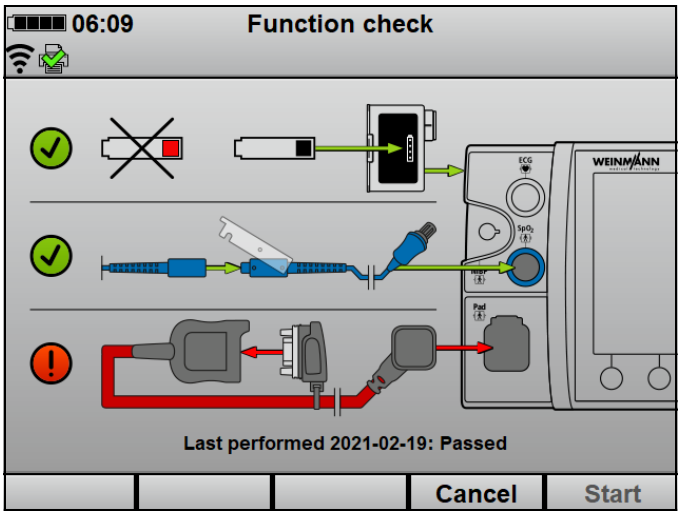
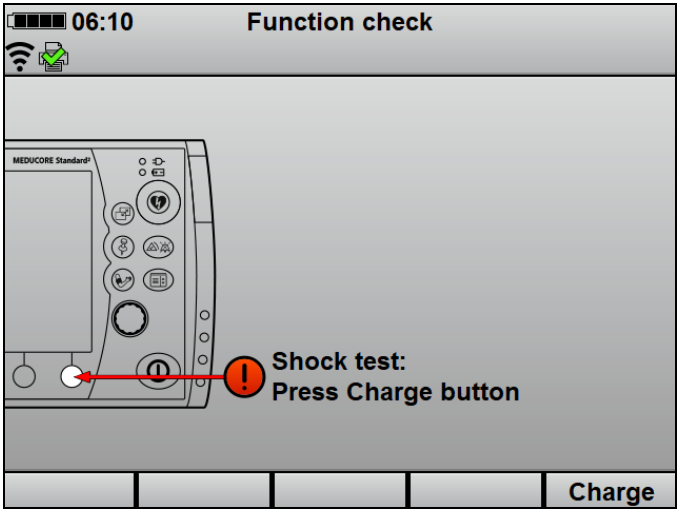
2. If necessary: Replace parts.
3. Check the expiry date on the packaging for the ECG electrodes and the defibrillation electrodes.
   If necessary: Replace ECG electrodes and/or defibrillation electrodes.
4. Switch on the device (see "6.1 Switching on the device", page 118).
   The start menu appears.
5. Select the **Function check** menu item in the start menu.

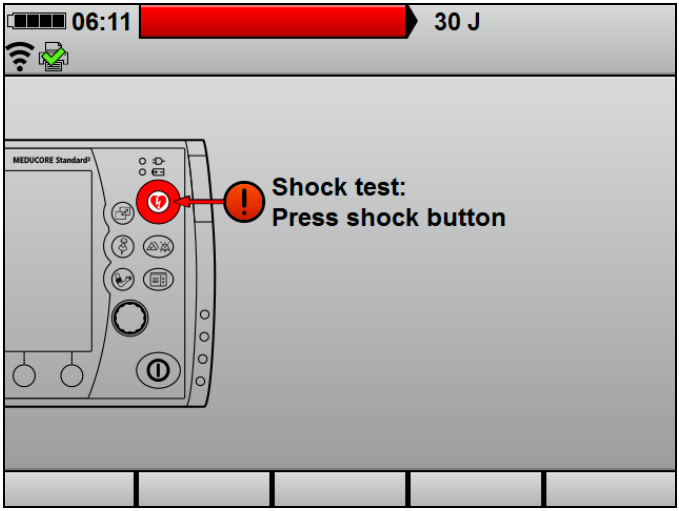


The automatic function check starts. The date and event of the last function check carried out are displayed.

6. Connect the function test resistor to the master cable.
7. Once all components are marked with a green check mark:
   Press the **Start** function button.
   The function check starts and can now no longer be canceled.



8. Press the **Charge** function button.
   The shock capacitor is charged to 30 J and the shock energy is maintained for 30 s.



9. When the shock capacitor is fully charged and the shock button flashes: Press shock button .

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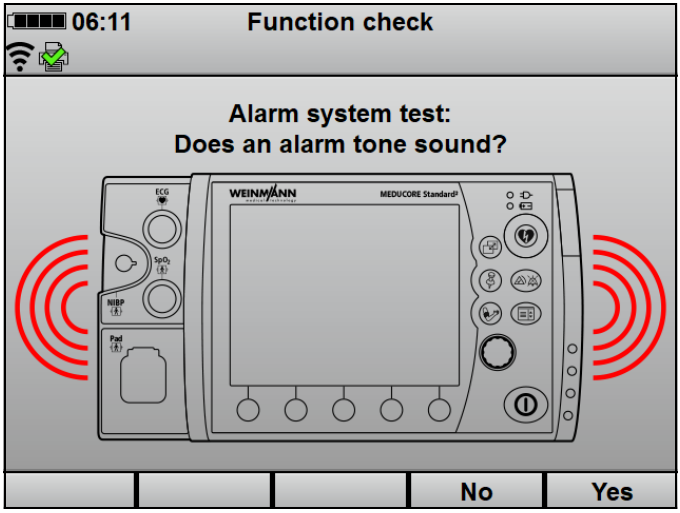
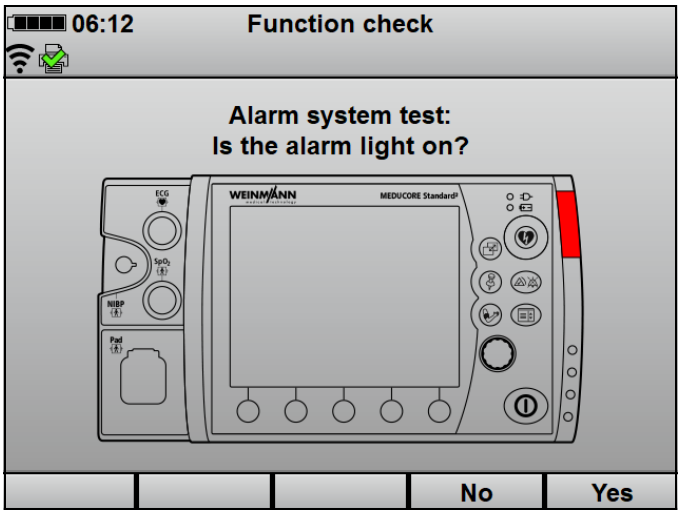


10. If an audible alarm is emitted: Press the **Yes** function button.

11. If no audible alarm is emitted: Press the **No** function button.



12. When the alarm light is red: Press the **Yes** function button.

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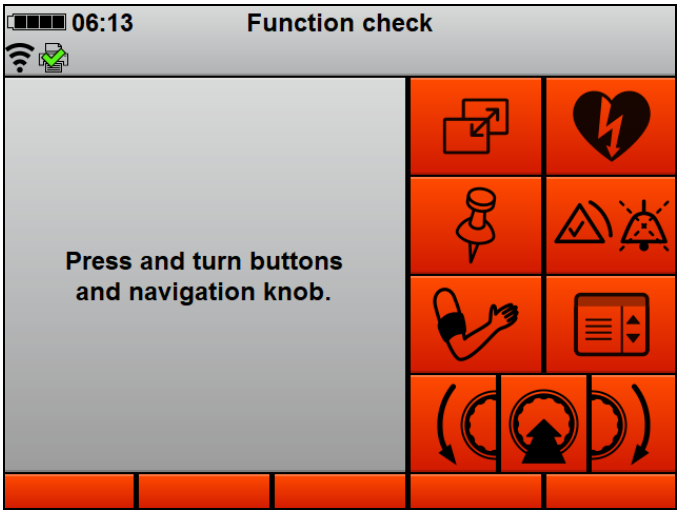
13. If the alarm light is not red: Press the **No** function button.



14. In the button function check, press all of the controls one after the other except for the On/Off button ⏻.

15. To cancel the button function test: Press menu button ▤ twice.

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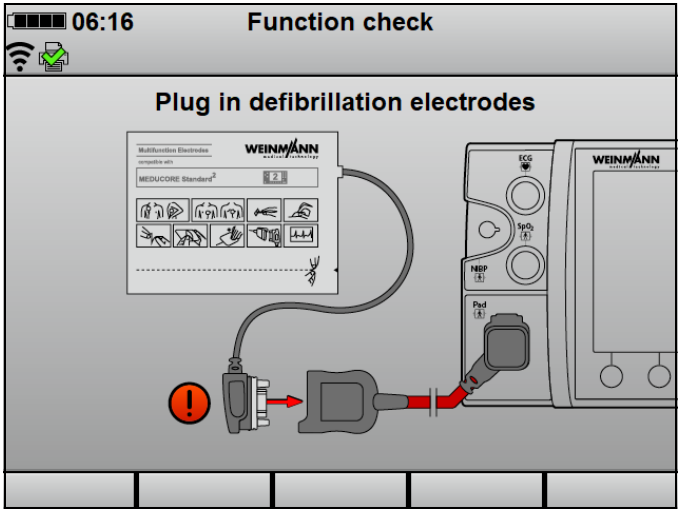
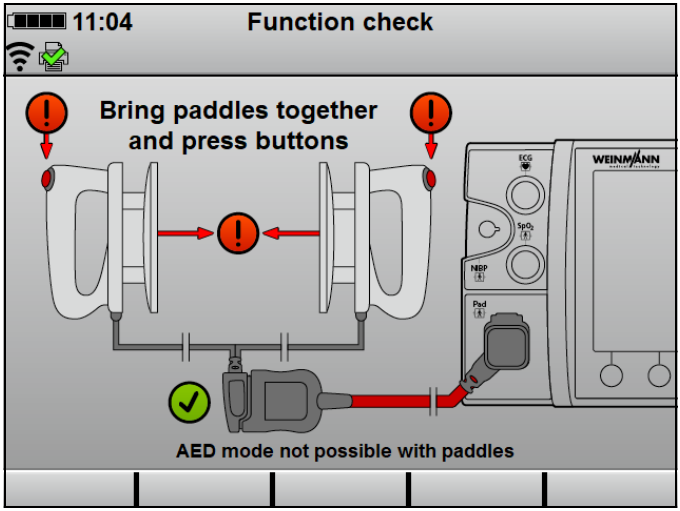
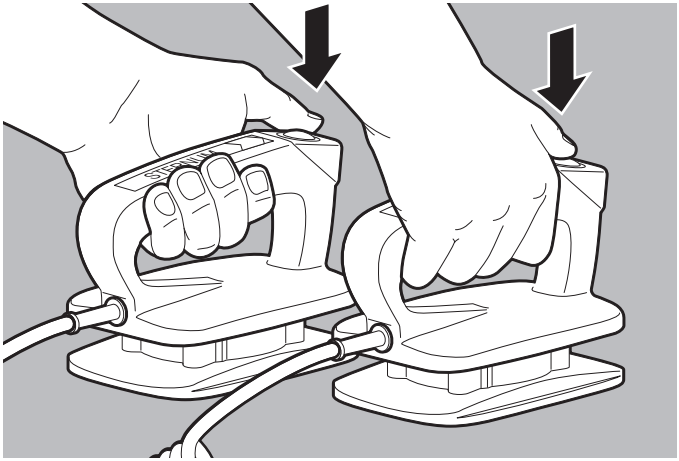


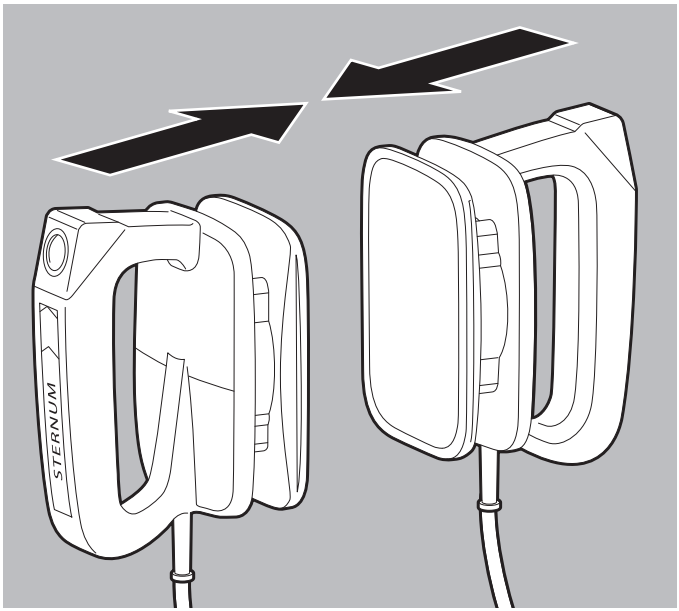
16. If defibrillation electrodes are being used: Disconnect the function test resistor from the master cable and connect defibrillation electrodes to the master cable.



17. If paddles are being used: Disconnect the function test resistor from the master cable and connect paddles to the master cable.



18. Press both buttons on the paddles.



19. Briefly press the paddles together.

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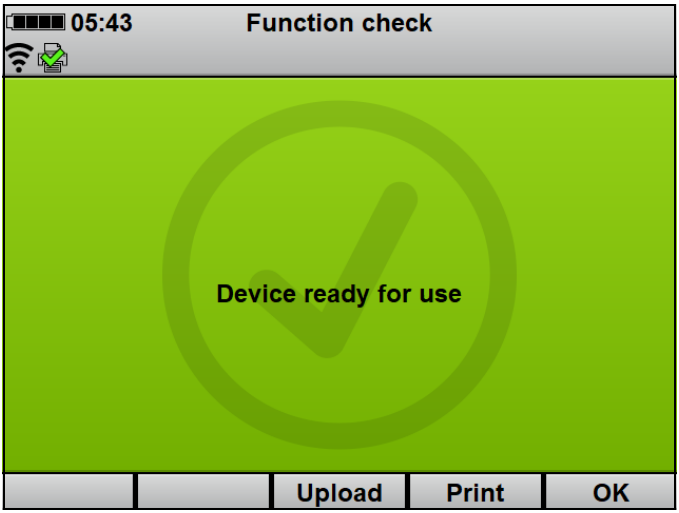
The status report appears (example: Function check passed):



20. Print the function check report by pressing the **Print** function button (only with **Printing** option) (see "6.16.5 Printing a function check report", page 201).

21. Upload the function check to WEINMANN Connect with the **Upload** function button (see "5.3 Uploading function check to WEINMANN Connect", page 112).

⚠ WARNING

Risk of injury due to device not ready for use!
If you operate the device after a failed function check, the patient may be injured.
⇒ Only operate the device after it passes a function check.

22. Proceed with the device according to the following table:

Display	Meaning	Action
Device ready for use	Function check passed	Use device without restriction.

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Display	Meaning	Action
Device not ready for use	Function check failed **or** Function check canceled	Repeat the function check.
		Contact the manufacturer or a technician expressly authorized by WEINMANN Emergency.
Device ready for use The service symbol flashes in the start menu.	Function check passed, but note about service due	Use device without restriction, but have device checked.

23. Finish function check with the **OK** function button.
    The start menu appears.
24. Connect the ECG cable to the ECG connection for ECG cable.
25. Connect the NIBP cuff to the NIBP connection for the NIBP connecting tube using the NIBP connecting tube.

Result The function check is complete. The device is ready for use.

5.3 Uploading function check to WEINMANN Connect

Requirement

- A default network has been configured (see "12.3 Configuring default network", page 292).
- The device has been registered with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298).
- A function check has been carried out.
- The status report of the function check is displayed.

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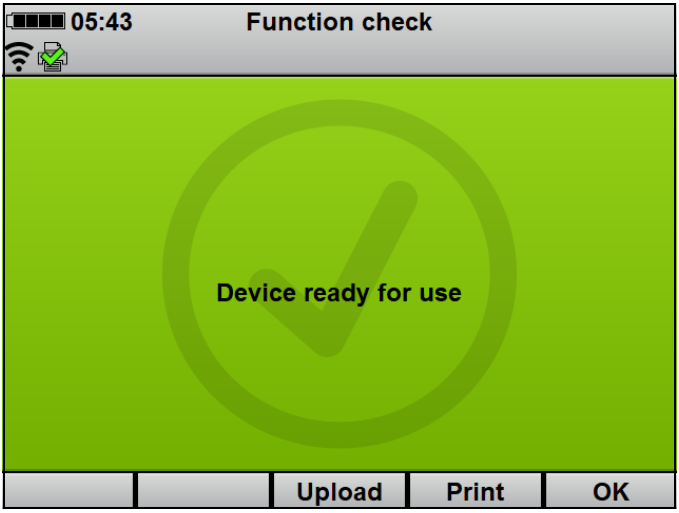

1. Select the **Upload** function button.
   All configured networks are displayed.
2. Select a network within range.
3. Confirm with the **OK** function button.
   The device connects to the selected network and uploads the result of the function check to WEINMANN Connect. When upload is successful, the symbol appears in the display. If upload is unsuccessful, the symbol appears in the display and an alarm is displayed (see "11.2 Alarm messages", page 271).
4. Confirm with the **OK** function button.

Result The function check has been uploaded to WEINMANN Connect.

5.4 Checking ECG cables

In addition to visual inspection of the ECG cables (see "5.2 Carrying out a function check", page 104), WEINMANN Emergency recommends checking the function of ECG cables at regular intervals.

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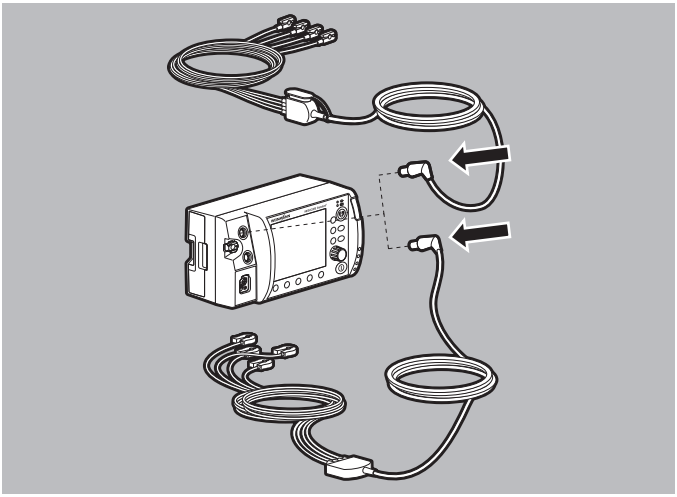
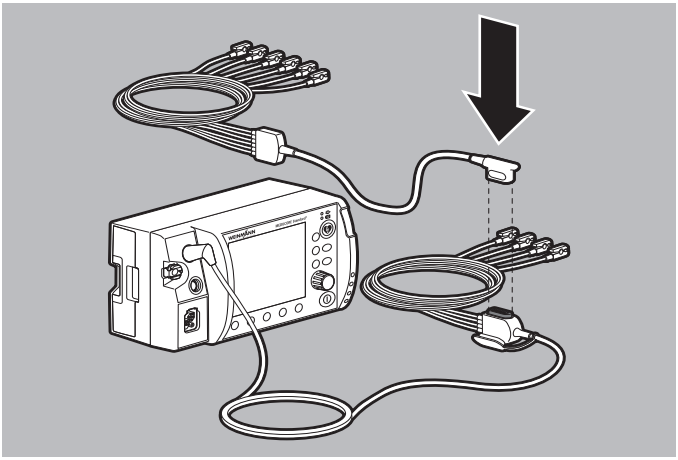


1. Connect the ECG cable to the ECG connection for ECG cable.

   Alternatively:

   Connect the ECG cable to the ECG connection for ECG cable using the connection for 12-lead ECG extension cable.



2. To check 12-lead ECG recording and assessment:
   Connect the 12-lead ECG extension cable to the ECG cable with connection for 12-lead ECG extension cable.

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3. Connect the terminals of the ECG cables used to an ECG simulator:
   - ECG simulator, 6-lead ECG, shockable WM 45444
   - ECG simulator, 12-lead ECG, shockable WM 45445

In principle, any ECG simulator can be used. Alternatively, the ECG cables can also be tested on a volunteer test subject.

4. Switch on the ECG simulator and set a sinus rhythm.
5. Switch on the device (see "6.1 Switching on the device", page 118).
   The start menu appears.
6. Select the **Adult** patient group (see "6.4 Selecting patient group", page 120).
7. If the ECG curve is shown in the center curve field: Press the **Lead** button to display all ECG leads.
8. Assess the ECG leads:
   - All ECG leads must be displayed.
   - All ECG leads must display the set sinus rhythm.
   - Shaking the cable must not result in one or more ECG leads either not being displayed or being displayed with faults.
9. If ECG leads are not shown or are shown with faults: Replace ECG cable.
10. Switch off the device (see "6.2 Switching the device off", page 119).
11. Disconnect the ECG simulator from the ECG cable used.

Result The ECG cables have been checked.

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5.5 Checking NIBP cuff and NIBP connecting tube

In addition to visual inspection of the NIBP cuff and NIBP connecting tube (see "5.2 Carrying out a function check", page 104), WEINMANN Emergency recommends checking the function of parts at regular intervals:

1. Carry out non-invasive blood pressure measurement on a volunteer test subject (see "6.12 Non-invasive blood pressure measurement (NIBP measurement)", page 182).
2. Watch for escaping air during the measurement to ensure that the system is free from leaks.
3. If the NIBP connecting tube leaks: Replace the NIBP connecting tube.
4. If the NIBP cuff leaks: Replace the NIBP cuff.
5. If non-invasive blood pressure measurement takes too long or produces implausible results: Check whether the patient group and NIBP cuff are suitable for the test subject and that the NIBP cuff has been attached correctly (see "6.12.1 Preparing non-invasive blood pressure measurement (NIBP measurement)", page 182).
6. Repeat non-invasive blood pressure measurement.
7. If the non-invasive blood pressure measurement again takes too long or produces incorrect results: Contact WEINMANN Emergency or a technician expressly authorized by WEINMANN Emergency.

Result The NIBP cuff and NIBP connecting tube have been checked.

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5.6 Carrying out a function check on the printer (only with Printing option)

At the end of the device function check you can print out a function check report. By assessing this report, you can check that the printer is working properly. This printer function check is not part of the device function check.

Requirement

- A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).
- The printer is switched on.

1. Carry out a function check of the device (see "5.2 Carrying out a function check", page 104).
2. When the status report appears: Print the function check report using the **Print** function button (see "6.16.5 Printing a function check report", page 201).
3. Assess whether the printer is working properly:
   - The function check report has been printed.
   - The function check report is legible in its entirety and not interrupted.
   - No other printer defect is apparent.

Result The printer function check has been completed.

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6 Operation

6.1 Switching on the device

Requirement

- The ECG cable is not connected to the patient.
- The defibrillation electrodes or paddles are not connected to the patient.
- A fully charged battery is inserted in the device.

1. Briefly press the On/Off button ⏻.

   An automatic self-test starts, which runs through the following items:

   - Alarm light flashes and test tone sounds
   - The start screen appears
   - Shock standby indicator comes on

   The self-test is successful when all of the steps mentioned have been completed.
   When doing so, please note:

Condition	**Device behavior**
Device switched off ≥ 30 s	• The start menu appears. • The device starts with the presets from the operator menu.
Device switched off for < 30 s and patient measured values determined beforehand **or** event saved manually	• The device starts in the mode previously active and with the preset start view. • The settings in the user menu from the last session are retained. • The device assigns the session data to the last session.
The ECG cable and the defibrillation electrodes/paddles are already connected to the patient at the start of the self-test	The device skips the test of the ECG module and the defibrillation module.

2. If one or more conditions are not met: Do not operate the device.

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3. Carry out a function check (see "5.2 Carrying out a function check", page 104).

Result The device is switched on.

6.2 Switching the device off

Requirement The device is switched on (see "6.1 Switching on the device", page 118).

1. Press and hold the On/Off button ⏻ for at least 2 seconds.

Result The device is completely switched off.

6.3 Navigating in the device

Action	**Result**			
	In a menu	**Within a menu item**	**In the start menu**	**In a mode**
◯ Press the function button	The function is shown in the display, directly above the function button (e.g. **AED** or **Back**).			
◯ Turn the navigation knob counterclockwise	Navigate upwards	Decrease value	Navigate upwards	-
◯ Turn the navigation knob clockwise	Navigate downwards	Increase value	Navigate downwards	-
◯ Press the navigation knob	Select menu item	Confirm the set value	Select menu item	Activate the application menu
▭ Press the menu button	Close the menu	Close the menu	Activate the operator menu	Activate the user menu

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Action	Result			
	In a menu	**Within a menu item**	**In the start menu**	**In a mode**
 Press the view button	-	-	-	Switch view: • Parameter view • Curve view In 12-lead ECG function mode (only with 12-lead ECG option): Change the number of leads displayed
 Press the event button	-	-	-	Opens the events list.
 Press the NIBP button	-	-	-	• Activate NIBP function mode (press for < 2 s) • Start NIBP measurement (press for > 2 s)

6.4 Selecting patient group

When you select a patient group, the presets which the operator specified for this patient group are loaded. If the operator has not specified presets, the factory settings are loaded.

Requirement The device is switched on (see "6.1 Switching on the device", page 118).

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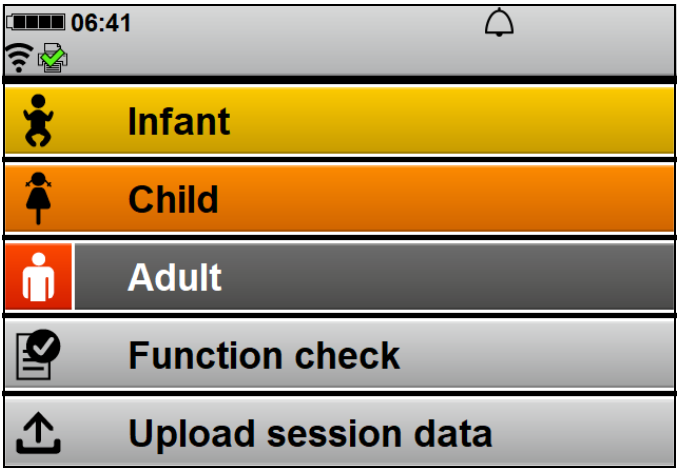
⚠ WARNING

Risk of injury due to incorrectly selected patient group!
If the wrong patient group is selected, the shock energy may be insufficient or too high for the selected patient group and may injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If the patient group is incorrect: Change the patient group in the application menu.



1. When the start menu is active: Select the patient group with the navigation knob.

   Alternatively:

   If the timer has expired: The device automatically selects the **Adult** patient group.

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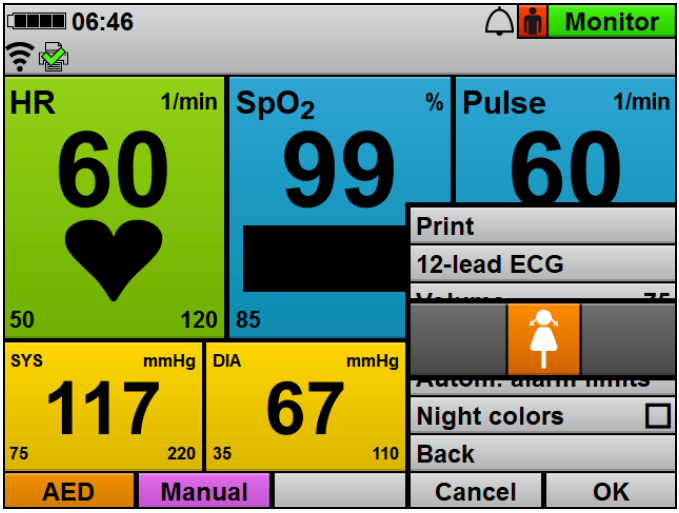

2. During ongoing operation: Open the application menu with the navigation knob and change the patient group.
   When doing so, please note: The Infant patient group is not available in AED mode.

Result The selected patient group is shown in the top right-hand corner next to mode display.

6.5 Preparing for shock delivery

6.5.1 Preparing for shock delivery using defibrillation electrodes

The following section describes how to connect the defibrillation electrodes to the device and attach them to the patient's torso. The specifications in the instructions for use provided by the manufacturer of the defibrillation electrodes and the information on the packaging of the defibrillation electrodes are key for use of the defibrillation electrodes. Observe these instructions for use and the packaging information.

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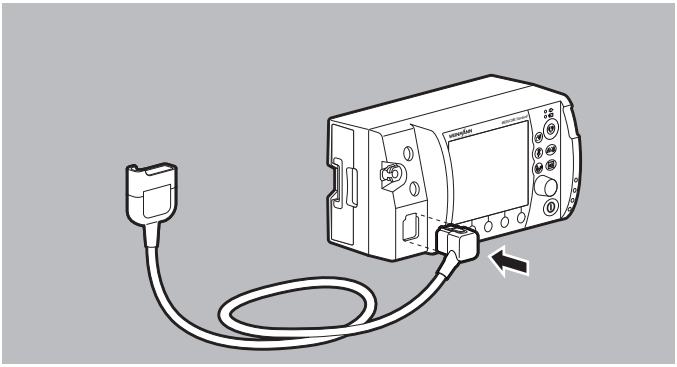

1. Connect the master cable connector to the Pad connection for master cable on the device.

⚠ CAUTION

Risk of injury due to incorrectly selected size of defibrillation electrodes!

If the wrong size of defibrillation electrodes is selected, this may result in sub-optimal defibrillation results or in burns.

⇒ Select the correct size of defibrillation electrodes in line with currently applicable guidelines and not based on the weight specifications given on the packaging.

2. Select defibrillation electrodes suitable for adults (Adult) or children (Pediatric).
3. In the case of defibrillation electrodes for children (Pediatric): Tear open the defibrillation electrode packaging and take out the defibrillation electrodes.

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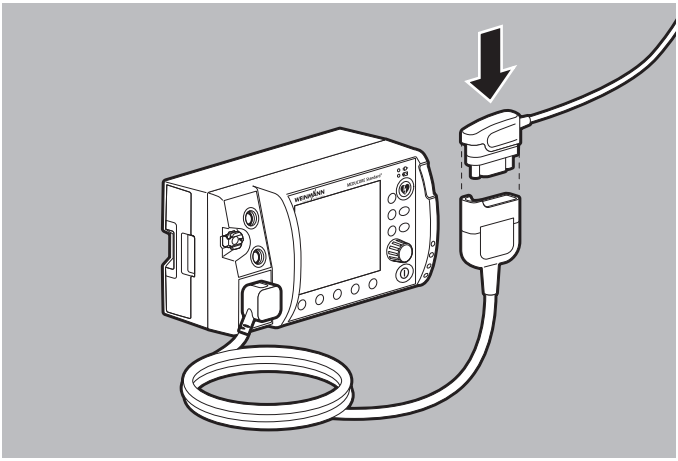

4. Attach the Pad connector of the defibrillation electrodes to the master cable.
   When doing so, please note: The Pad connector must be plugged in firmly.
5. Bare the patient's torso.

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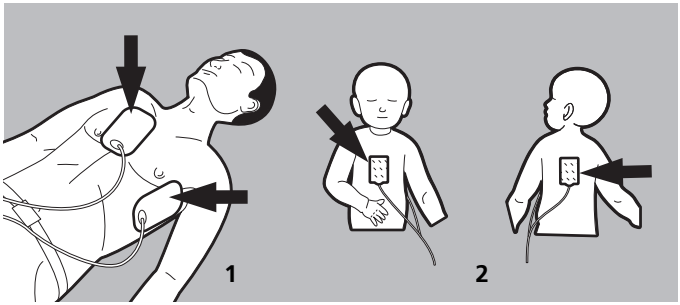
⚠ WARNING

Risk of injury from incorrect positioning of the defibrillation electrodes!

Incorrectly positioned defibrillation electrodes lead to a sub-optimal defibrillation/cardioversion result.

⇒ Select the correct electrode position in line with currently applicable guidelines.

⇒ Maintain distance from ECG electrodes.



6. Select the desired electrode position on the patient's torso:
   - Position **1**: Sternum-apex
   - Position **2**: Anterior-posterior (can also be used for adults)

⚠ WARNING

Risk of injury due to air/moisture between defibrillation electrodes and the patient's skin!

Air (e.g. in the case of hirsute patients) or moisture between the defibrillation electrodes and the patient's skin prevent correct shock delivery and may result in burns to the skin and unsuccessful defibrillation/cardioversion.

⇒ Remove hair from hirsute patients.

⇒ Rub the patient's skin dry.

⇒ Wipe down oily skin with an alcohol pad.

⇒ Press the defibrillation electrodes on firmly.

7. Remove hair from the torso.
8. Rub damp spots on the torso dry.
9. Wipe down oily skin with an alcohol pad.
10. In the case of defibrillation electrodes for adults (Adult): Tear open the defibrillation electrode packaging and take out the defibrillation electrodes.
11. Remove the protective film from the defibrillation electrodes.

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12. Attach defibrillation electrodes and press in place firmly.

⚠ WARNING

Risk of injury from defibrillation electrodes not adhering correctly!
If defibrillation electrodes have been attached incorrectly and are attached again, they no longer adhere correctly and may lead to inadequate shock delivery. This may injure the patient.
⇒ Always keep spare defibrillation electrodes to hand.
⇒ If defibrillation electrodes are attached incorrectly: Always use new defibrillation electrodes.

13. If defibrillation electrodes are attached incorrectly: Use new defibrillation electrodes instead of the old defibrillation electrodes.

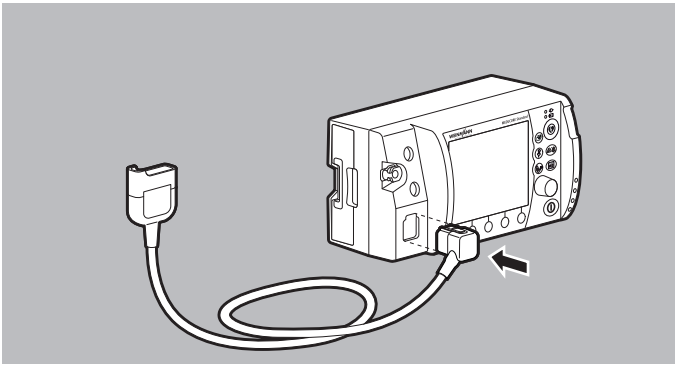
14. Stroke out any air trapped under the defibrillation electrodes.

Result Shock delivery via defibrillation electrodes is prepared.

6.5.2 Preparing for shock delivery using paddles

⚠ WARNING

Risk of injury from using paddles with the incorrect software version!
On devices with a software version < 2.1, the device does not detect paddles so they cannot be used correctly. This may injure the patient and the user.
⇒ Only use paddles on devices running software version 2.1 or above.



1. Connect the master cable connector to the Pad connection for master cable on the device.

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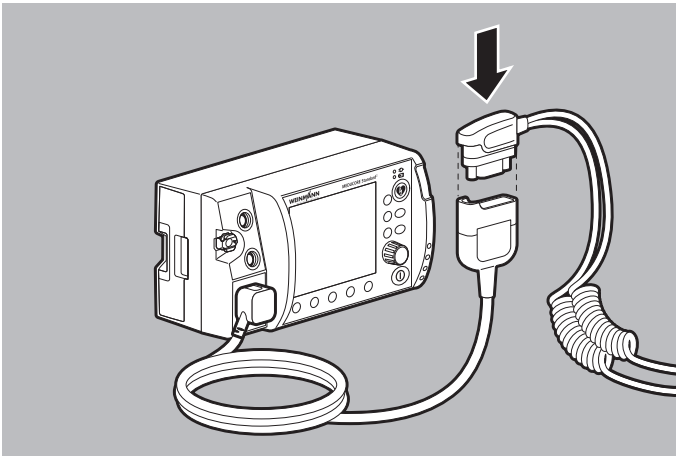

2. Connect the Pad connector of the paddles to the master cable. When doing so, please note: The Pad connector must be plugged in firmly.

⚠ WARNING

Risk of injury due to air/moisture between the paddles and the patient's skin!

Air (e.g. in the case of hirsute patients) or moisture between the paddles and the patient's skin prevent correct shock delivery and may result in burns to the skin and unsuccessful defibrillation/ cardioversion.

⇒ Remove hair from hirsute patients.
⇒ Rub the patient's skin dry.
⇒ Wipe down oily skin with an alcohol pad.
⇒ Always use electrode gel with paddles.
⇒ Always press paddles on firmly with a contact pressure of about 8 kg.

3. Remove hair from the torso.
4. Rub damp spots on the torso dry.
5. Wipe down oily skin with an alcohol pad.

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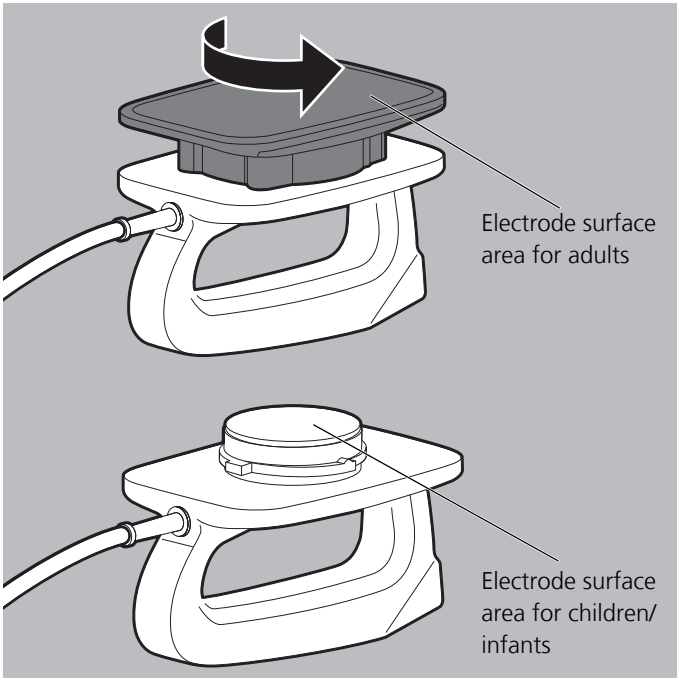

6. Select the electrode surface area of the paddles to suit the patient group:
   - Adults: Use attachments for large electrode surface areas.
   - Children/infants: Twist off and remove attachments for large electrode surface areas.
     The attachments for small electrode surface areas are located under the attachments for large electrode surface areas.

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⚠ WARNING

Risk of injury due to incorrect handling of electrode gel!
Incorrect handling of electrode gel may lead to electric shock, to ineffective shock delivery, and to burns, injuring the patient, user, and bystanders.
⇒ Always use electrode gel with paddles.
⇒ Do not allow any electrode gel to get between the surface of the electrode and the handle in order to prevent electric shock.
⇒ Do not use too much electrode gel to prevent a gel bridge and thus burns on the chest.
⇒ Do not use too little electrode gel to keep the resistance to the patient low for effective shock delivery and to prevent burns on the chest.

⚠ CAUTION

Risk of injury from the incorrect electrode gel!
The incorrect electrode gel may trigger intolerance reactions and lead to ineffective shock delivery. This may injure the patient.
⇒ Only use electrode gel recommended by WEINMANN Emergency.

7. Wet the electrode surfaces of the paddles completely with electrode gel.

Result Shock delivery via paddles is prepared.

6.6 Semi-automatic defibrillation in AED mode with defibrillation electrodes

The defibrillation sequence in AED mode described here corresponds to the device settings as delivered. The operator menu enables you to adapt the device to users' qualification level and to provide optimal support to users during resuscitation measures whilst taking regional features into account.

Requirement

- A charged battery is inserted in the device.
- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- Shock delivery via defibrillation electrodes is prepared (see "6.5.1 Preparing for shock delivery using defibrillation electrodes", page 122).

⚠ WARNING

Risk of injury due to unsuitable AED analysis algorithm in children below one year of age!
The device's AED analysis algorithm is not designed for children below one year of age and may result in injury to the child.
⇒ Do not use AED mode on children below one year of age.

⚠ WARNING

Risk of injury due to use of paddles in AED mode!
Shocks cannot be delivered using paddles in AED mode. This may result in injury to the patient.
⇒ Only use defibrillation electrodes in AED mode.

⚠ WARNING

Risk of injury due to missing battery!
Operation with line power without a battery prevents the device being fully ready for use as the shock capacitor in the device cannot charge. This prevents shock delivery and delays the patient's treatment.
⇒ Only operate the device with the battery inserted.

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⚠ CAUTION

Delay in treatment due to simultaneous voice prompts from defibrillator and ventilator!
If the defibrillator in AED mode is used in conjunction with a ventilator (MEDUMAT Easy CPR) which also guides the user through CPR by means of voice prompts, the simultaneous voice prompts from the defibrillator and ventilator may confuse the user and delay treatment.
⇒ When using the defibrillator in AED mode and a ventilator at the same time: Switch off the ventilator voice prompts.

1. Select AED mode using the **AED** function button.
   When doing so, please note:
   - Depending on the patient group selected, the AED settings from the operator menu which apply to this group are taken as the basis.
   - When defibrillation electrodes for children are connected, shock energy is limited to 100 J. If a higher shock energy was preset in the device, the device reduces the shock energy to 100 J.
   - The Infant patient group is not available since the AED analysis algorithm is not suitable for children under the age of 1 year.
   - No alarms are displayed or emitted in AED mode.
   - Only defibrillation electrodes can be used in AED mode.
   - During cardiac rhythm analysis, the system determines that "---" is displayed instead of heart rate.

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⚠ WARNING

Delayed or failed therapy due to defective defibrillation electrodes!
Defective defibrillation electrodes may delay or prevent analysis and continued therapy in AED mode and injure the patient.
⇒ Always keep spare defibrillation electrodes to hand.

2. If the AED instruction **Plug in defibrillation electrodes** appears in spite of correctly connected defibrillation electrodes: Use spare defibrillation electrodes.

⚠ WARNING

Risk of injury due to incorrectly selected patient group!
If an incorrect patient group is selected in AED mode, shock energy, energy progression and/or metronome frequency, the pause for ventilation, and the compressions/ventilation ratio may be unsuitable for the patient and injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If the patient group is incorrect: Change the patient group in the application menu.

3. If the patient group is incorrect: Open the application menu with the navigation knob and change the patient group. When doing so, please note: In AED mode, only the adult and child patient groups are available in the application menu.
4. Follow the voice prompts and AED instructions.

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If you operate the device via line power and the inserted battery is defective or if the battery does not have sufficient capacity to charge the shock capacitor, in AED mode the device guides you through CPR without charging for shocking. If you then insert an undamaged and sufficiently charged battery, the device starts cardiac rhythm analysis immediately and prepares to charge for shocking.

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Result The device carries out a cardiac rhythm analysis. The cardiac rhythm analysis has one of two results:

- Shock required (see " Shock required", page 133)

  or

- Shock not possible (see " Shock not possible", page 135)

Shock required

The device carries out a cardiac rhythm analysis, charges for shock delivery and outputs the message:

Voice prompt	**AED instruction**
Stand clear of the patient	**Stand clear of the patient**
Cardiac rhythm is being analyzed	**Analysis**

If, based on the cardiac rhythm analysis, the device determines that a shock is required, the device outputs the message:

Voice prompt	**AED instruction**
Shock required	**Shock required**
Press shock button	**Press shock button**

The shock button flashes and an audible alarm sounds.

⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may injure the user or bystanders.
⇒ Stand clear of the patient.
⇒ Keep patient away from liquids (e.g. blood, gel or saline solution).
⇒ Do not touch parts in contact with the patient (e.g. bed frames or stretchers).
⇒ Keep your distance from liquids in contact with the patient.
⇒ Clearly warn bystanders to stand clear of the patient or parts in contact with the patient and to keep their distance from liquids in contact with the patient.

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⚠ WARNING

Failure of therapy due to defibrillation electrodes accidentally coming loose during shock delivery!
Defibrillation electrodes accidentally coming loose during shock delivery may lead to damage to the device and thus to the failure of treatment. This may injure the patient.
⇒ Ensure that the defibrillation electrodes are always connected to the device during shock delivery.

1. Deliver a shock with the shock button .
   When doing so, please note:
   - Up until the shock is triggered, the device continues analyzing cardiac rhythm in the background and cancels the shock if the analysis result is **Shock not possible**.
   - If the shock button is not pressed, the shock capacitor discharges automatically after 15 s.
   - Only with the Print option: If the printer is connected to the device and the **Defibrillation report** menu item is activated (see "13.9 Printer settings (only with Printing option)", page 332), the printer automatically prints a defibrillation report after shock delivery (see "6.16.4 Printing a defibrillation report", page 201).

Result The patient has been given an electric shock. The shock energy corresponds to the settings in the operator menu. When the device is supplied, the device settings are as follows:

Patient group	Setting
Child	First shock: 75 J Further shocks: 75 J
Adult	First shock: 150 J Further shocks: 200 J

The device guides you through CPR by means of voice prompts, AED instructions, and the metronome (see " Carrying out CPR", page 135). It warns you again to stand clear of the patient after the preset time has elapsed (120 s when device supplied), to allow it to carry out another cardiac rhythm analysis.

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Shock not possible

The device carries out a cardiac rhythm analysis, charges for shock delivery and outputs the message:

Voice prompt	AED instruction
Stand clear of the patient	**Stand clear of the patient**
Cardiac rhythm is being analyzed	**Analysis**

If, based on the cardiac rhythm analysis, the device determines that a shock is **not** required, the device outputs the message:

Voice prompt	AED instruction
Shock not recommended	**Shock not recommended**

1. Carry out CPR (see " Carrying out CPR", page 135).

Result The patient does not have a cardiac rhythm which can be defibrillated. The device guides you through CPR by means of voice prompts, AED instructions, and the metronome. It warns you again to stand clear of the patient after the preset time has elapsed (120 s when device supplied), to allow it to carry out another cardiac rhythm analysis.

Carrying out CPR

This section describes CPR in AED mode. When supplied, the device carries out CPR with the following parameters; these, however, can be adapted by the operator:

Setting	Patient group	
	Adult	**Child**
CPR phase		
Duration	120 s	120 s
Pause for ventilation	5 s	5 s

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Setting	Patient group	
	Adult	**Child**
Audio outputs		
CPR voice prompts	Deactivated	Deactivated
Metronome	15:2/30:2	15:2/30:2
CV ratio	30:2	15:2
Metronome frequency	100/min	100/min
Start analysis automatically		
Start analysis automatically	Activated	Activated

After cardiac rhythm analysis and shock delivery (if necessary), the device instructs you to carry out CPR. A metronome provides a guide for chest compressions.

Voice prompt (optional)	AED instruction
Carry out cardiopulmonary resuscitation	**CPR**

1. Carry out chest compressions:
   - 30 chest compressions for the adult patient group
   - 15 chest compressions for the child patient group
   - Continuous chest compression on intubated patients

   When doing so, please note:
   - The metronome sets the ideal frequency.
   - The device only issues certain AED instructions and voice prompts after CPR is complete (**Operator menu | Adult AED settings/Child AED settings | CPR phase | Duration**), as complete and correct carrying out of cardiopulmonary resuscitation takes priority.

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After 30/15 metronome beats, there is a pause to allow for ventilation:

Voice prompt (optional)	AED instruction
Ventilate twice	**Ventilate twice**

2. Ventilate the patient twice.

The device outputs the message:

Voice prompt (optional)	AED instruction
Carry out cardiopulmonary resuscitation	**CPR**

3. Repeat the CPR sequence.
4. If the patient is intubated:
   - Open the application menu using the navigation knob.
   - Select the  symbol in the **Metronome** menu item.
5. If the patients shows vital signs (breathing, response): Take basic patient care steps.
6. Before every cardiac rhythm analysis: Check that the defibrillation electrodes are positioned correctly.

Result CPR has been carried out.

6.7 Manual defibrillation (only with Manual defibrillation option)

6.7.1 Carrying out manual defibrillation using defibrillation electrodes

This function is only available if manual mode has been enabled and activated by the operator: **Operator menu | System settings | Enable options | Manual defibrillation** (see "13.12 System settings", page 342).

If you are the operator of the device and have access to the operator menu, you can disable manual mode: **Operator menu | System settings | Disable functions | Manual mode** (see "13.12 System settings", page 342).

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Requirement

- A charged battery is inserted in the device.
- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- Shock delivery via defibrillation electrodes is prepared (see "6.5.1 Preparing for shock delivery using defibrillation electrodes", page 122).

⚠ WARNING

Risk of injury due to lack of knowledge and failure to follow guidelines in manual mode!
The use of manual mode by users without medical qualifications and training in defibrillation/cardioversion and/or failure to follow guidelines may result in injury to the patient, user or bystanders.
⇒ Only use manual mode if the user has a medical qualification and is familiar with device operation and options.
⇒ Follow currently applicable guidelines on defibrillation/ cardioversion.
⇒ Observe national and regional provisions on defibrillation/ cardioversion.
⇒ Observe organizational guidelines on defibrillation/ cardioversion.
⇒ Include the patient condition when deciding on treatment.

⚠ WARNING

Risk of injury due to incorrectly selected patient group!
If the wrong patient group is selected, the shock energy may be insufficient or too high for the selected patient group and may injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If the patient group is incorrect: Change the patient group in the application menu.

1. If the patient group is incorrect: Open the application menu with the navigation knob and change the patient group.
2. Select manual mode with the **Manual** function button. When doing so, please note:

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- It is not possible to switch to parameter view in manual mode. If you activate manual mode from parameter view, the device automatically switches to curve view, since for manual shock delivery the ECG analysis is required in the display.
- Audio alarm output is deactivated in manual mode.

3. To activate audio alarm output: Briefly press the alarm button .
4. Evaluate the ECG lead.
5. If shock is required: Select shock energy using the **Energy** function button.
   When doing so, please note: When the defibrillation electrodes for children (Pediatric) are connected, the shock energy is automatically restricted to 100 J. It is not possible to set a higher shock energy in manual mode.
6. Press the **Charge** function button.
   The charge progress bar appears. A rising charging tone sounds until the device is ready to deliver the shock. When the device is charged, a sequence of tones sounds which signals shock standby and the shock button flashes.
7. To cancel shock charging: Cancel shock charging by pressing the **Cancel** function button or by switching to another mode.
8. Check the ECG leads to see whether defibrillation is still indicated.

⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may injure the user or bystanders.
⇒ Stand clear of the patient.
⇒ Keep patient away from liquids (e.g. blood, gel or saline solution).
⇒ Do not touch parts in contact with the patient (e.g. bed frames or stretchers).
⇒ Keep your distance from liquids in contact with the patient.
⇒ Clearly warn bystanders to stand clear of the patient or parts in contact with the patient and to keep their distance from liquids in contact with the patient.

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⚠ WARNING

Failure of therapy due to defibrillation electrodes accidentally coming loose during shock delivery!
Defibrillation electrodes accidentally coming loose during shock delivery may lead to damage to the device and thus to the failure of treatment. This may injure the patient.
⇒ Ensure that the defibrillation electrodes are always connected to the device during shock delivery.

9. Deliver a shock with the shock button .
   When doing so, please note:
   - If the shock button is not pressed, the shock capacitor discharges automatically after 30 seconds.
   - Only with the Print option: If the printer is connected to the device and the **Defibrillation report** menu item is activated (see "13.9 Printer settings (only with Printing option)", page 332), the printer automatically prints a defibrillation report after shock delivery (see "6.16.4 Printing a defibrillation report", page 201).

Result The patient has been given an electric shock.

6.7.2 Carrying out manual defibrillation using paddles

This function is only available if manual mode has been enabled and activated by the operator: **Operator menu | System settings | Enable options | Manual defibrillation** (see "13.12 System settings", page 342).

If you are the operator of the device and have access to the operator menu, you can disable manual mode: **Operator menu | System settings | Disable functions | Manual mode** (see "13.12 System settings", page 342).

Requirement
- A charged battery is inserted in the device.
- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).

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- Shock delivery via paddles is prepared (see "6.5.2 Preparing for shock delivery using paddles", page 126).

⚠ WARNING

Risk of injury due to lack of knowledge and failure to follow guidelines in manual mode!
The use of manual mode by users without medical qualifications and training in defibrillation/cardioversion and/or failure to follow guidelines may result in injury to the patient, user or bystanders.
⇒ Only use manual mode if the user has a medical qualification and is familiar with device operation and options.
⇒ Follow currently applicable guidelines on defibrillation/ cardioversion.
⇒ Observe national and regional provisions on defibrillation/ cardioversion.
⇒ Observe organizational guidelines on defibrillation/ cardioversion.
⇒ Include the patient condition when deciding on treatment.

⚠ WARNING

Risk of injury due to incorrectly selected patient group!
If the wrong patient group is selected, the shock energy may be insufficient or too high for the selected patient group and may injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If the patient group is incorrect: Change the patient group in the application menu.

1. If the patient group is incorrect: Open the application menu with the navigation knob and change the patient group.
2. Adapt the electrode surface area of the paddles to suit the changed patient group (see "6.5.2 Preparing for shock delivery using paddles", page 126).
3. Select manual mode with the **Manual** function button. When doing so, please note:
   - It is not possible to switch to parameter view in manual mode. If you activate manual mode from parameter view, the device automatically switches to curve view, since for manual shock delivery the ECG analysis is required in the display.
   - Audio alarm output is deactivated in manual mode.

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4. To activate audio alarm output: Briefly press the alarm button  .

⚠ WARNING

Risk of injury from movement artifacts during rapid derivation!
Movement artifacts may falsify the ECG and lead to misinterpretations. This may injure the patient.
⇒ In the normal case, use 6-lead ECG monitoring.
⇒ Only use rapid derivation in an emergency.

5. Prepare 6-lead ECG monitoring (see "6.10.1 Preparing 6-lead ECG monitoring", page 164).

   Alternatively:

   Position paddles on the upper torso in line with currently applicable guidelines to carry out a rapid derivation.

6. Evaluate the ECG lead.
7. If necessary: Select another ECG lead using the **Lead** function button.

⚠ CAUTION

Risk of injury due to incorrectly selected shock energy in children!
If the attachments for small electrode surfaces are used in combination with too high a shock energy on the paddles, this may lead to injuries in children/infants.
⇒ When using the attachments for small electrode surfaces, set a maximum shock energy of 100 J for children/infants.

8. If shock is required: Select shock energy using the **Energy** function button.

⚠ WARNING

Risk of injury from incorrect positioning of the paddles!
Incorrect positioning of the paddles may lead to incorrect measurements and unsuccessful defibrillation. This may injure the patient.
⇒ Select the position of the paddles in accordance with the diagram.
⇒ Maintain distance from ECG electrodes.

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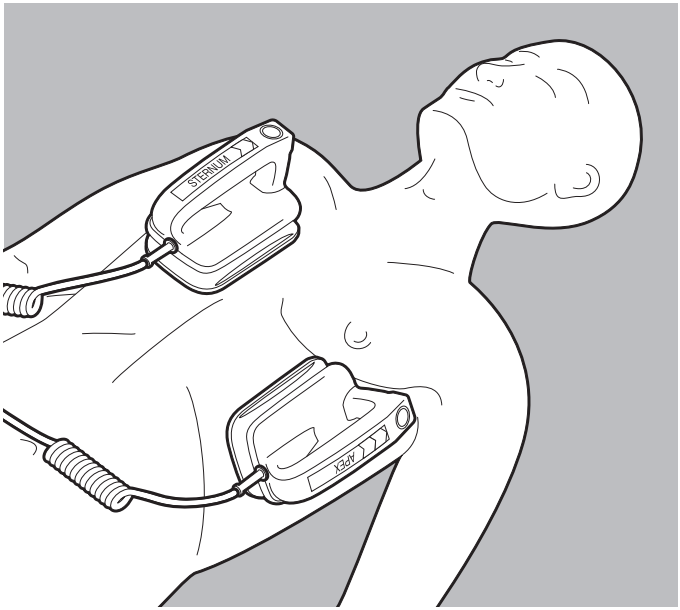

9. Position paddles on the upper torso in accordance with currently applicable guidelines.
10. Briefly press and release the charge button (**CHARGE**) on the **APEX** paddle.
    When doing so, please note: The shock capacitor can only be charged if the user menu is not activated.

    The charge progress bar appears. A rising charging tone sounds until the device is ready to deliver the shock.
11. To cancel shock charging: Cancel shock charging by pressing the **Cancel** function button or by switching to another mode.
12. Check the ECG leads to see whether defibrillation is still indicated.

⚠ WARNING

Risk of injury due to paddles having an inadequate contact pressure!
Too low a contact pressure of the paddles leads to a high resistance against the patient and may prevent shock delivery (at a resistance > 400 Ω). This may injure the patient.
⇒ Always press paddles on with a contact pressure of about 8 kg.

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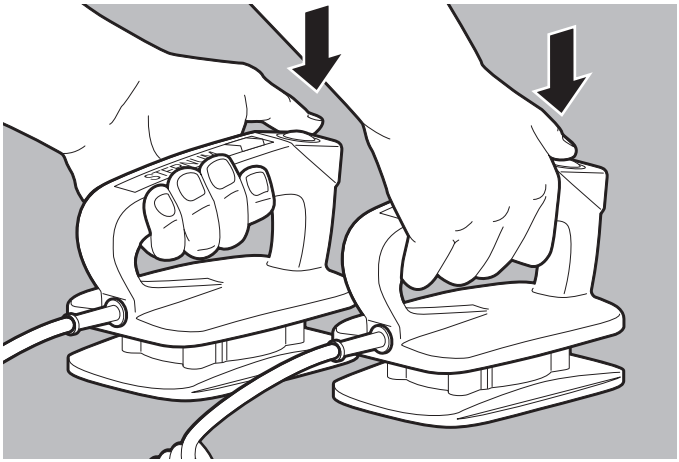
13. Press on paddles with a contact pressure of about 8 kg to keep resistance to the patient low.

⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may injure the user or bystanders.
⇒ Stand clear of the patient.
⇒ Keep patient away from liquids (e.g. blood, gel or saline solution).
⇒ Do not touch parts in contact with the patient (e.g. bed frames or stretchers).
⇒ Keep your distance from liquids in contact with the patient.
⇒ Clearly warn bystanders to stand clear of the patient or parts in contact with the patient and to keep their distance from liquids in contact with the patient.



14. Press both buttons (**SHOCK**) on the paddles simultaneously.
When doing so, please note: Only with Printing option: If the printer is connected to the device and the **Defibrillation report** menu item is activated (see "13.9 Printer settings (only with Printing option)", page 332), the printer prints a defibrillation report (see "6.16.4 Printing a defibrillation report", page 201).

Result The patient has been given an electric shock.

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6.8 Cardioversion (only with Cardioversion option)

6.8.1 Carrying out cardioversion using defibrillation electrodes

In cardioversion, shock delivery is synchronized with the R wave of the ECG (**SYNC**).

Requirement

- A charged battery is inserted in the device.
- The patient is prepared in line with currently applicable guidelines.
- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- Shock delivery via defibrillation electrodes is prepared (see "6.5.1 Preparing for shock delivery using defibrillation electrodes", page 122).
- 6-lead ECG monitoring is prepared (see "6.10.1 Preparing 6-lead ECG monitoring", page 164).

⚠ WARNING

Risk of injury from movement artifacts when using defibrillation electrodes for synchronous shock delivery!
Cardioversion cannot be carried out without 6-lead monitoring, as the device may erroneously detect movement artifacts as R waves and deliver a shock at the wrong time. This may injure the patient.
⇒ Always carry out 6-lead ECG monitoring for synchronous shock delivery.

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⚠ WARNING

Risk of injury due to lack of knowledge and failure to follow guidelines in manual mode!

The use of manual mode by users without medical qualifications and training in defibrillation/cardioversion and/or failure to follow guidelines may result in injury to the patient, user or bystanders.

⇒ Only use manual mode if the user has a medical qualification and is familiar with device operation and options.

⇒ Follow currently applicable guidelines on defibrillation/ cardioversion.

⇒ Observe national and regional provisions on defibrillation/ cardioversion.

⇒ Observe organizational guidelines on defibrillation/ cardioversion.

⇒ Include the patient condition when deciding on treatment.

⚠ WARNING

Risk of injury due to incorrectly selected patient group!

If the wrong patient group is selected, the shock energy may be insufficient or too high for the selected patient group and may injure the patient.

⇒ Adapt the patient group to the patient.

⇒ If the patient group is incorrect: Change the patient group in the application menu.

1. If the patient group is incorrect: Open the application menu with the navigation knob and change the patient group.
2. Select manual mode with the **Manual** function button. When doing so, please note:
   - It is not possible to switch to parameter view in manual mode. If you activate manual mode from parameter view, the device automatically switches to curve view, since for manual shock delivery the ECG analysis is required in the display.
   - Audio alarm output is deactivated in manual mode.
3. To activate audio alarm output:
   Briefly press the alarm button (⚠).
4. Evaluate the ECG lead.
5. If necessary: Select another ECG lead using the **Lead** function button.

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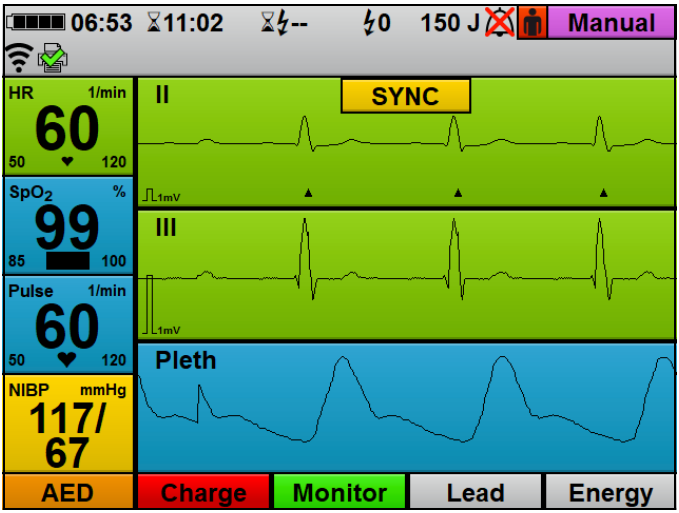
6. If cardioversion is required: Select shock energy using the **Energy** function button.
7. Open the application menu using the navigation knob.



8. Select and activate the **SYNC** menu item.
   Manual mode switches to cardioversion:
   - The **SYNC** marking indicates that the next shock delivery will be synchronized with the R wave.
   - In the ECG, R waves are marked with a triangle ▲.
9. Wait until the ECG curve has stabilized.

⚠ WARNING

Delayed therapy due to incorrectly selected feed rate for the ECG!
An incorrectly selected feed rate may make it harder to assess R waves, delaying therapy.
⇒ Select the feed rate of the ECG so that reliable assessment of R wave detection is possible.

10. Select the feed rate of the ECG so that reliable assessment of R wave detection is possible.

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⚠ WARNING

Risk of injury due to shock being delivered at the wrong time during cardioversion!

A cardioversion carried out at the wrong time may lead to cardiac arrhythmias and cause the patient severe or life-threatening injury.

⇒ Ensure that the ECG is stable.

⇒ Ensure that the device detects and marks R waves correctly in the ECG.

⚠ CAUTION

Risk of injury from pacemaker pulses incorrectly detected as R waves!

Pacemaker pulses may lead to the device interpreting them as R waves and triggering a shock at the wrong time.

⇒ Ensure that the device detects and marks R waves correctly in the ECG.

11. Check the ECG curve, and that the triangles ▲ match the R waves.
    When doing so, please note:
    - The ECG curve must be stable.
    - The triangles ▲ must be present.
    - The position of the triangles ▲ must match the position of the R waves.
    - The triangles ▲ must not be displaced from heartbeat to heartbeat.
    - The triangles ▲ must mark every R wave reliably.
12. Press the **Charge** function button.
    The charge progress bar appears. A rising charging tone sounds until the device is ready to deliver the shock. When the device is charged, a sequence of tones sounds which signals shock standby and the shock button ⚡ flashes.
13. To cancel shock charging: Cancel shock charging by pressing the **Cancel** function button or by switching to another mode.
14. Check the ECG leads to see whether cardioversion is still indicated.

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⚠ WARNING

Risk of injury due to movement artifacts!
Movement artifacts erroneously detected as R waves may cause the device to deliver a shock at the wrong time and thus injure the patient.
⇒ Prepare the patient for cardioversion in line with currently applicable guidelines in order to avoid patient movements.
⇒ Stand clear of the patient to avoid movement artifacts.

⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may injure the user or bystanders.
⇒ Stand clear of the patient.
⇒ Keep patient away from liquids (e.g. blood, gel or saline solution).
⇒ Do not touch parts in contact with the patient (e.g. bed frames or stretchers).
⇒ Keep your distance from liquids in contact with the patient.
⇒ Clearly warn bystanders to stand clear of the patient or parts in contact with the patient and to keep their distance from liquids in contact with the patient.

⚠ WARNING

Failure of therapy due to defibrillation electrodes accidentally coming loose during shock delivery!
Defibrillation electrodes accidentally coming loose during shock delivery may lead to damage to the device and thus to the failure of treatment. This may injure the patient.
⇒ Ensure that the defibrillation electrodes are always connected to the device during shock delivery.

15. Press and hold the shock button to deliver the shock. When doing so, please note:
    - The device synchronizes shock delivery with the next R wave.
    - If the shock button is not held down, or the device does not detect an R wave after the shock button has been pressed, the shock capacitor discharges automatically after 5 s.

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- Only with Printing option: If the printer is connected to the device and the **Defibrillation report** menu item is activated (see "13.9 Printer settings (only with Printing option)", page 332), the printer prints a defibrillation report (see "6.16.4 Printing a defibrillation report", page 201).
- After shock delivery, cardioversion (**SYNC** marking) remains activated in manual mode. You can set in the operator menu whether further cardioversion or defibrillation is to follow cardioversion (see "13.5 Manual mode settings (only with Manual defibrillation option)", page 321).

Result The patient has undergone cardioversion.

6.8.2 Carrying out cardioversion using paddles

In cardioversion, shock delivery is synchronized with the R wave of the ECG (**SYNC**). The ECG is derived via the ECG cable.

Requirement

- A charged battery is inserted in the device.
- The patient is prepared in line with currently applicable guidelines.
- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- Shock delivery via paddles is prepared (see "6.5.2 Preparing for shock delivery using paddles", page 126).
- 6-lead ECG monitoring is prepared (see "6.10.1 Preparing 6-lead ECG monitoring", page 164).

⚠ WARNING

Risk of injury from movement artifacts when using paddles for synchronous shock delivery!
Cardioversion cannot be carried out without 6-lead monitoring, as the device may erroneously detect movement artifacts as R waves and deliver a shock at the wrong time. This may injure the patient.
⇒ Always carry out 6-lead ECG monitoring for synchronous shock delivery.

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⚠ WARNING

Risk of injury due to lack of knowledge and failure to follow guidelines in manual mode!

The use of manual mode by users without medical qualifications and training in defibrillation/cardioversion and/or failure to follow guidelines may result in injury to the patient, user or bystanders.

⇒ Only use manual mode if the user has a medical qualification and is familiar with device operation and options.

⇒ Follow currently applicable guidelines on defibrillation/ cardioversion.

⇒ Observe national and regional provisions on defibrillation/ cardioversion.

⇒ Observe organizational guidelines on defibrillation/ cardioversion.

⇒ Include the patient condition when deciding on treatment.

⚠ WARNING

Risk of injury due to incorrectly selected patient group!

If the wrong patient group is selected, the shock energy may be insufficient or too high for the selected patient group and may injure the patient.

⇒ Adapt the patient group to the patient.

⇒ If the patient group is incorrect: Change the patient group in the application menu.

1. If the patient group is incorrect: Open the application menu with the navigation knob and change the patient group.
2. Adapt the electrode surface area of the paddles to suit the changed patient group (see "6.5.2 Preparing for shock delivery using paddles", page 126).
3. Select manual mode with the **Manual** function button. When doing so, please note:
   - It is not possible to switch to parameter view in manual mode. If you activate manual mode from parameter view, the device automatically switches to curve view, since for manual shock delivery the ECG analysis is required in the display.
   - Audio alarm output is deactivated in manual mode.
4. To activate audio alarm output: Briefly press the alarm button (⚠).
5. Evaluate the ECG lead.

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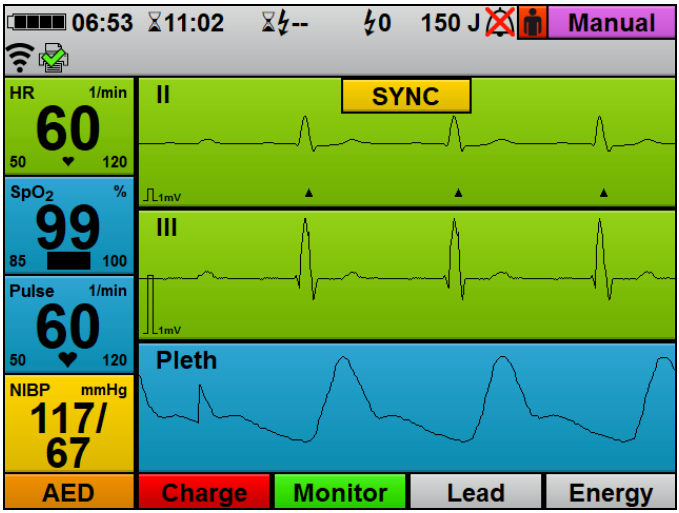
6. If necessary: Select another ECG lead using the **Lead** function button.

⚠ CAUTION

Risk of injury due to incorrectly selected shock energy in children!
If the attachments for small electrode surfaces are used in combination with too high a shock energy on the paddles, this may lead to injuries in children/infants.
⇒ When using the attachments for small electrode surfaces, set a maximum shock energy of 100 J for children/infants.

7. If cardioversion is required: Select shock energy using the **Energy** function button.
8. Open the application menu using the navigation knob.



9. Select and activate the **SYNC** menu item.
   Manual mode switches to cardioversion:
   - The **SYNC** marking indicates that the next shock delivery will be synchronized with the R wave.
   - In the ECG, R waves are marked with a triangle ▲.

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⚠ WARNING

Risk of injury due to shock delivery with an unstable ECG curve!
An unstable ECG curve may lead to shock delivery at the wrong time. This may injure the patient.
⇒ Always wait until the ECG curve has stabilized.

10. Wait until the ECG curve has stabilized.

⚠ WARNING

Delayed therapy due to incorrectly selected feed rate for the ECG!
An incorrectly selected feed rate may make it harder to assess R waves, delaying therapy.
⇒ Select the feed rate of the ECG so that reliable assessment of R wave detection is possible.

11. Select the feed rate of the ECG so that reliable assessment of R wave detection is possible.

⚠ WARNING

Risk of injury due to shock being delivered at the wrong time during cardioversion!
A cardioversion carried out at the wrong time may lead to cardiac arrhythmias and cause the patient severe or life-threatening injury.
⇒ Ensure that the ECG is stable.
⇒ Ensure that the device detects and marks R waves correctly in the ECG.

⚠ CAUTION

Risk of injury from pacemaker pulses incorrectly detected as R waves!
Pacemaker pulses may lead to the device interpreting them as R waves and triggering a shock at the wrong time.
⇒ Ensure that the device detects and marks R waves correctly in the ECG.

12. Check the ECG curve, and that the triangles ▲ match the R waves.
    When doing so, please note:
    - The ECG curve must be stable.
    - The triangles ▲ must be present.
    - The position of the triangles ▲ must match the position of the R waves.
    - The triangles ▲ must not be displaced from heartbeat to heartbeat.

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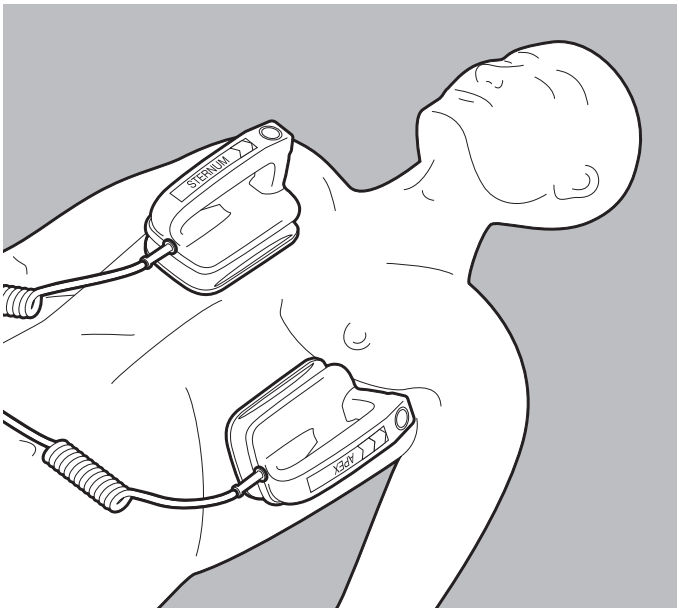
- The triangles ▲ must mark every R wave reliably.



13. Position paddles on the upper torso in accordance with currently applicable guidelines.
14. Briefly press and release the charge button (**CHARGE**) on the **APEX** paddle.
    When doing so, please note: The shock capacitor can only be charged if the user menu is not activated.

    The charge progress bar appears. A rising charging tone sounds until the device is ready to deliver the shock.
15. To cancel shock charging: Cancel shock charging by pressing the **Cancel** function button or by switching to another mode.
16. Check the ECG leads to see whether cardioversion is still indicated.

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⚠ WARNING

Risk of injury due to paddles having an inadequate contact pressure!
Too low a contact pressure of the paddles leads to a high resistance against the patient and may prevent shock delivery (at a resistance > 400 Ω). This may injure the patient.
⇒ Always press paddles on with a contact pressure of about 8 kg.

17. Press on paddles with a contact pressure of about 8 kg to keep resistance to the patient low.

⚠ WARNING

Risk of injury due to movement artifacts!
Movement artifacts erroneously detected as R waves may cause the device to deliver a shock at the wrong time and thus injure the patient.
⇒ Hold the paddles still after pressing them on.
⇒ Again, check the ECG curve and that the triangles ▲ match the R waves before shock delivery.

18. Again, check the ECG curve and that the triangles ▲ match the R waves before shock delivery.

⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may injure the user or bystanders.
⇒ Stand clear of the patient.
⇒ Keep patient away from liquids (e.g. blood, gel or saline solution).
⇒ Do not touch parts in contact with the patient (e.g. bed frames or stretchers).
⇒ Keep your distance from liquids in contact with the patient.
⇒ Clearly warn bystanders to stand clear of the patient or parts in contact with the patient and to keep their distance from liquids in contact with the patient.

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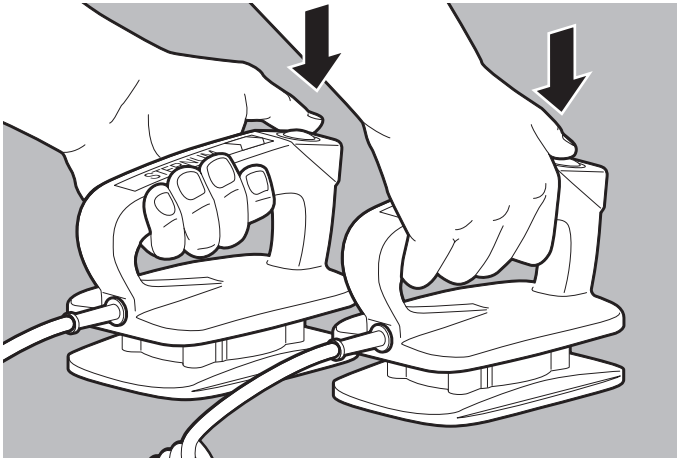

19. Press and hold both (**SHOCK**) buttons on the paddles simultaneously.
    When doing so, please note:
    - The device synchronizes shock delivery with the next R wave.
    - Only with Printing option: If the printer is connected to the device and the **Defibrillation report** menu item is activated (see "13.9 Printer settings (only with Printing option)", page 332), the printer prints a defibrillation report (see "6.16.4 Printing a defibrillation report", page 201).
    - After shock delivery, cardioversion (**SYNC** marking) remains activated in manual mode. You can set in the operator menu whether further cardioversion or defibrillation is to follow cardioversion (see "13.5 Manual mode settings (only with Manual defibrillation option)", page 321).

Result The patient has undergone cardioversion.

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6.9 Pulse oximetry monitoring

6.9.1 Preparing pulse oximetry monitoring

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).

⚠ WARNING

Risk of injury due to incorrect use of the pulse oximetry sensor!

Incorrect use of the pulse oximetry sensor may falsify measurement results and lead to patient injury.

⇒ Keep the pulse oximetry sensor away from strong electromagnetic sources (e.g. electrosurgical devices).

⇒ Do not use the pulse oximetry sensor in areas subject to X-ray (e.g. with MRI devices).

⇒ Keep the pulse oximetry sensor away from strong and fluctuating ambient light (including infrared and UV light). If necessary: Cover the pulse oximetry sensor.

⇒ Avoid strong movement of the pulse oximetry sensor. If necessary: To relieve strain, loop the pulse oximetry sensor cable and the pulse oximetry sensor connecting cable and fix to the patient with a plaster.

⇒ Do not attach the pulse oximetry sensor to a limb on which there is already an NIBP cuff or catheter port.

⇒ Keep the pulse oximetry sensor away from nail polish and artificial fingernails.

⇒ Keep the pulse oximetry sensor away from intravascular dyes.

⇒ Be aware of deviations from the measurement result with a high proportion of dysfunctional hemoglobins.

⇒ Be aware of deviations from the measurement result in the case of severe anemia, venous pulsation and high total bilirubin values.

⇒ Be aware of deviations in pulse rate with an intra-aortic balloon pump or certain arrhythmias.
If necessary: Compare the pulse rate with the heart rate determined by ECG monitoring.

⇒ Be aware of deviations from the measurement result during defibrillation/cardioversion.

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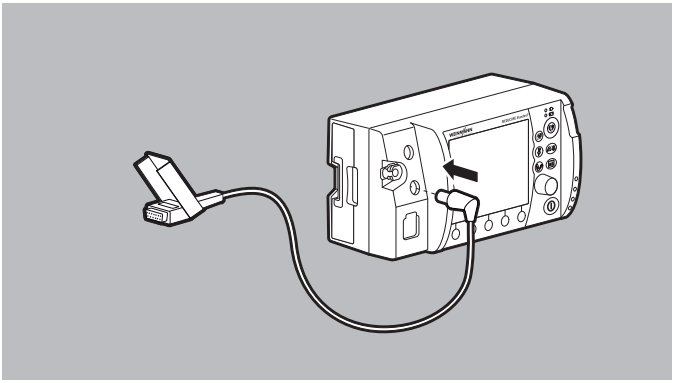
⇒ Only use undamaged pulse oximetry sensors.
⇒ Only use the pulse oximetry sensors and pulse oximetry sensor connecting cables quoted in the scope of supply and in the accessories.



1. Connect the SpO_2 connector of the pulse oximetry sensor connecting cable to the SpO_2 connection on the device.
2. Select the appropriate pulse oximetry sensor for the patient group:

Pulse oximetry sensor	**Patient group**	**Application site**
MCS2-SoftTip pulse oximetry sensor, size S	Ø 7.5 mm - 12.5 mm finger diameter	Finger/big toe
MCS2-SoftTip pulse oximetry sensor, size M	Ø 10 mm - 19 mm finger diameter	
MCS2-SoftTip pulse oximetry sensor, size L	Ø 12.5 mm - 25.5 mm finger diameter	
MCS2-Wrap pulse oximetry sensor	> 10 kg body weight	Finger/hand
MCS2-Earclip pulse oximetry sensor	> 30 kg body weight	Ear
MCS2-Wrap pulse oximetry sensor, adult (Adult), disposable	> 30 kg body weight	Finger/big toe
MCS2-Wrap pulse oximetry sensor, child (Pediatric), disposable	10 kg - 50 kg body weight	
MCS2-Wrap pulse oximetry sensor, infant (Infant), disposable	10 kg - 20 kg body weight	

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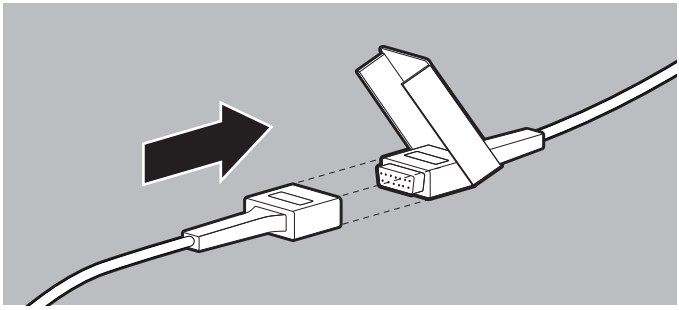
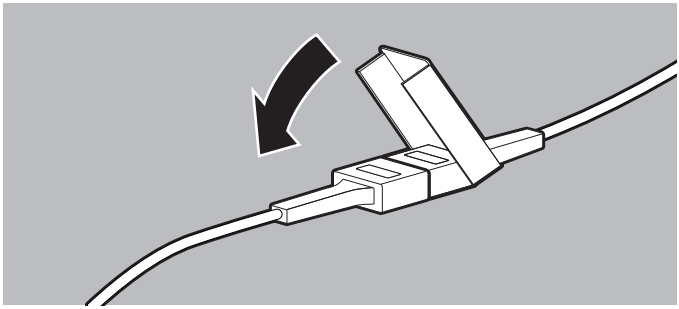
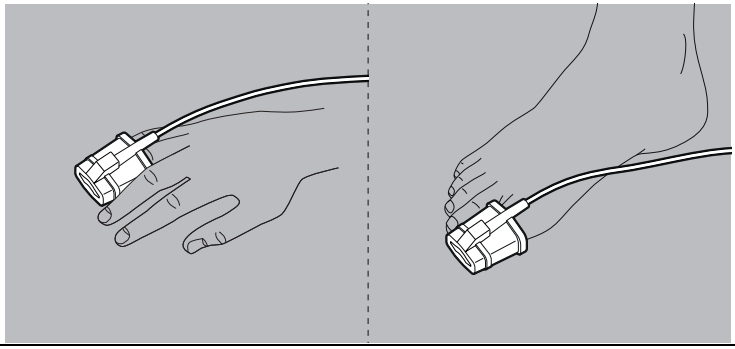
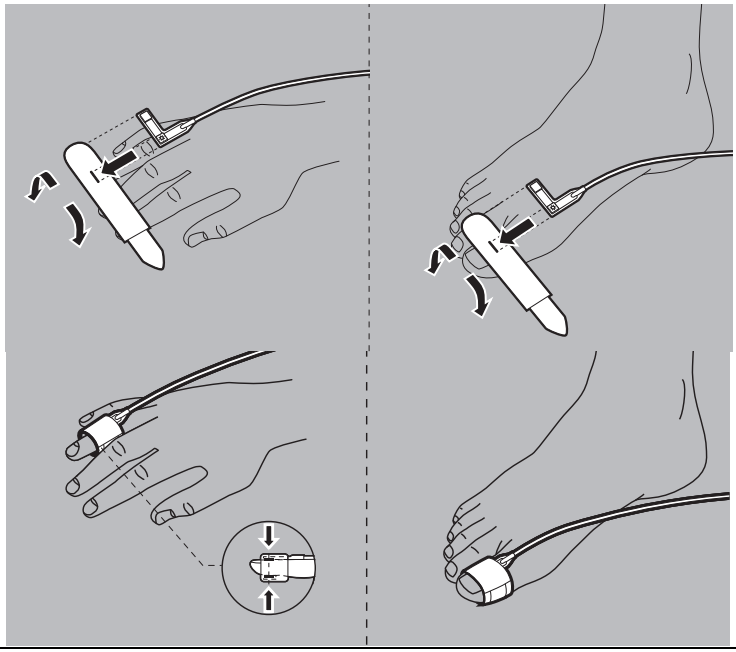


3. Connect the selected pulse oximetry sensor to the pulse oximetry sensor connecting cable.



4. Press the safety closure until you hear it engage.

5. Attach the pulse oximetry sensor:

Pulse oximetry sensor	**Point of attachment**
MCS2-SoftTip pulse oximetry sensor Special feature: The finger mark must point upwards	
MCS2-Wrap pulse oximetry sensor Special feature: The transmitter and receiver of the pulse oximetry sensor must be aligned to face each other on one axis.	

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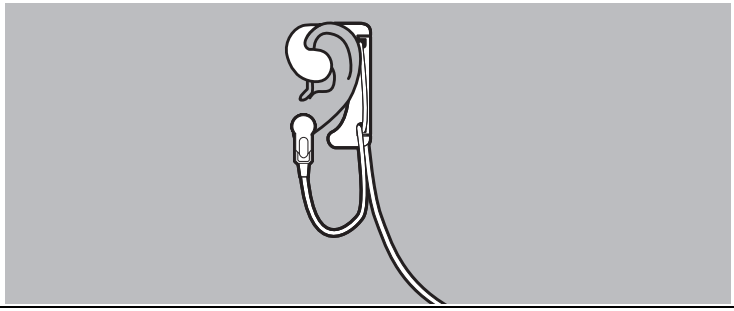
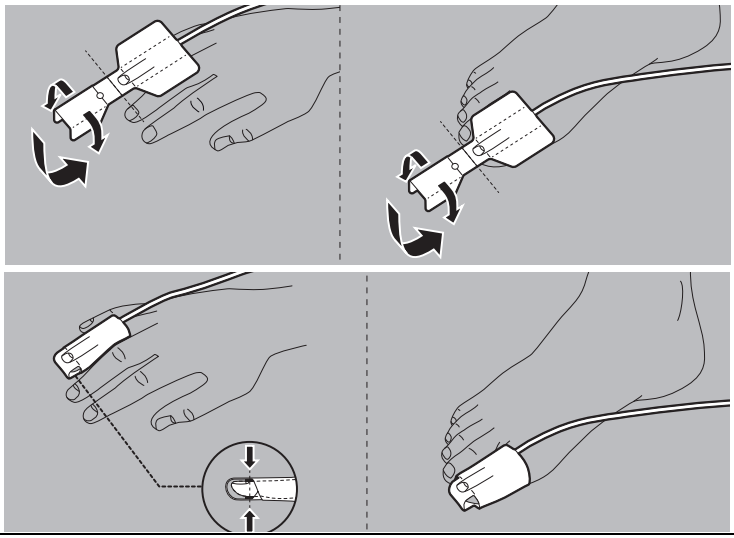
Pulse oximetry sensor	Point of attachment
MCS2-Earclip pulse oximetry sensor	
MCS2-Wrap pulse oximetry sensor, disposable Special feature: The transmitter and receiver of the disposable pulse oximetry sensor must be aligned to face each other on one axis.	

When doing so, please note:

- The site must have a good blood supply.
- When attaching to the finger, use the ring finger or middle finger on the non-dominant hand.
- The pulse oximetry sensor must not be attached too tightly.
- The pulse oximetry sensor must be checked every 4 hours and repositioned if necessary.
- The pulse oximetry sensor must be repositioned if there are any skin changes.

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6. Check whether the oxygen saturation values displayed on the device are plausible.

Result A pulse oximetry sensor is connected.

6.9.2 Carrying out pulse oximetry monitoring

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- A pulse oximetry sensor is connected (see "6.9.1 Preparing pulse oximetry monitoring", page 157).

1. If the patient group is incorrect: Select another patient group (see "6.4 Selecting patient group", page 120).
2. If necessary: Select monitor mode using the **Monitor** function button.
3. If necessary: Switch between parameter view and curve view with the view button .

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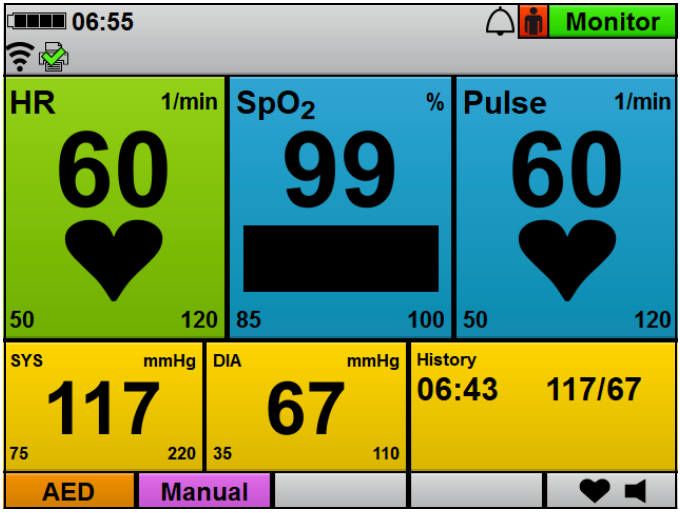
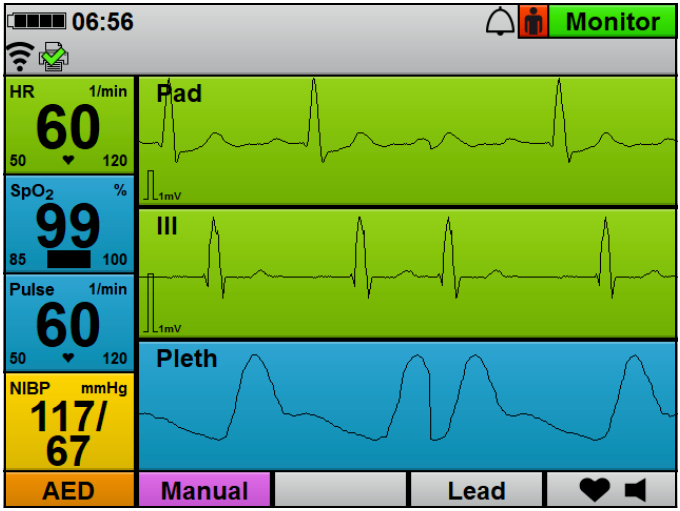


4. In parameter view: Read off the measured values for arterial oxygen saturation (**SpO_2**) and pulse rate (**Pulse**).

Alternatively:



In curve view: Evaluate the SpO_2 curve (**Pleth**) and read off the measured values for arterial oxygen saturation (**SpO_2**) and pulse rate (**Pulse**).

5. If necessary: Make the following SpO_2 settings in the user menu (see "10.3.4 SpO_2 settings", page 261):
   - Adapt the feed rate of the plethysmogram.
   - Give audio pulse tone output priority over heart rate tone output so that the tone level is dependent on oxygen saturation even when the ECG cable or defibrillation electrodes are connected to the patient.
6. If necessary: Set alarm limits in the user menu (see "10.3.1 Alarm settings", page 255).

   Alternatively:

   Set automatic alarm limits in the application menu (see "9 Application menu", page 248).
7. If necessary: Deactivate the pulse tone with the heart rate tone/ pulse tone function button ♥ 🔈.
8. If there are artifacts in the SpO_2 curve or if signal quality is poor (bar in the **SpO_2** parameter field): Reposition the pulse oximetry sensor on the patient's limb.

Result Pulse oximetry monitoring is carried out.

6.10 6-lead ECG monitoring

6.10.1 Preparing 6-lead ECG monitoring

Requirement
- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).

⚠ WARNING

Risk of injury due to live connection for 12-lead ECG extension cable!
The connection for the 12-lead ECG extension cable may be live and lead to an electric shock if contacted. This may injure the user.
⇒ Always seal the 12-lead ECG extension cable connection with the protective cap if no 12-lead ECG extension cable is connected.

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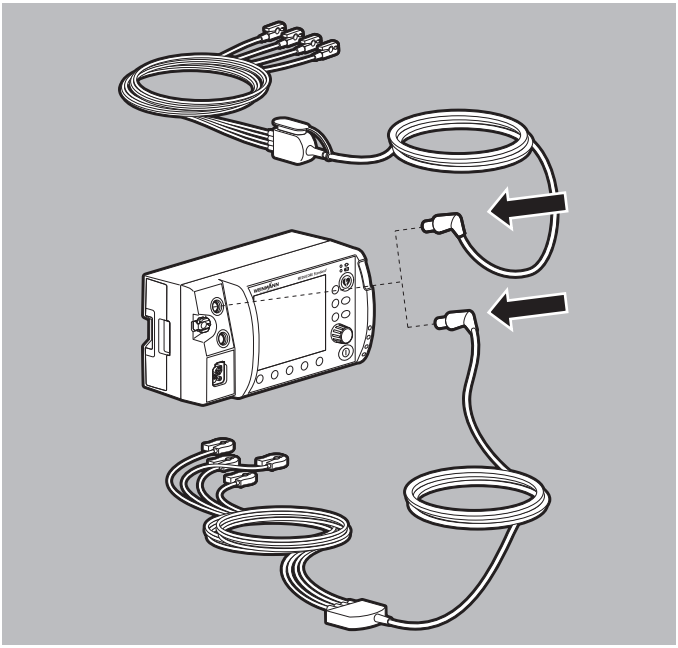

1. Connect the ECG connector of the ECG cable to the ECG connection for ECG cable on the device.

   Alternatively:

   Connect the ECG connector of the ECG cable to the ECG connection for ECG cable on the device using the connection for the 12-lead ECG extension cable.

2. Bare the patient's torso.

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⚠ WARNING

Risk of injury due to air/moisture between ECG electrodes and the patient's skin!

Air (e.g. in the case of hirsute patients) or moisture between the ECG electrodes and the patient's skin impair the quality of the ECG signal and falsify measurement results. This may injure the patient.

⇒ Remove hair from hirsute patients.
⇒ Rub the patient's skin dry.
⇒ Wipe down oily skin with an alcohol pad.

3. Remove hair from the torso.
4. Rub damp spots on the torso dry.
5. Wipe down oily skin with an alcohol pad.
6. Remove the protective film from the ECG electrodes.

⚠ WARNING

Risk of injury from incorrect positioning of the ECG electrodes!

Incorrectly positioned ECG electrodes impair the quality of the ECG signal and falsify measurement results.

⇒ Select the electrode position according to the illustration.
⇒ Position ECG electrodes so that defibrillation/cardioversion is possible.
⇒ Maintain distance from the defibrillation electrodes.
⇒ Maintain distance from other ECG electrodes.
⇒ Do not position ECG electrodes on tendons or muscle groups.
⇒ Do not route individual lines of the ECG cable via ECG electrodes or other lines.

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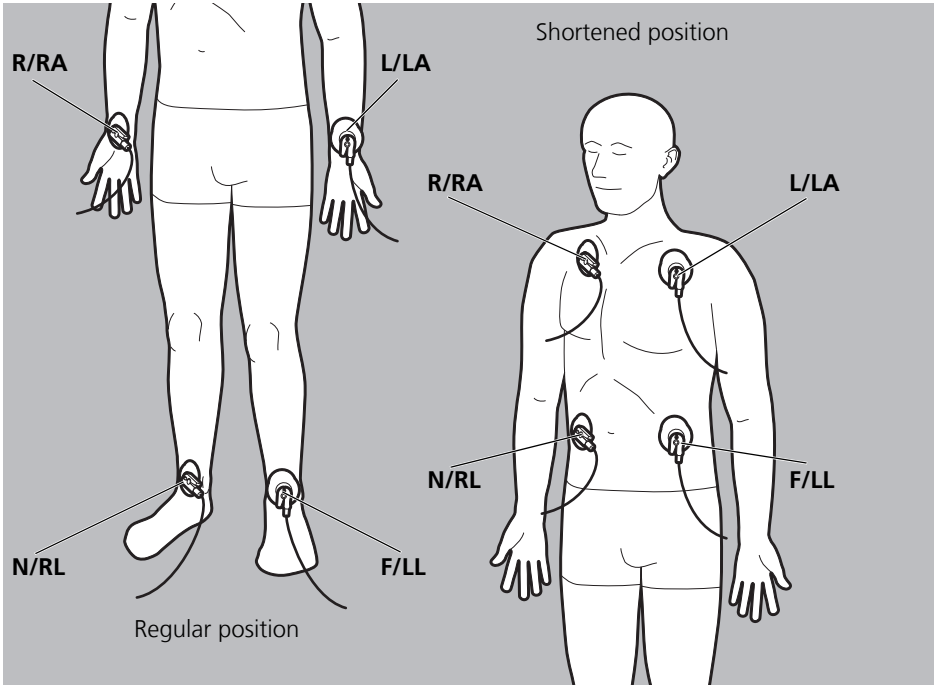

7. Attach and firmly press on the ECG electrodes (limb electrodes) as follows:

Code 1/ERC (Europe)		**Code 2/AHA (USA)**		
Electrode marking	**Color coding**	**Electrode marking**	**Color coding**	**Application site**
Limb electrodes				
R	Red	RA	White	Right arm, shortened: Below right collarbone
L	Yellow	LA	Black	Left arm, shortened: Below left collarbone
F	Green	LL	Red	Left leg, shortened: Left groin crease, centrally to leg axis
N	Black	RL	Green	Right leg, shortened: Right groin crease, centrally to leg axis

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8. If ECG electrodes are used at the same time as defibrillation electrodes: Do not allow ECG electrodes and defibrillation electrodes to overlap.
9. If necessary: Stroke out any air trapped under the ECG electrodes.
10. Clip the ECG cable to the individual ECG electrodes.
11. Check whether the ECG curves for ECG recording displayed on the device are plausible.

Result The 6-lead ECG cable and the ECG electrodes are connected. 6-lead ECG monitoring is prepared.

6.10.2 Carrying out 6-lead ECG monitoring

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- 6-lead ECG monitoring is prepared (see "6.10.1 Preparing 6-lead ECG monitoring", page 164).

1. If the patient group is incorrect: Select another patient group (see "6.4 Selecting patient group", page 120).
2. If necessary: Select monitor mode using the **Monitor** function button.
3. If necessary: Switch between parameter view and curve view with the view button .
4. Following a shock delivery: Wait until the ECG has stabilized again.

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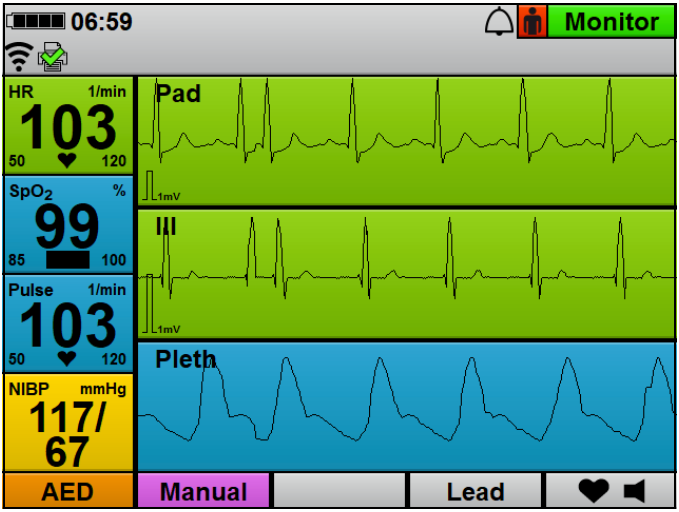

5. Evaluate the ECG leads and heart rate.
6. If necessary: Select another ECG lead using the **Lead** function button.
7. If necessary: Make the following ECG settings in the user menu (see "10.3.2 ECG settings", page 259):
   - Adapt amplitude scaling in order to adapt the displayed height of the ECG curve to the ECG measuring signal.
   - Set **Autom.** for amplitude scaling to have the displayed height of the ECG curve adapted to the ECG measuring signal automatically.
   - Adapt the feed rate of the ECG curve.
   - Activate the filter to filter interference caused by the power supply network out of the ECG display.
8. If necessary: Set alarm limits in the user menu (see "10.3.1 Alarm settings", page 255).

   Alternatively:

   Set automatic alarm limits in the application menu (see "9 Application menu", page 248).

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9. If necessary: Switch off heart rate tone/pulse tone with the ♥ function button.
   The symbol ♥ appears.
10. If desired: Print a live printout of a 6-lead ECG (see "6.16.2 Printing a live printout of ECG and measured values", page 198).

Result 6-lead ECG monitoring is carried out.

6.11 12-lead ECG recording and assessment (only with 12-lead ECG option)

⚠ WARNING

Risk of injury due to incorrect use of 12-lead ECG function mode!

Use of 12-lead ECG function mode by users without medical training and instruction in 12-lead ECG recording and assessment may injure the patient.

⇒ Only use 12-lead ECG function mode if the user is medically trained and has received instruction in 12-lead ECG recording and assessment.

⇒ Only use 12-lead ECG function mode if the user is familiar with the 12-lead ECG function mode of the device.

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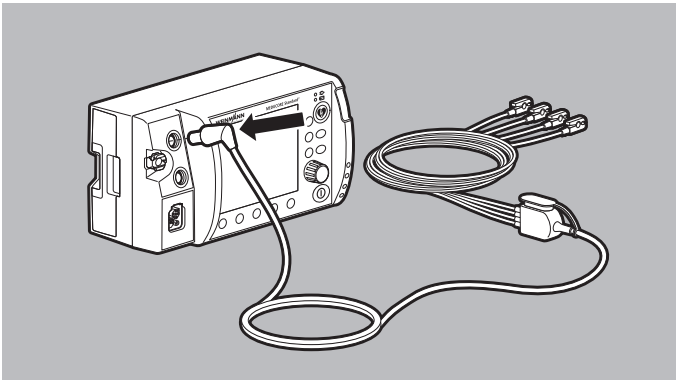
6.11.1 Preparing 12-lead ECG recording and assessment

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).



1. Connect the ECG connector of the ECG cable to the ECG connection for ECG cable on the device using the connection for the 12-lead ECG extension cable.

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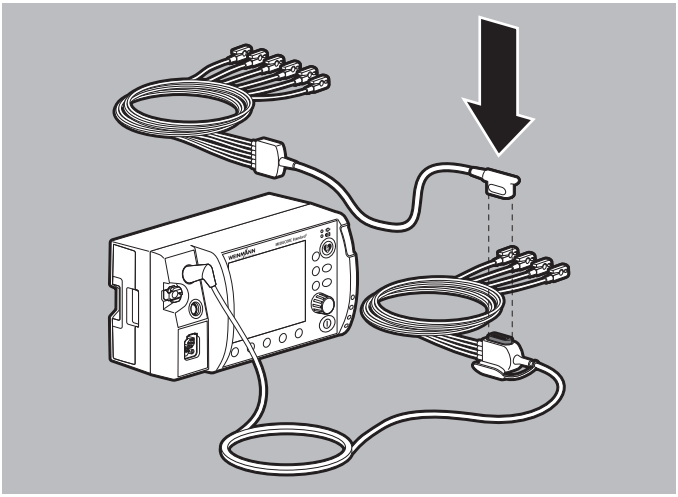
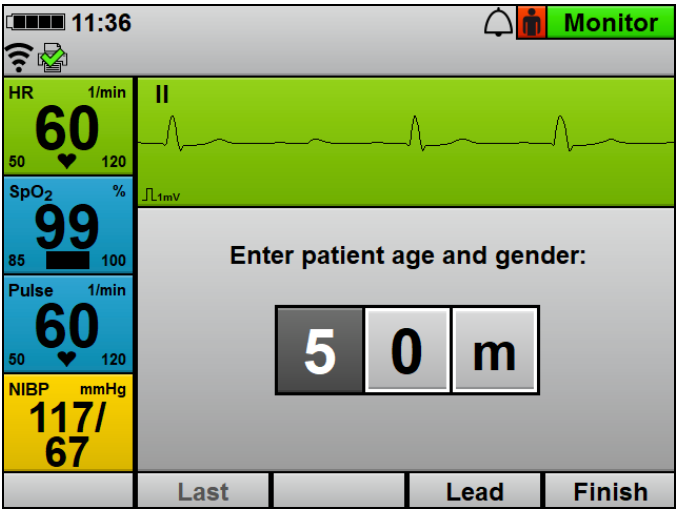


2. Connect the connector of the 12-lead ECG extension cable to the connector of the ECG cable with a connection for the 12-lead ECG extension cable.
3. Open the application menu using the navigation knob.
4. Select the **12-lead ECG** menu item.



5. Select the age and gender of the patient.
6. Bare the patient's torso.

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⚠ WARNING

Risk of injury due to air/moisture between ECG electrodes and the patient's skin!

Air (e.g. in the case of hirsute patients) or moisture between the ECG electrodes and the patient's skin impair the quality of the ECG signal and falsify measurement results. This may injure the patient.

⇒ Remove hair from hirsute patients.
⇒ Rub the patient's skin dry.
⇒ Wipe down oily skin with an alcohol pad.

7. Remove hair from the torso.
8. Rub damp spots on the torso dry.
9. Wipe down oily skin with an alcohol pad.
10. Remove the protective film from the ECG electrodes.

⚠ WARNING

Risk of injury from incorrect positioning of the ECG electrodes!

Incorrectly positioned ECG electrodes impair the quality of the ECG signal and falsify measurement results.

⇒ Select the electrode position according to the illustration.
⇒ Position ECG electrodes so that defibrillation/cardioversion is possible.
⇒ Maintain distance from the defibrillation electrodes.
⇒ Maintain distance from other ECG electrodes.
⇒ Do not position ECG electrodes on tendons or muscle groups.
⇒ Do not route individual lines of the ECG cable via ECG electrodes or other lines.
⇒ For female patients: Always position chest wall electrodes V3/C3 to V6/C6 underneath the breast.

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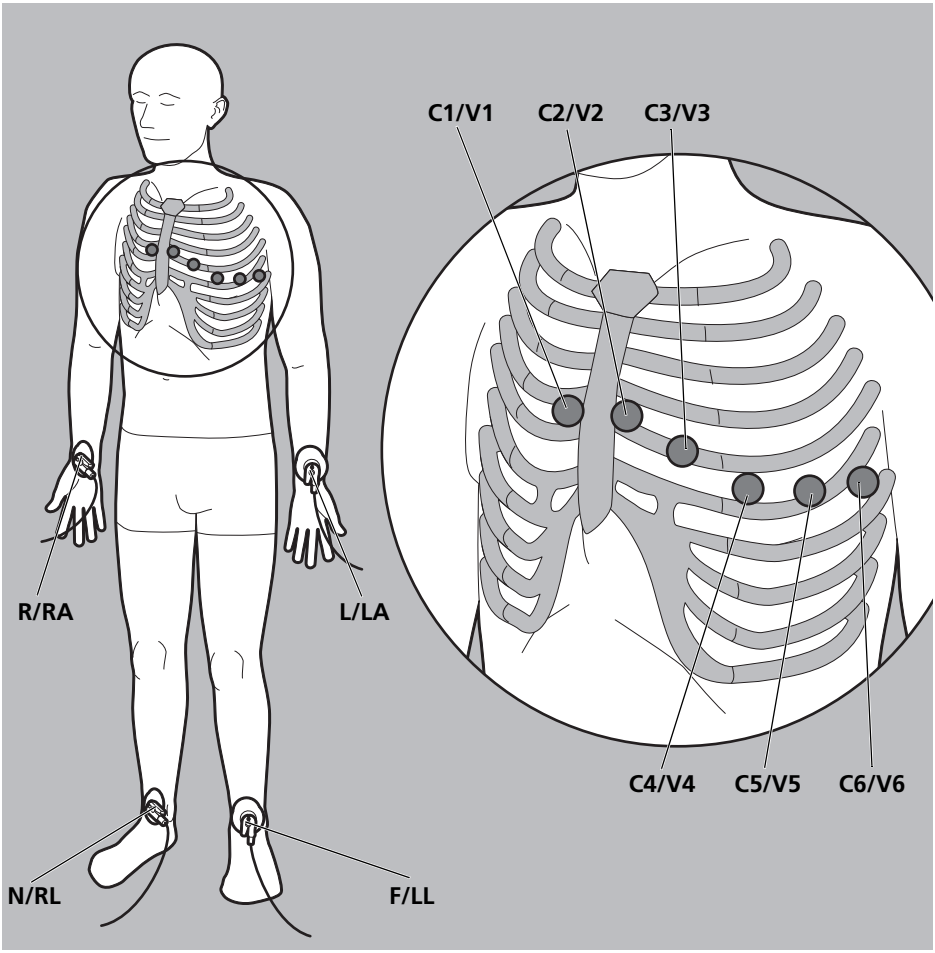

11. Attach and firmly press on the ECG electrodes as follows:

Code 1/ERC (Europe)		Code 2/AHA (USA)		
Electrode marking	**Color coding**	**Electrode marking**	**Color coding**	**Application site**
Limb electrodes				
R	Red	RA	White	Right arm
L	Yellow	LA	Black	Left arm
F	Green	LL	Red	Left leg
N	Black	RL	Green	Right leg

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Code 1/ERC (Europe)		Code 2/AHA (USA)		
Electrode marking	**Color coding**	**Electrode marking**	**Color coding**	**Application site**
Chest wall electrodes				
C1	Red	V1	Red	Fourth intercostal space on the right-hand edge of the breastbone
C2	Yellow	V2	Yellow	Fourth intercostal space on the left-hand edge of the breastbone
C3	Green	V3	Green	Centrally between V2/C2 and V4/C4
C4	Brown	V4	Blue	Fifth intercostal space on the medioclavicular line
C5	Black	V5	Orange	Left ventral axillary line at the level of V4/C4
C6	Purple	V6	Purple	Left mid-axillary line at the same level as V4/C4 and V5/C5

12. If ECG electrodes are used at the same time as defibrillation electrodes: Do not allow ECG electrodes and defibrillation electrodes to overlap.

13. If necessary: Stroke out any air trapped under the ECG electrodes.

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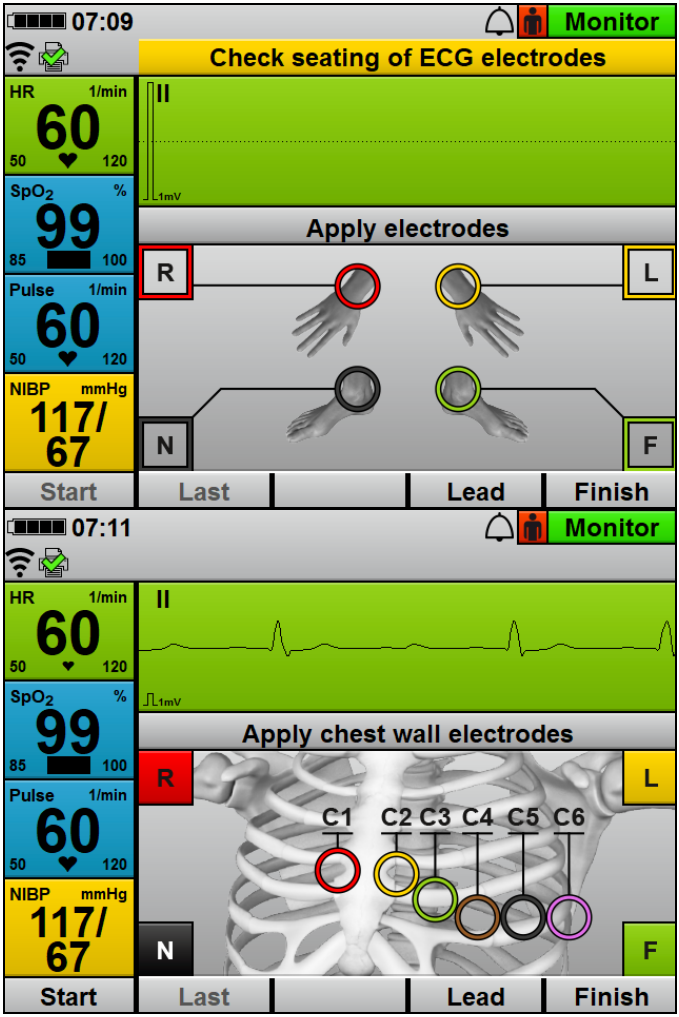

14. Clip the ECG cables to the individual ECG electrodes. Correctly connected ECG electrodes are indicated by a check mark. The limb electrodes are only displayed once all the limb electrodes have been attached. With chest wall electrodes, each chest wall electrode is displayed individually.

15. Check whether the ECG curves for 12-lead ECG recording displayed on the device are plausible.

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Result The ECG electrodes and ECG cable for 12-lead ECG recording and assessment are connected. 12-lead ECG recording and assessment is prepared.

6.11.2 Carrying out and delivering 12-lead ECG recording and assessment

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- 12-lead ECG recording and assessment is prepared (see "6.11.1 Preparing 12-lead ECG recording and assessment", page 171).

1. Call up all ECG leads using the **Lead** function button:
   - Check whether all ECG leads are being displayed in a stable manner. If the ECG leads are not stable: Ensure the ECG electrodes are connected to the patient and ECG cable.
   - Check whether the sequence of ECG leads is plausible.
   - Following a shock delivery: Wait until the ECG has stabilized again.
2. If a 12-lead ECG has already been recorded in the current session: Call up the last 12-lead ECG with the **Last** function button.
   When doing so, please note:
   - You can only call up the last 12-lead ECG of the current session.
   - If no 12-lead ECG has yet been recorded in this session, the **Last** function button will not be available.
3. To cancel 12-lead ECG function mode:
   Cancel 12-lead ECG function mode using the **Finish** function button.

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⚠ CAUTION

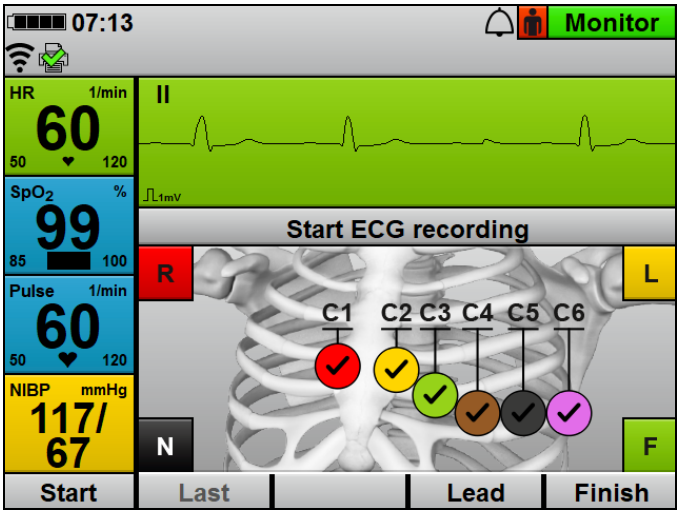
Risk to therapy from movement artifacts when recording the 12-lead ECG!

Movement artifacts falsify the 12-lead ECG. They may result in the user or the device interpreting the 12-lead ECG incorrectly, delaying treatment.

During recording of the 12-lead ECG:

⇒ Ensure that the patient does not move.

⇒ Stand clear of the patient.



4. Start 12-lead ECG recording using the **Start** function button. The device starts recording the 12-lead ECG.

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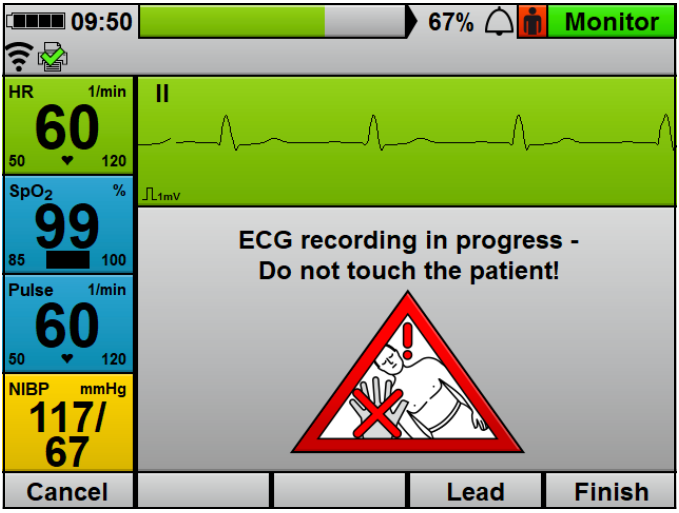
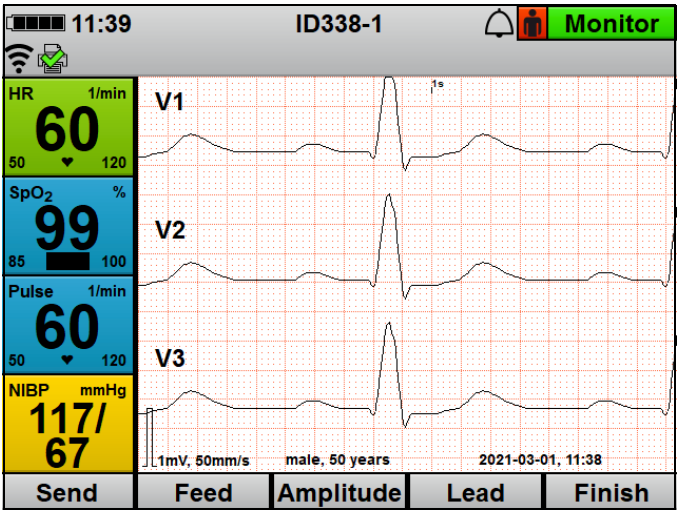


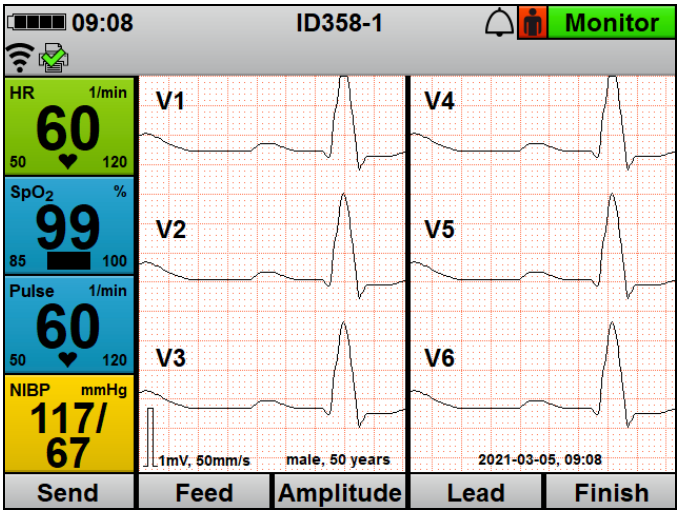
5. Wait until the 12-lead ECG recording is finished.
   When doing so, please note: The patient must not be moved.



6. If the 12-lead ECG has been recorded: Assess the ECG leads.

7. If the low-pass filter is incorrect: Set the low-pass filter in the user menu (see "10.3.3 12-lead ECG settings (only with 12-lead ECG option)", page 260).

8. If a different view is required: Set the view in the user menu (see "10.3.3 12-lead ECG settings (only with 12-lead ECG option)", page 260).



9. Switch between the individual views using the view button :
   - Display 1 curve
   - Display 3 curves simultaneously
   - Display 6 curves simultaneously
10. Select another ECG lead using the **Lead** function button.
11. Displace ECG leads using the navigation knob.
12. Use the **Feed** function button to change the feed rate of the ECG curve.
13. Use the **Amplitude** function button to adapt the amplitude scaling to adapt the displayed height of the ECG curve to the ECG measuring signal.

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⚠ WARNING

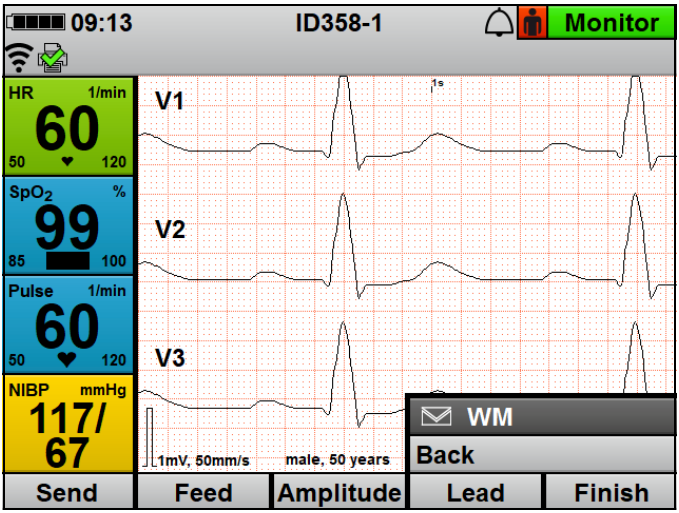
Delayed therapy due to severely delayed reception of the 12-lead ECG!

If the infrastructure of the monitoring station/hospital is not configured by the operator to receive 12-lead ECGs, receipt of the 12-lead ECG may be severely delayed. This may lead to delayed therapy and injure the patient.

⇒ Configure e-mail delivery 12-lead ECG correctly and check it (see "12.5 Configuring e-mail delivery 12-lead ECG (only with E-mail delivery 12-lead ECG option)", page 299).

⇒ If transmission time is unexpectedly high: Contact the system administrator of the e-mail recipient.

14. If desired (only with E-mail delivery 12-lead ECG option): Press the **Send** function button.



15. Select the recipient's name and send the 12-lead ECG to a predefined recipient by e-mail (see "12.5 Configuring e-mail delivery 12-lead ECG (only with E-mail delivery 12-lead ECG option)", page 299).
    Following successful delivery, the symbol appears in the display. If delivery is unsuccessful, the symbol appears in the display and an alarm is displayed (see "11.2 Alarm messages", page 271).

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16. If desired (only with Printing option): Print 12-lead ECG (see "6.16.3 Printing 12-lead ECG (only with 12-lead ECG option)", page 199).
17. Exit 12-lead ECG function mode using the **Finish** function button.

Result A 12-lead ECG has been recorded and assessed.

6.12 Non-invasive blood pressure measurement (NIBP measurement)

NIBP measurement technology has been optimized for measuring blood pressure with a normal sinus rhythm. Certain conditions may impair the ability of the non-invasive blood pressure measurement module to record correct measured values.

⚠ CAUTION

Risk of injury from falsified measured values during non-invasive blood pressure measurement!
Cardiac rhythm disorders, arteriosclerosis, reduced perfusion, diabetes, pregnancy, pre-eclampsia, arrhythmias (in newborns up to 28 days), kidney problems, shaking, shivering or the use of a cardiac pacemaker may impair the ability of the non-invasive blood pressure measuring module to record correct measured values. Evidence of the safety and efficacy of non-invasive blood pressure measurement has not been obtained for patient groups with these characteristics. This may injure the patient.
⇒ Include the status of these patient groups when evaluating the measured values of non-invasive blood pressure measurement.
⇒ Only use non-invasive blood pressure measurement on patient groups for whom evidence of the safety and efficacy of non-invasive blood pressure measurement has been provided.

6.12.1 Preparing non-invasive blood pressure measurement (NIBP measurement)

The following section describes how to attach the NIBP cuff. The instructions for use provided by the NIBP cuff manufacturer are binding for attachment. Follow these instructions for use.

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⚠ CAUTION

Risk of injury if NIBP cuff selected or put on incorrectly!
An NIBP cuff selected or put on incorrectly may interrupt the blood supply or falsify measurement results due to excessive contact pressure. This may result in injury to the patient.

⇒ Always use the NIBP cuff best suited to the patient's limb. Selecting the right NIBP cuff is the key to ensuring a good-quality measured value.
⇒ Attach the NIBP cuff level with the heart.
⇒ Attach the NIBP cuff so that the blood supply is not stopped.
⇒ Avoid moving the NIBP cuff during NIBP measurement.
⇒ When NIBP measurement is for an extended period: Check the position of the NIBP cuff regularly and, if necessary, reposition the NIBP cuff.
⇒ Repeat the NIBP measurement if measurement results are implausible. If the repeat measurement is still implausible, select an alternative method.
⇒ Do not bend or crush the NIBP cuff tube or the NIBP connecting tube.
⇒ Do not attach the NIBP cuff to a limb with poor circulation.
⇒ Do not attach the NIBP cuff to a limb with an intravenous infusion.
⇒ Do not attach the NIBP cuff to a limb on which there is already a pulse oximetry sensor or another monitoring device.
⇒ Do not attach the NIBP cuff to a limb with a shunt.
⇒ Do not attach the NIBP cuff to a limb with open wounds or burns.
⇒ In the case of patients who have undergone a mastectomy, do not attach the NIBP cuff to the affected side. In the case of patients who have undergone double mastectomies, attach the NIBP cuff to the non-dominant arm.
⇒ Only use an undamaged NIBP cuff.
⇒ Only use the NIBP cuffs and NIBP connecting tubes quoted in the scope of supply and in the accessories.
⇒ Follow the instructions for use of the NIBP cuff.

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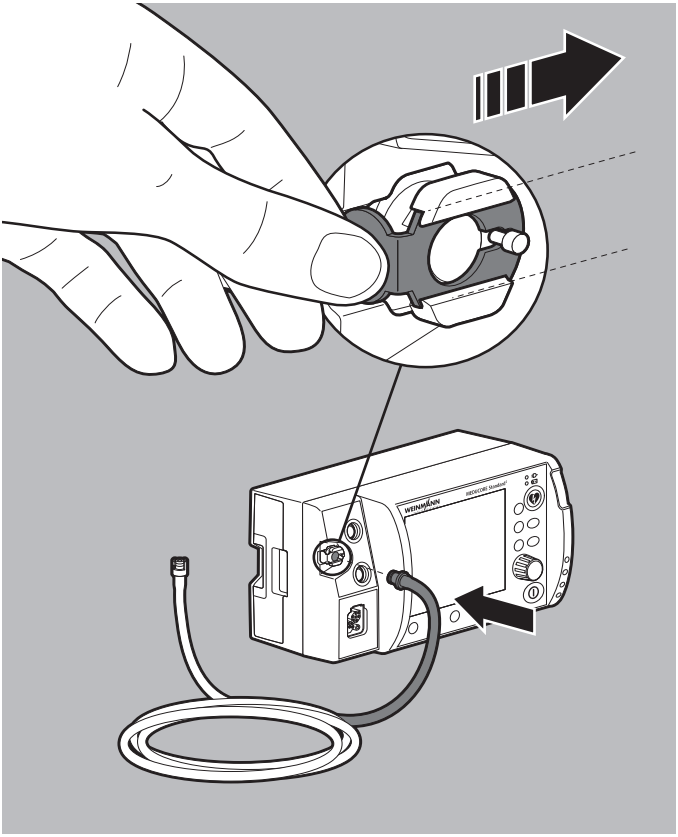

1. If the NIBP connection for NIBP connecting tube is latched: Push the latch of the NIBP connection to the right to release the NIBP connecting tube from the NIBP connection.
2. Connect NIBP connecting tube to the NIBP connection for NIBP connecting tube.

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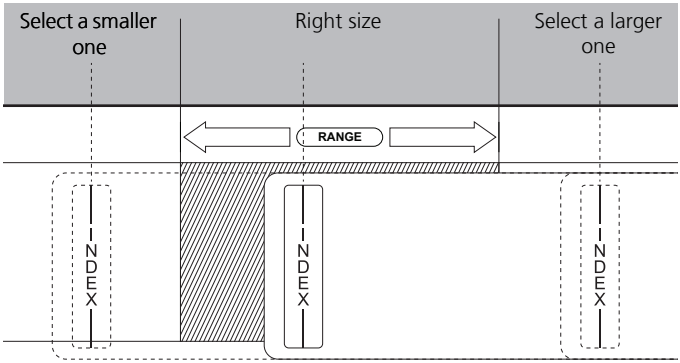
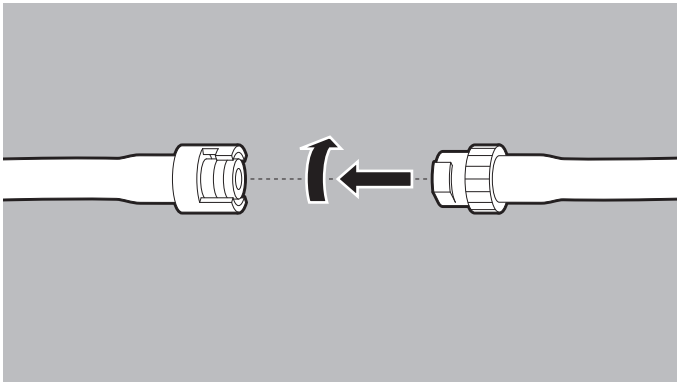
3. Select the NIBP cuff which is suitable for the patient's limb as per the following table:

Designation	Color	Limb circumference
Thigh		
Thigh	Brown	38 cm-50 cm
Upper arm		
Large Adult plus	Dark red	40 cm-55 cm
Adult plus	Dark blue	28 cm-40 cm
Adult	Dark blue	23 cm-33 cm
Small Adult	Turquoise	17 cm-25 cm
Child	Green	12 cm-19 cm
Infant	Orange	8 cm-13 cm

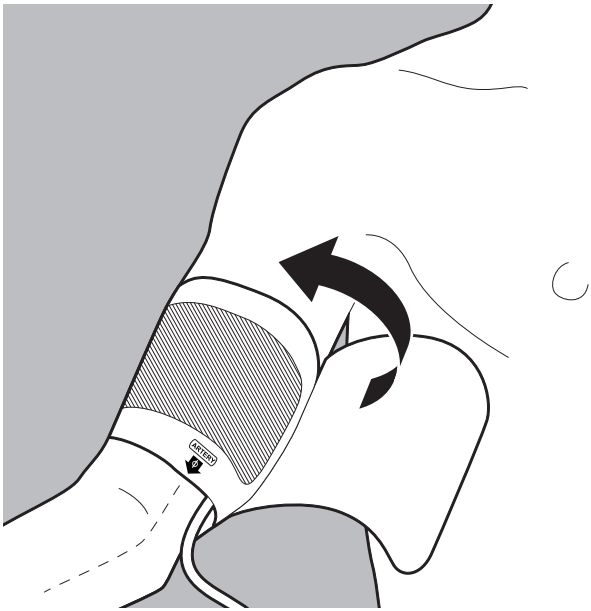
When doing so, please note:



- The index printed on the NIBP cuff must be within the printed range (Range).
- If the index marking does not extend into the printed range (Range): Select a larger NIBP cuff.
- If the index marking extends beyond the printed range (Range): Select a smaller NIBP cuff.
- For disposable NIBP cuffs for newborns: Use adapter tube (WM 45467).



4. Connect the NIBP connecting tube to the tube of the NIBP cuff.
5. Turn the two tubes against each other until they lock into place.



6. Attach the empty NIBP cuff to fit snugly around the patient's limb.
   When doing so, please note:
   - The skin below the NIBP cuff must be undamaged.

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- The NIBP cuff must fit snugly around the limb.
- When applying to the arm: The artery marking (ARTERY) of the NIBP cuff must be positioned over the brachial artery and point toward the hand.
- When applying to the leg: The artery marking (ARTERY) of the NIBP cuff must be positioned over the femoral artery and point toward the foot.
- If the NIBP cuff is attached to the arm: The NIBP cuff must be positioned level with the heart.

Result An NIBP cuff suitable for the patient is attached.

6.12.2 Carrying out non-invasive blood pressure measurement (NIBP measurement)

With an individual NIBP measurement, the device inflates the NIBP cuff to the set pressure (initial NIBP cuff pressure). The user can adapt the initial NIBP cuff pressure (**Initial** function button). To determine the patient's systolic and diastolic blood pressure, the air is slowly released from the NIBP cuff whilst measuring the pressure of the pulse wave. The values for diastolic and systolic blood pressure are determined from this and shown in the display. At the end of the NIBP measurement, the device releases the remaining air from the NIBP cuff.

The NIBP measurement can be influenced by various factors:

- Application site of the NIBP cuff
- Patient position (ideal position: Sitting comfortably, legs not crossed, feet flat on the floor, back and arm supported, center of the NIBP cuff level with the right heart atrium)
- Exertion (recommendation: Patient should rest for 5 minutes before the measurement, keep still during the measurement and not speak)
- Physiological condition

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).

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- A patient group is selected (see "6.4 Selecting patient group", page 120).
- A non-invasive blood pressure measurement (NIBP measurement) is prepared (see "6.12.1 Preparing non-invasive blood pressure measurement (NIBP measurement)", page 182).

1. Press the NIBP button for < 2 s.
   The device switches to NIBP function mode.

⚠ CAUTION

Risk of injury due to incorrectly selected patient group!
The device only delivers correct measured values if the appropriate patient group is selected. An incorrect patient group may lead to incorrect measurements and injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If the patient group is incorrect: Change the patient group in the application menu.

2. If the patient group is incorrect: Select another patient group (see "6.4 Selecting patient group", page 120).
   The NIBP module is configured accordingly in the device with the selected patient group.

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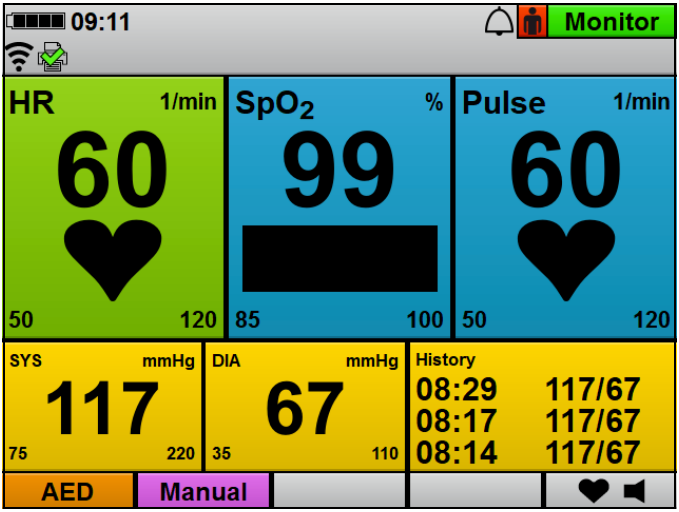

3. Adapt the initial NIBP cuff pressure to the patient using the **Initial** function button and navigation knob.
   When doing so, please note: Following successful NIBP measurement, the initial NIBP cuff pressure adapts to the patient (approximately 30 mmHg above the systolic measured value of the previous NIBP measurement).

4. Press the **Start** function button.

   Alternatively:

   Press the NIBP button for > 2 s.
   An NIBP measurement starts. After the end of the measurement, the device displays systolic and diastolic arterial pressure.

5. Evaluate the NIBP measurement result.

6. If implausible measured values are shown:

   - Check whether the NIBP cuff is correctly selected and attached.
   - If necessary: Repeat the NIBP measurement.

7. If necessary: Cancel the NIBP measurement with the **Stop** function button.
   The device releases the pressure from the NIBP cuff.

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8. If necessary: Set alarm limits in the user menu (see "10.3.1 Alarm settings", page 255).

   Alternatively:

   Set automatic alarm limits in the application menu (see "9 Application menu", page 248).

9. If necessary: Press the **Back** function button.

   Alternatively:

   Press the NIBP button for < 2 s.
   The device exits NIBP function mode and switches to the set mode.

10. Once the measurement is finished: Remove the NIBP cuff.

Result A non-invasive blood pressure measurement (NIBP measurement) has been carried out.

6.12.3 Carrying out interval measurement

During an interval measurement (**Interval** function button), the device carries out several successive NIBP measurements. The interval duration indicates the time between two successive NIBP measurements.

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- A non-invasive blood pressure measurement (NIBP measurement) is prepared (see "6.12.1 Preparing non-invasive blood pressure measurement (NIBP measurement)", page 182).

1. Press the NIBP button for < 2 s.
   The device switches to NIBP function mode.

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⚠ CAUTION

Risk of injury due to incorrectly selected patient group!
The device only delivers correct measured values if the appropriate patient group is selected. An incorrect patient group may lead to incorrect measurements and injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If the patient group is incorrect: Change the patient group in the application menu.

2. If the patient group is incorrect: Select another patient group (see "6.4 Selecting patient group", page 120).
   The NIBP module is configured accordingly in the device with the selected patient group.
3. Press the **Interval** function button.
4. Set the interval duration using the navigation knob.
5. Press the **Start** function button.

   Alternatively:

   Press the NIBP button for > 2 s.
   An NIBP measurement starts. After the end of the measurement, the device displays the systolic and diastolic arterial blood pressure, the timer counts down, and when it has finished the next measurement starts automatically.
6. Evaluate the NIBP measurement result.
7. If necessary: Cancel the NIBP measurement with the **Stop** function button.
   The device releases the pressure from the NIBP cuff.
8. If necessary: Set alarm limits in the user menu (see "10.3.1 Alarm settings", page 255).

   Alternatively:

   Set automatic alarm limits in the application menu (see "9 Application menu", page 248).

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9. If necessary: Press the **Back** function button.

   Alternatively:

   Press the NIBP button for < 2 s.
   The device exits NIBP function mode and switches to the set mode.

10. Once the measurement is finished: Remove the NIBP cuff.

Result An interval measurement has been carried out.

6.12.4 Carrying out venous stasis

With venous stasis (**IV** function button), the device inflates the NIBP cuff and maintains this pressure for the time preset in the operator menu (**Operator menu | NIBP settings | Venous stasis duration**). The venous blood return flow is impeded and the user can puncture one of the patient's veins. Venous stasis can only be carried out on the **Adult** patient group.

If you are the operator of the device and have access to the operator menu, you can disable the **Venous stasis** function: **Operator menu | System settings | Disable functions | Venous stasis** (see "13.12 System settings", page 342).

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- The **Adult** patient group has been selected.
- A mode is set.
- A non-invasive blood pressure measurement (NIBP measurement) is prepared (see "6.12.1 Preparing non-invasive blood pressure measurement (NIBP measurement)", page 182).

1. Press the NIBP button for < 2 s.
   The device switches to NIBP function mode.
2. Press the **IV** function button.
   The NIBP cuff is inflated to the pressure set in the operator menu. The timer displaying the duration of venous stasis counts down. Throughout venous stasis duration, pressure in the NIBP cuff is maintained.

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3. Create the intravenous access.
4. Once the access has been created: Release the pressure from the NIBP cuff using the **Stop** function button.
5. Once venous stasis is finished: Remove the NIBP cuff.

Result Venous stasis has been carried out.

6.13 Using audio alarm output

6.13.1 Canceling audio alarm output

Requirement An alarm is active and is audible.

1. Briefly (< 2 s) press the alarm button  .

Result Audio alarm output is canceled for this alarm. The symbol  appears in the display and no audio signal is outputted for this alarm.

6.13.2 Pausing/muting audio alarm output

1. Press and hold the alarm button  (> 2 s).

Result Audio alarm output pauses for the time set in the operator menu (**Operator menu | Alarm settings | Pause audio**). The symbol  appears in the display. If you set the time in the operator menu to ∞ (infinite), audio alarm output is permanently paused (audio alarm output is muted). The symbol  appears in the display.

A reminder signal can remind you at certain intervals that audio alarm output is paused or muted. You can set the reminder signal in the operator menu (**Operator menu | Alarm settings | Reminder signal**).

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6.13.3 Canceling muting or pausing of audio alarm output

Requirement An alarm is active and is muted or paused.

1. Briefly (< 2 s) press the alarm button .

   Alternatively:

   Switch mode.

Result Muting or pausing of audio alarm output is canceled.

6.14 Changing the volume of the device

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).

1. Open the application menu using the navigation knob.
2. Select the **Volume** menu item.
3. Select volume and confirm with the navigation knob.

Result The volume of the device has been changed.

6.15 Saving event manually in the session data set

Measured values and user actions carried out on the device are saved in the internal memory and on the SD card.

With the event button , events which cannot be recorded by the device automatically (e.g. intubation, administration of medication, etc.) can be saved in the data set in order retrospectively to assign them chronologically during evaluation.

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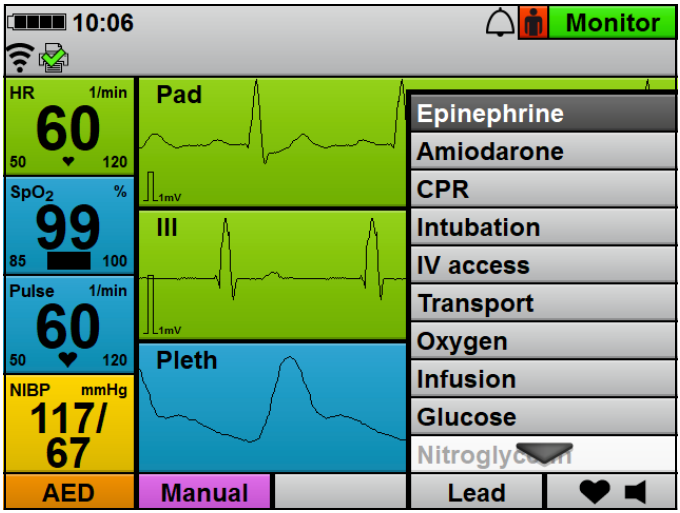
Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).

1. Press the event button .
   The events list opens.



2. Select and confirm an event from the events list using the navigation knob.

If you are the operator of the device and have access to the operator menu, you can adapt the events list to suit your requirements:
Operator menu | System settings | Events list (see "13.12 System settings", page 342)

Result The device saves the event selected in the events list in the session data set.

6.16 Printing ECGs and reports (only with Printing option)

⚠ CAUTION

Delayed therapy due to incorrect storage of the printer!
Storage outside the specified ambient conditions may lead to printer malfunctions or damage the printer. This may delay the patient's therapy.
⇒ Always store the printer within the specified ambient conditions.
⇒ In the event of problems with the printer: Carry out a function check of the printer (see "5.6 Carrying out a function check on the printer (only with Printing option)", page 117).

6.16.1 Connecting the printer to the device

Requirement

- The printer battery is inserted (see "4.7.2 Inserting the printer battery", page 97).
- The printer paper is inserted (see "4.7.3 Inserting printer paper", page 98).
- The printer is stowed in the printer case (see "4.7.4 Stowing the printer in the printer case", page 100).
- A printer has been paired with the device (see "12.2 Pair printer with device (only with Printing option)", page 290).

⚠ WARNING

Risk of injury from defective printer!
A defective printer may lead to electric shock if touched. This may injure the patient or the user.
⇒ Always operate the printer in the printer case.

⚠ WARNING

Delayed therapy due to printer not being ready for use!
The device cannot be connected to the printer if e-mail delivery 12-lead ECG or network data transmission are taking place in parallel.
⇒ Wait until the e-mail delivery 12-lead ECG or network data transmission is finished.
⇒ If necessary: Switch the printer on again.

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⚠ CAUTION

Printer function restricted due to excessive distance between printer and device!
An excessive distance between the printer and the device may lead to special characters in the printout and confuse the user.
⇒ Reduce the distance between the printer and the device.

1. Position the printer within range of the device.
   When doing so, please note: The printer must be positioned at least 20 cm away from the patient's body (excluding limbs).
2. Press and hold the On/Off button ⏻ of the printer for 3 s.
   The status indicator of the printer is green and an audible signal sounds.
3. Wait until the printer has connected to the device.
   When doing so, please note:
   - When connection is successful, the symbol appears in the display.
   - The device outputs an audio signal when connected successfully.
   - The connection indicator appears in the printer display when connection is successful.
4. Leave the printer switched on.
   When doing so, please note:
   - The printer battery gets hot during operation.
   - Maximum print time may be reduced at low temperatures.
   - If the device is switched off, the connection to the printer is disconnected. The printer switches off automatically after 1 minute.
5. If the paper roll has finished: Insert new printer paper.
6. If the printer battery is empty: Insert a charged printer battery.
7. To disconnect the connection between the printer and the device: Press and hold the On/Off button ⏻ of the printer for 3 s.
   The printer switches off.

Result The printer has been connected to the device.

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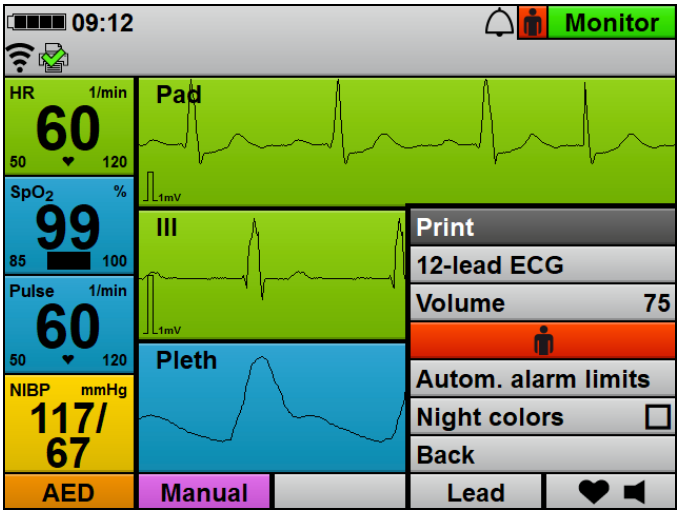
6.16.2 Printing a live printout of ECG and measured values

Requirement A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).

1. If necessary: In the user menu, set the feed rate for the ECG to be printed out (see "10.3.5 Printer settings (only with Printing option)", page 262).



2. Open the application menu using the navigation knob.

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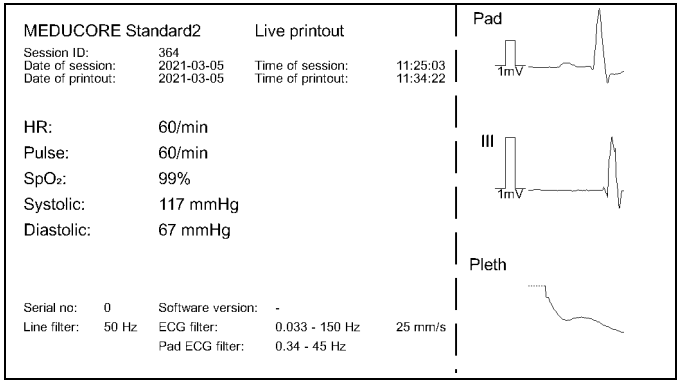
3. Select the **Print** menu item.
   The printer prints current measured values and the curves currently shown in the display on printer paper for 10 s (shown in abstract form here):



4. To stop printing manually: Select the **Stop print xx s** menu item.

If you are the operator of the device and have access to the operator menu, you can adapt automatic stopping of printing to suit your requirements:
Operator menu | Printer settings | Automatic stop print (see "13.9 Printer settings (only with Printing option)", page 332)

Result The measured values and curves currently shown in the display have been printed.

6.16.3 Printing 12-lead ECG (only with 12-lead ECG option)

Requirement

- A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).
- A 12-lead ECG recording and assessment has been carried out (see "6.11.2 Carrying out and delivering 12-lead ECG recording and assessment", page 177).
- 12-lead ECG function mode is activated.

1. If necessary: Use the **Feed** function button to change the feed rate of the ECG curve.

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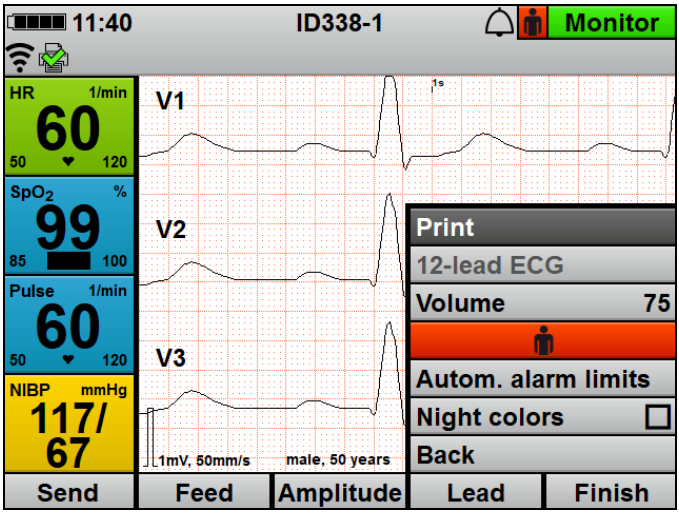
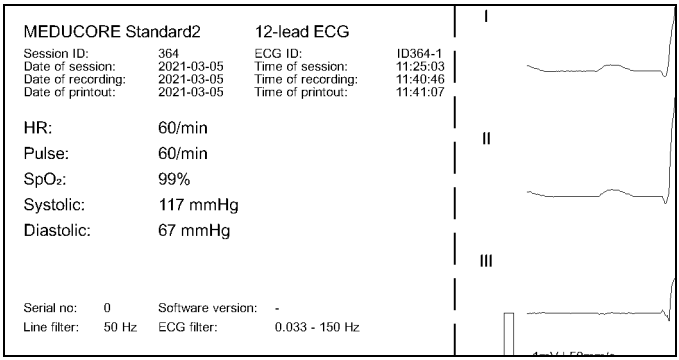
2. If necessary: Use the **Amplitude** function button to change the amplitude scaling in order to adapt the displayed height of the ECG curve to the ECG measuring signal.



3. Open the application menu using the navigation knob.

4. Select the **Print** menu item.
   The printer prints the previously recorded measured values and all 12 ECG leads (shown in abstract form here):



Result A 12-lead ECG has been printed.

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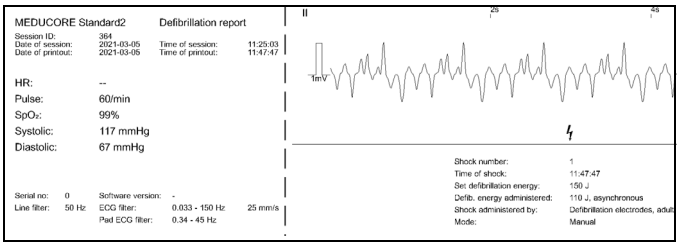
6.16.4 Printing a defibrillation report

Requirement

- A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).
- The **Defibrillation report** menu item is activated in the operator menu (see "13.9 Printer settings (only with Printing option)", page 332).

1. Carry out defibrillation or cardioversion.
   On every shock delivery, the printer prints a defibrillation report (3 s before and 5 s after the shock delivery, shown in abstract form here):



Result A defibrillation report has been printed.

6.16.5 Printing a function check report

Requirement A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).

1. Carry out a function check (see "5 Function check", page 103).

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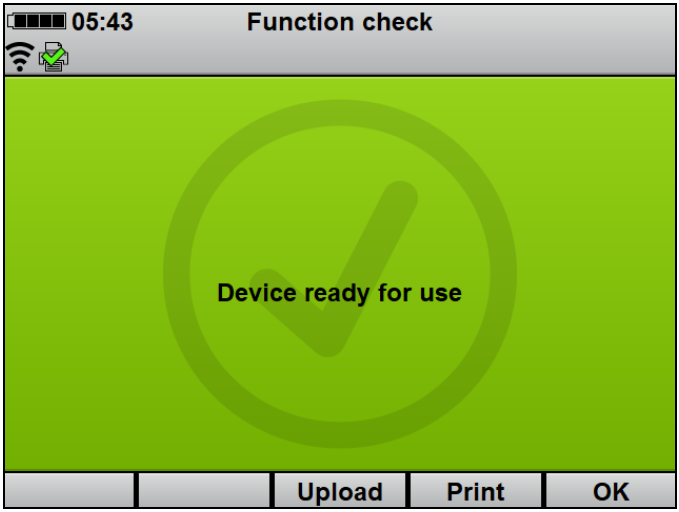

2. When the status report appears: Select the **Print** function button.
   The printer prints a report with the results of the function check (shown in abstract form here):

MEDUCORE Standard2 Function check report

Date of printout: 2021-03-05 Time of printout: 12:14:30

Alarm system test:	OK
Button test:	OK
ECG module:	OK
NIBP module:	OK
Defibrillation module:	OK
Master cable:	OK
Defibrillation electrodes:	OK
SpO_2 module:	OK
SpO_2 sensor:	OK
SD card:	OK

Result: Device ready for use

Serial no: 0 Software version: -

Name:

Signature:

Result A function check report has been printed.

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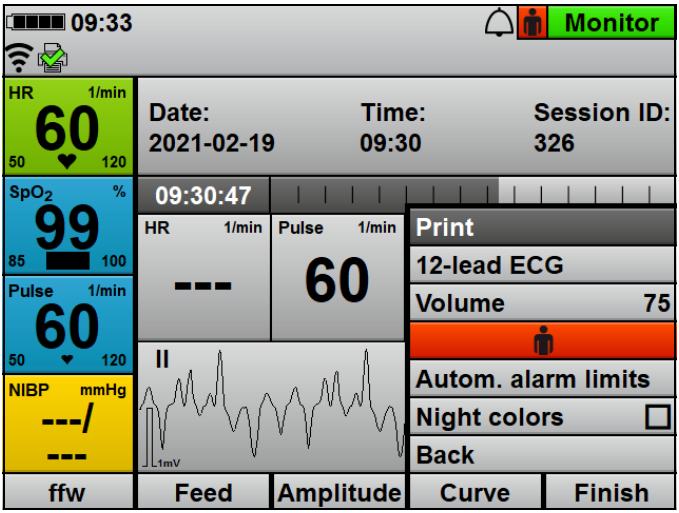
6.16.6 Printing replay view (only with Printing and Replay view options)

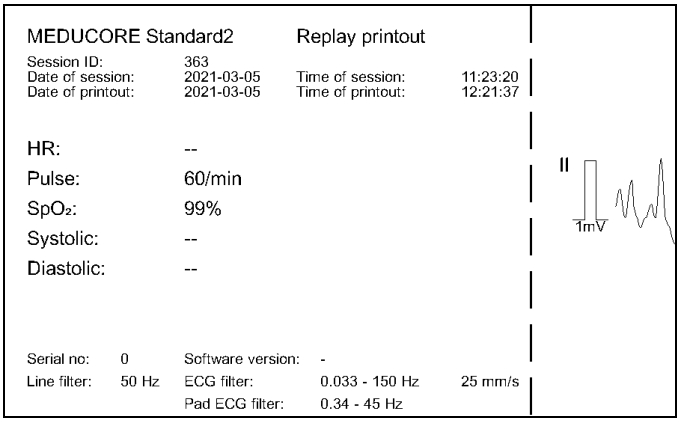
Requirement

- A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).
- The Printing option is enabled and activated (see "13.12 System settings", page 342).
- The Replay view option is enabled and activated (see "13.12 System settings", page 342).
- Replay view shows one event in the session (see "6.17.2 Analyzing the session in replay view on the device (only with Replay view option)", page 207).



1. Open the application menu using the navigation knob.

2. Select the **Print** menu item.
   The printer prints the replay view of the event on printer paper (10 s from the time of the event, shown in abstract form here):



3. To stop printing manually: Select the **Stop print xx s** menu item.

If you are the operator of the device and have access to the operator menu, you can adapt automatic stopping of printing to suit your requirements:
Operator menu | Printer settings | Automatic stop print (see "13.9 Printer settings (only with Printing option)", page 332)

Result Replay view of an event (replay printout) has been printed.

6.16.7 Print a session report (only with Printing option)

Requirement

- A printer has been connected to the device (see "6.16.1 Connecting the printer to the device", page 196).
- The Print option is enabled and activated (see "13.12 System settings", page 342).
- The details included in the session report have been specified in the operator menu (see "13.9 Printer settings (only with Printing option)", page 332).
- A session has been selected in the session archive (see "6.17.1 Selecting a session in the session archive", page 205).

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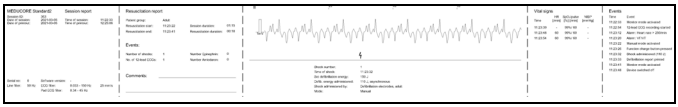
1. Select the **Print session report** menu item.
   The device prints the session report with all the details specified in the operator menu (abstract example shown here):



   When doing so, please note:

   - The device only prints a resuscitation report in the session report if a shock was delivered or a resuscitation mode (AED mode or manual mode) was activated for > 2 minutes in the selected session.
   - In the resuscitation report, the first two events from the events list are recorded and counted (see "13.12.2 Possible values", page 344).

2. To cancel printing of the session report: Select the **Cancel printing** menu item.

Result A session report has been printed.

6.17 Analyzing sessions

6.17.1 Selecting a session in the session archive

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- A patient group is selected (see "6.4 Selecting patient group", page 120).
- A mode is set.
- At least one session has been carried out with the device.
- The user menu is activated (see "10.1 Navigating the user menu", page 252).

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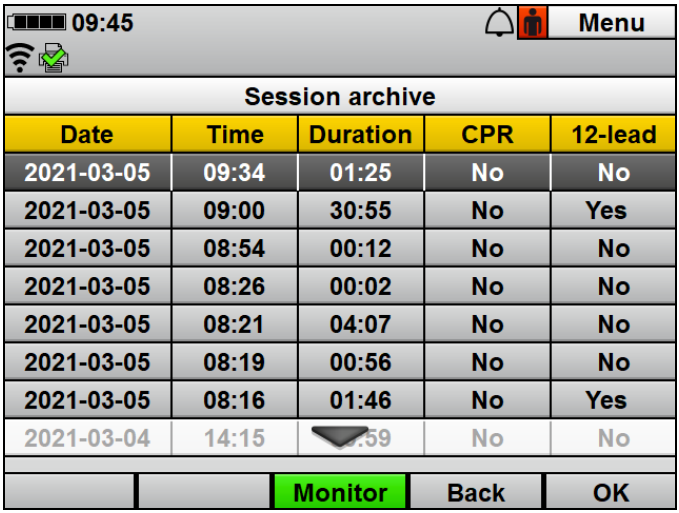
1. Select the **Session archive** menu item.
   The session archive appears:



2. Select the session by session time and the following criteria:
   - Resuscitation (defibrillation or cardioversion) carried out during the session: **Yes** in the **CPR** column
   - One or more 12-lead ECGs recorded during the session: **Yes** in the **12-lead** column
3. Confirm with the **OK** function button.

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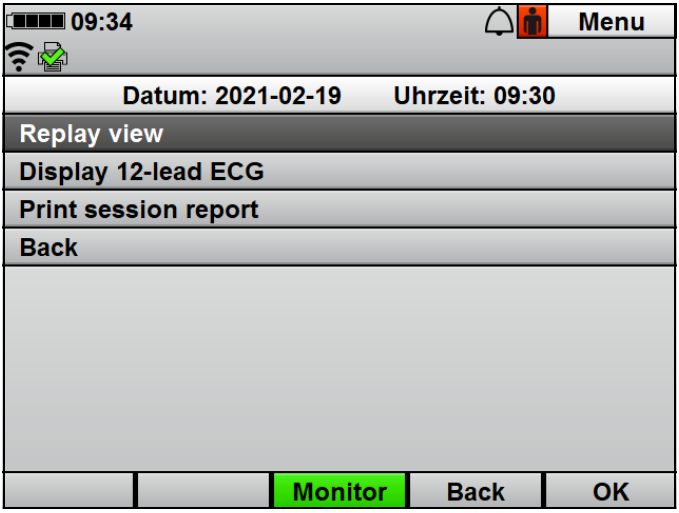


4. Analyze the session in replay view on the device (see "6.17.2 Analyzing the session in replay view on the device (only with Replay view option)", page 207).

   Alternatively:

   Analyze the 12-lead ECG of the session (see "6.17.3 Analyzing and delivering a 12-lead ECG of a session (only with 12-lead ECG option)", page 209).

   Alternatively:

   Print session report (see "6.16.7 Print a session report (only with Printing option)", page 204).

5. Confirm with the **OK** function button.

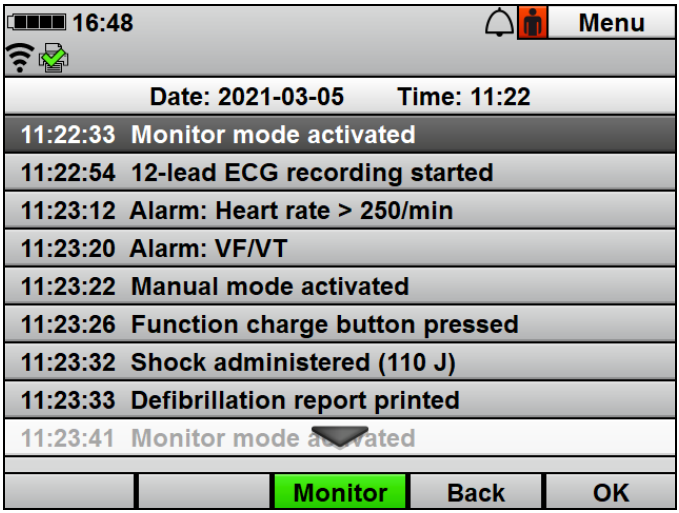
Result A session has been selected for further analysis in the session archive.

6.17.2 Analyzing the session in replay view on the device (only with Replay view option)

Requirement

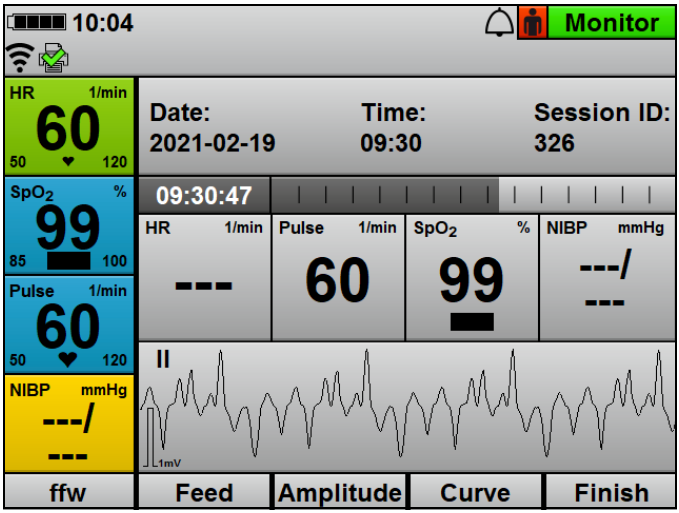
- The Replay view option is enabled and activated (see "13.12 System settings", page 342).
- A session has been selected in the session archive (see "6.17.1 Selecting a session in the session archive", page 205).

1. Select the **Replay view** menu item.
   The device displays a selection of events during a session.



2. Select event.

3. Confirm with the **OK** function button.
   The device displays the event in replay view.



4. Select another ECG lead or the plethysmogram using the **Curve** function button.

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5. Use the **Amplitude** function button to adapt the amplitude scaling to adapt the displayed height of the ECG curve to the ECG measuring signal.
6. Use the **Feed** function button to adapt the feed rate of the ECG curve.
7. Use the **ffw** function button to adapt the scrolling resolution.
8. Shift the session as from the time of the event using the navigation knob.
9. Analyze the event in the session.
10. If desired (only with Printing option): Print the replay view of the event (see "6.16.6 Printing replay view (only with Printing and Replay view options)", page 203).

Result A session has been analyzed in replay view on the device.

6.17.3 Analyzing and delivering a 12-lead ECG of a session (only with 12-lead ECG option)

Requirement

- The 12-lead ECG option is enabled and activated (see "13.12 System settings", page 342).
- If e-mail delivery 12-lead ECG is desired: A default network has been configured (see "12.3 Configuring default network", page 292).

1. Select a session with at least one 12-lead ECG (**Yes** in the **12-lead** column) in the session archive (see "6.17.1 Selecting a session in the session archive", page 205).
2. Confirm with the **OK** function button.
3. Select the **Display 12-lead ECG** menu item.
   The device displays all 12-lead ECGs recorded during the selected session.

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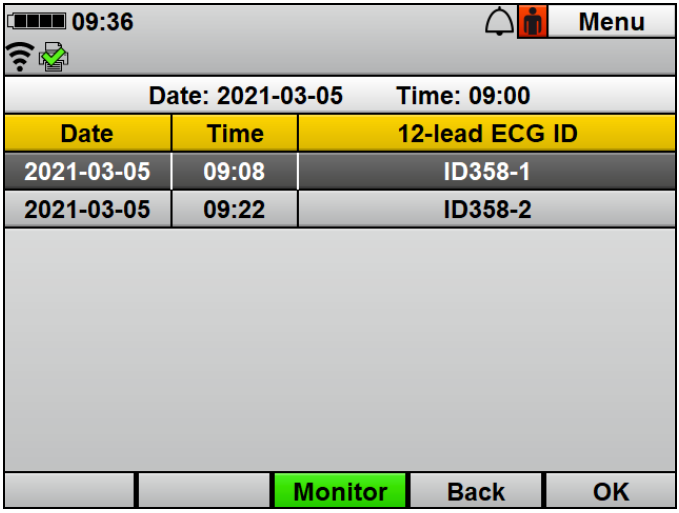

4. Select the desired 12-lead ECG.
   The device displays the desired 12-lead ECG.

5. If desired (only with E-mail delivery 12-lead ECG option): Use the **Send** function button to deliver the 12-lead ECG to a predefined recipient (see "12.5 Configuring e-mail delivery 12-lead ECG (only with E-mail delivery 12-lead ECG option)", page 299).

6. If desired (only with Printing option): Print 12-lead ECG (see "6.16.3 Printing 12-lead ECG (only with 12-lead ECG option)", page 199).

Result A 12-lead ECG from a session has been analyzed on the device.

6.17.4 Analyzing a session using DEFIview

1. Export session data from the internal memory to SD card (see "6.20.1 Exporting session data from the internal memory to SD card", page 213).

   Alternatively:

   Upload session data to WEINMANN Connect (see "6.20.2 Uploading session data to WEINMANN Connect (only with Upload session data option)", page 214).

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2. Analyze session data with the DEFIview PC software in accordance with the DEFIview instructions for use.

Result The session data have been analyzed using the DEFIview PC software.

6.18 Reprocessing the device after use

1. Remove disposable articles from the patient and dispose of them:
   - Defibrillation electrodes
   - ECG electrodes
   - Disposable pulse oximetry sensor
   - Disposable NIBP cuff for newborns
2. Put new disposables with the device.
3. Hygienically reprocess the device, components, and accessories (see "8 Hygienic reprocessing", page 230).
   When doing so, please note: It is recommended that hygienic reprocessing is carried out immediately after use, as dried-on residues are harder to remove.
4. Ensure that the device and printer batteries have a sufficiently good battery status.
5. Insert new printer paper and have spare printer paper to hand (see "4.7.3 Inserting printer paper", page 98).
6. Stow components and accessories in the protective transport bag (see "4.2.1 Stowing components and accessories in the protective transport bag", page 76).

   Alternatively:

   Stow components and accessories on the portable unit (see "4.2.2 Stowing components and accessories on the portable unit", page 83).
7. If required: Store the device, components, and accessories in accordance with the conditions for storage (see "15 Storage", page 354).

Result The device is reprocessed following use.

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6.19 Uploading data to an external device via Bluetooth® interface (only with Bluetooth® data transmission option)

Requirement

- The Bluetooth® data transmission option is enabled and activated (see "13.12 System settings", page 342).
- An external device with a Bluetooth® interface (Example: System for digital patient data recording) is within range.
- The user menu is activated (see "10.1 Navigating the user menu", page 252).

1. Select the **Bluetooth® data transmission** menu item. When doing so, please note:
   - The **Bluetooth® data transmission** menu item is grayed out as long as the printer is printing.
   - During Bluetooth® data transmission, the device cannot connect to a printer.
2. Start Bluetooth® data transmission on the external device.
3. If the device and the external device are not yet paired: Check whether the PIN displayed on the device is shown on the external device.
4. If the PIN displayed on the device and on the external device are identical: Confirm the pairing on the device and the external device.
   Device and external device are paired.
5. If the device is ready for Bluetooth® data transmission: Await completion of Bluetooth® data transmission.
6. Finish Bluetooth® data transmission using the **Finish** function button.

Result

Bluetooth® data transmission between the device and the external device has been set up. Device data have been uploaded to the external device.

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6.20 Archiving session data

From 60 seconds after the start of a session, the device permanently saves session data to its internal memory and on the SD card if the SD card is in the SD card slot at the beginning of the session. After a session has started, session data are saved only temporarily in the internal memory and not saved on the SD card and are deleted if you switch off the device in < 60 s.

If you switch off the device and then switch it on again after < 30 s, the device saves session data in the session data set already started.

If you switch off the device and then switch it on again after > 30 s, the device creates a new session data set.

6.20.1 Exporting session data from the internal memory to SD card

Requirement There is an SD card in the SD card slot.

1. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
2. Select **System settings | SD card | Export internal memory to SD card**.
3. Confirm with the **OK** function button.
   The export process starts.
4. Remove the SD card (see "4.6.2 Removing the SD card", page 93).

Result Session data and service data have been exported from the internal memory to the SD card.

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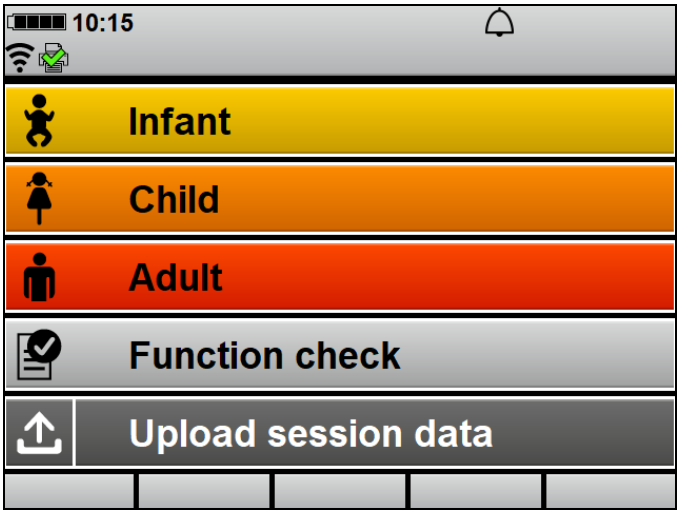
6.20.2 Uploading session data to WEINMANN Connect (only with Upload session data option)

Requirement

- The Upload session data option is enabled and activated (see "13.12 System settings", page 342).
- A default network has been configured (see "12.3 Configuring default network", page 292).
- The device has been registered with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298).
- The device has been switched off for > 30 s.

1. Switch on the device.
   The start menu appears.



2. Select the **Upload session data** menu item.
   All configured networks are displayed.
3. Select a network within range.
4. Confirm with the **OK** function button.
   The device connects to the selected network and the session archive appears.

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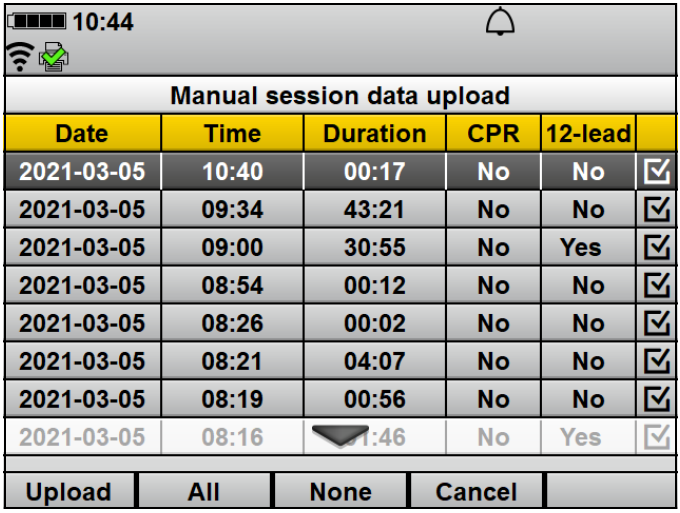

5. Select individual sessions in the session archive using the navigation knob.
6. If desired: Deselect all sessions using the **None** function button.

   Alternatively:

   Select all sessions using the **All** function button.
7. Upload the selected session data to WEINMANN Connect using the **Upload** function button.
   When upload is successful, the symbol appears in the display. If upload is unsuccessful, the symbol appears in the display and an alarm is displayed (see "11.2 Alarm messages", page 271).
8. Confirm with the **OK** function button.
9. To cancel the upload: Select the **Cancel** function button.
   When doing so, please note: If the upload is canceled, the **Upload session data** menu item is briefly grayed out in the start menu.

Result The session data have been uploaded to WEINMANN Connect.

6.21 Using service data

Service data are device data which WEINMANN Emergency can use to analyze the device in the event of a fault. Service data do not contain any patient data. There are two options for making service data available to WEINMANN Emergency Technical Service in the event of a fault:

- Upload service data straight to WEINMANN Emergency (see "6.21.1 Uploading service data to WEINMANN Emergency", page 216)
- Export service data to SD card and e-mail them to Technical Service (see "6.21.2 Exporting service data to SD card", page 217)

6.21.1 Uploading service data to WEINMANN Emergency

Requirement

- A default network has been configured (see "12.3 Configuring default network", page 292).
- The device has been registered with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298).
- The user menu is activated (see "10.1 Navigating the user menu", page 252).

  Alternatively:

  The operator menu is activated (see "13.1 Activating the operator menu", page 307).

1. Select **System settings | Service | Upload service data to WEINMANN**.
   The service data are uploaded to WEINMANN Emergency. When upload is successful, the symbol appears in the display. If upload is unsuccessful, the symbol appears in the display and an alarm is displayed (see "11.2 Alarm messages", page 271).
2. Confirm with the **OK** function button.

Result The service data have been uploaded to WEINMANN Emergency.

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6.21.2 Exporting service data to SD card

Requirement

- There is an SD card in the SD card slot.
- The user menu is activated (see "10.1 Navigating the user menu", page 252).

  Alternatively:

  The operator menu is activated (see "13.1 Activating the operator menu", page 307).

1. Select **System settings | Service | Export service data to SD card**.
2. Confirm with the **OK** function button.
   The export process starts.
3. If export is successful: Remove the SD card (see "4.6.2 Removing the SD card", page 93).
4. Insert the SD card in the SD card slot of a PC.
5. E-mail service data to WEINMANN Emergency Technical Service for further analysis.

Result Service data have been exported to the SD card and made available to WEINMANN Emergency Technical Service.

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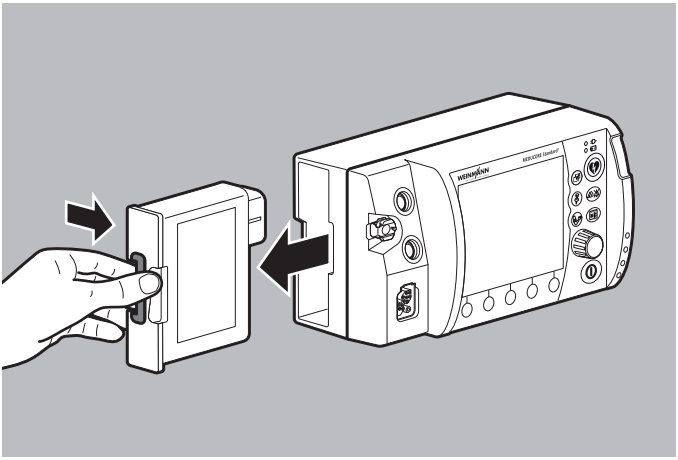
7 Disassembling

7.1 Disassembling the power supply

7.1.1 Removing battery

Requirement The device is switched off.

1. When used in a protective transport bag:
   - Open the left-hand side compartment of the protective transport bag.
   - Take components and accessories out of the side compartment.
   - Remove dividers from the side compartment.



2. Unlatch the battery.
3. Remove the battery.

Result The battery has been removed.

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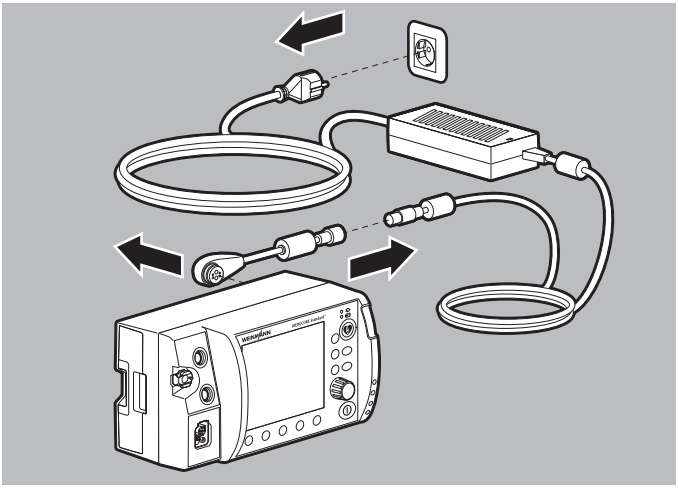
7.1.2 Disconnecting the device from line power

Requirement The device is switched off.

1. When used in a protective transport bag: Open the rear of the device compartment of the protective transport bag.



2. Disconnect the charging adapter from the power supply connection.
3. Disconnect the charging adapter from the power supply unit and charger.
4. Disconnect the power supply unit and charger from line power.

Result The device is disconnected from line power.

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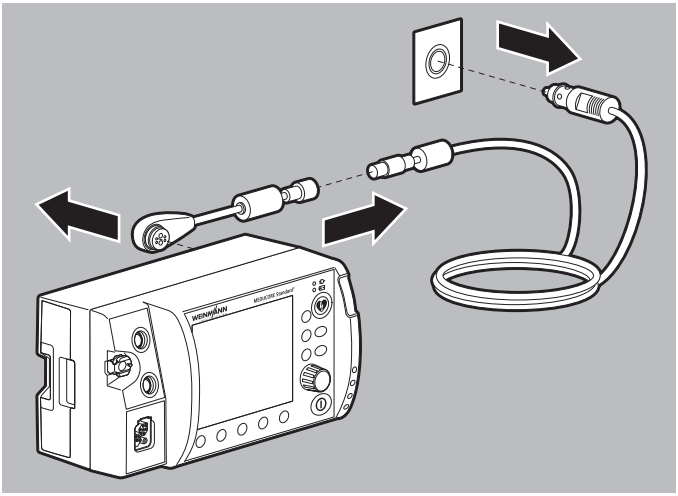
7.1.3 Disconnecting the device from the 12 V on-board power supply

Requirement The device is switched off.

1. When used in a protective transport bag: Open the rear of the device compartment of the protective transport bag.



2. Disconnect the charging adapter from the power supply connection.
3. Disconnect the charging adapter from the adapter cable for 12 V on-board power supply/circular connector.
4. Disconnect the adapter cable for 12 V on-board power supply/ circular connector from the 12 V on-board power supply.

Result The device is disconnected from the 12 V on-board power supply.

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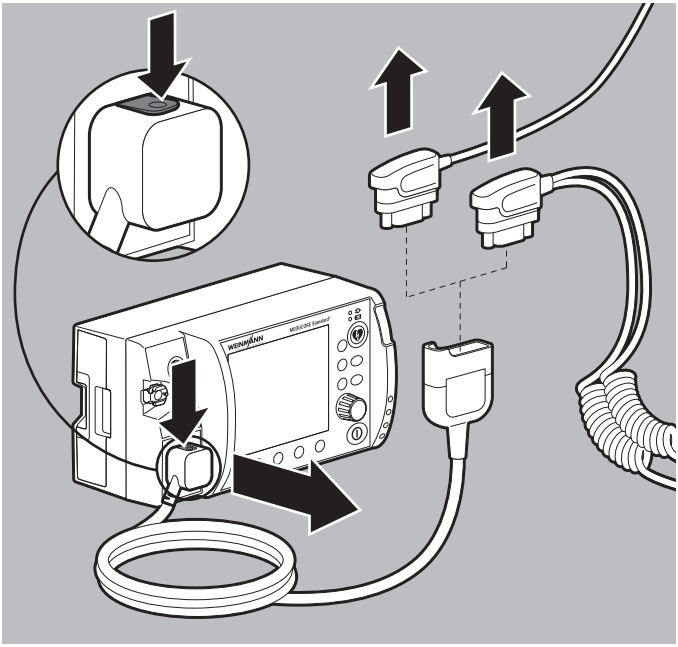
7.2 Disassembling defibrillation electrodes/paddles and master cable

Requirement

- The device is switched off (see "6.2 Switching the device off", page 119).
- The device is disconnected from the patient.

1. When used in a protective transport bag: Open the viewing window and side compartments of the protective transport bag.



2. Unlatch the master cable and disconnect it from the Pad connection.
3. Disconnect the Pad connector of the defibrillation electrodes from the master cable.

   Alternatively:

   Disconnect the Pad connector of the paddles from the master cable.

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4. Dispose of used defibrillation electrodes.
5. When used in a protective transport bag: Guide the master cable through the opening between the side compartment and the device compartment of the protective transport bag.

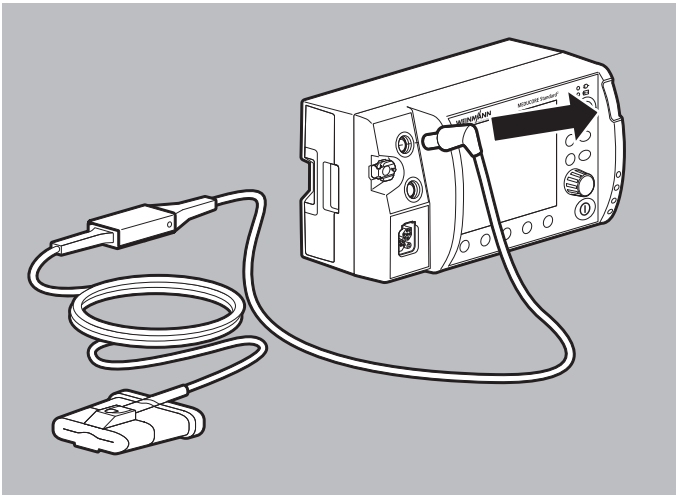
Result The defibrillation electrodes/paddles and the master cable have been disassembled.

7.3 Disassembling pulse oximetry sensor and pulse oximetry sensor connecting cable

Requirement

- The device is switched off (see "6.2 Switching the device off", page 119).
- The device is disconnected from the patient.

1. When used in a protective transport bag: Open the viewing window and side compartments of the protective transport bag.



2. Disconnect the pulse oximetry sensor connecting cable with the selected pulse oximetry sensor from the SpO_2 connection.

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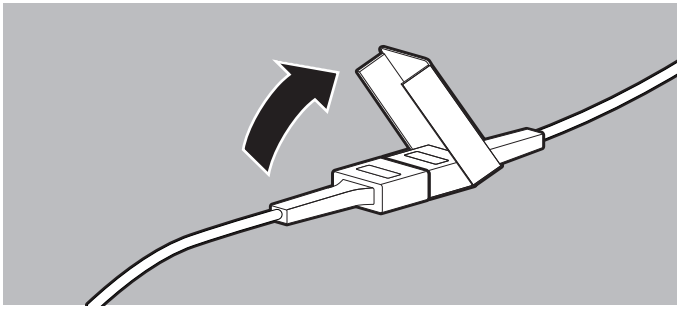
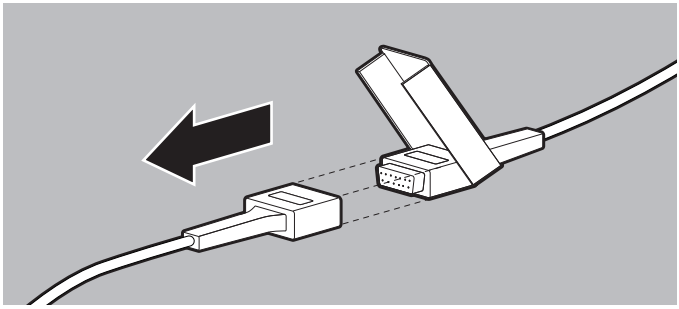


3. Open the safety closure.



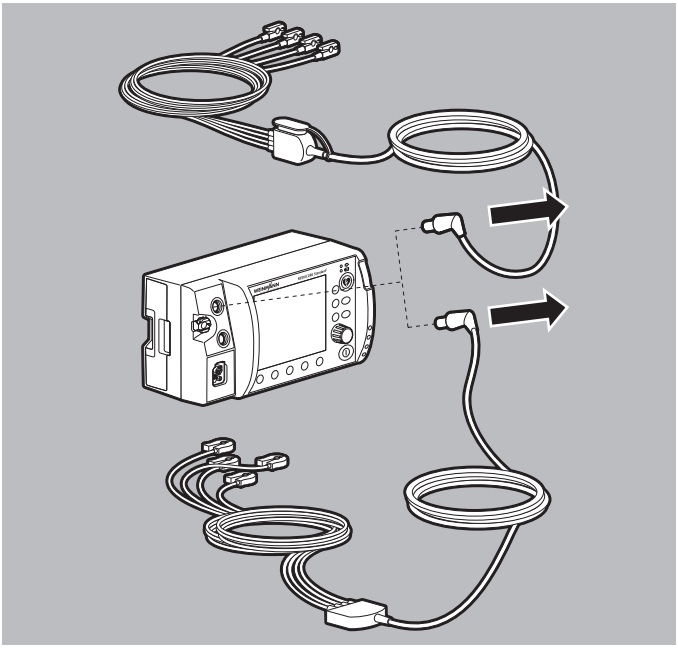
4. Disconnect the selected pulse oximetry sensor from the pulse oximetry sensor connecting cable.

Result A pulse oximetry sensor and the pulse oximetry sensor connecting cable have been disassembled.

7.4 Disassembling ECG cable

Requirement

- The device is switched off (see "6.2 Switching the device off", page 119).
- The device is disconnected from the patient.



1. Disconnect the selected ECG cable from the ECG connection on the device.

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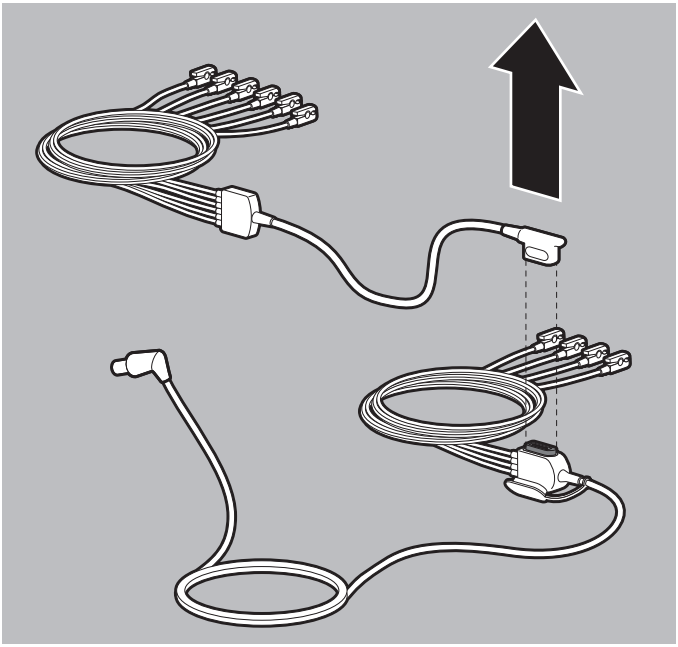

2. If the 12-lead ECG extension cable is connected: Disconnect the 12-lead ECG extension cable from the ECG cable with connection for 12-lead ECG extension cable.
3. Disconnect the ECG electrodes from the ECG cable clips and dispose of them.

Result An ECG cable has been disassembled.

7.5 Disassembling the NIBP cuff and NIBP connecting tube

Requirement

- The device is switched off (see "6.2 Switching the device off", page 119).
- The device is disconnected from the patient.

1. When used in a protective transport bag: Open the viewing window and side compartments of the protective transport bag.

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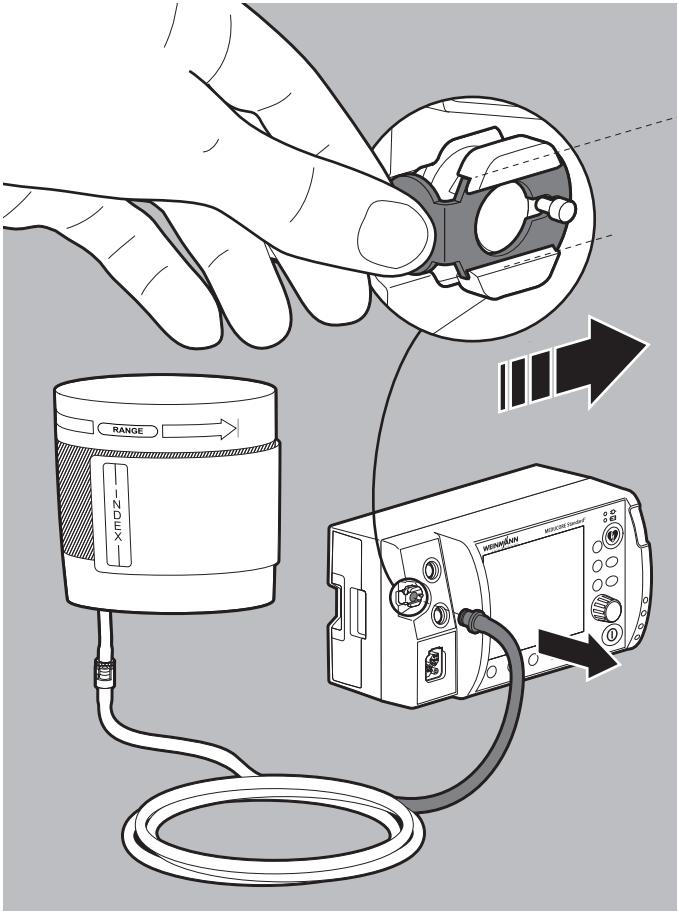

2. Disconnect the NIBP connecting tube with the selected NIBP cuff from the NIBP connection on the device.
   When doing so, please note: The latch of the NIBP connection must be pushed to the right to release the NIBP connecting tube from the NIBP connection.

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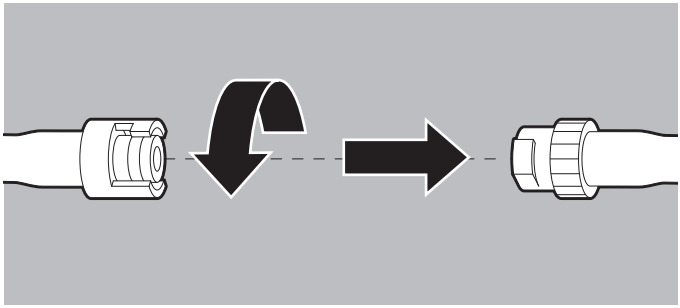

3. Open the safety closure.
4. Disconnect the NIBP cuff from the NIBP connecting tube.
5. If necessary: Pass all tubes through the respective openings in the protective transport bag.

Result An NIBP cuff and the NIBP connecting tube have been disassembled.

7.6 Disassembling the device from the protective transport bag and the retaining plate

Required auxiliary equipment Phillips screwdriver, size PH1

1. Place the protective transport bag with its back on a level, firm surface.
2. Release the magnetic catch of the protective transport bag and open the viewing window.
3. Disconnect all cables and tubes from the device.
4. Open the snap fasteners between the retaining plate and the protective transport bag.

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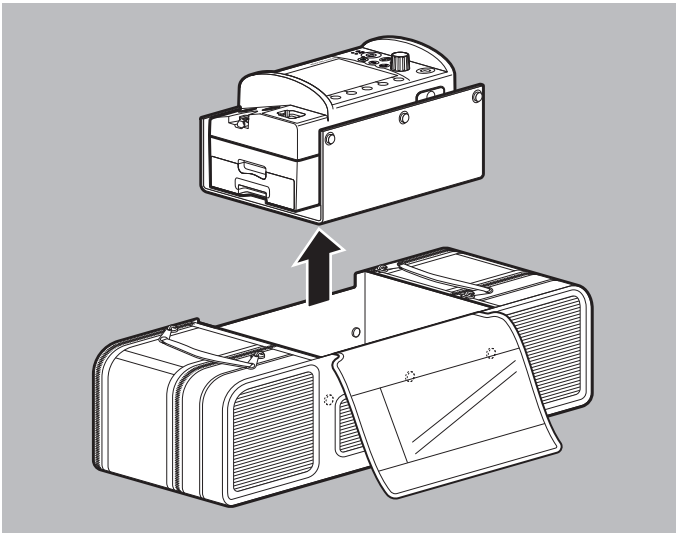
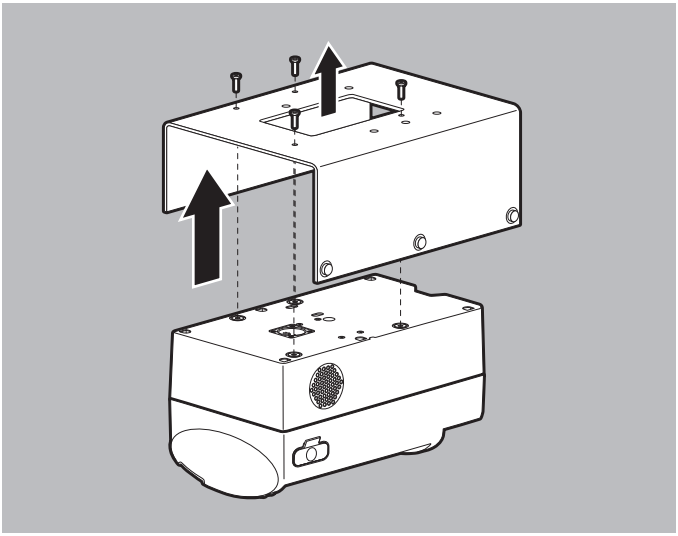


5. Take the device on the retaining plate up out of the protective transport bag.



6. Put the device on the retaining plate on a smooth, firm surface with the control panel membrane facing down.
7. Undo the screws from the retaining plate.
8. Remove the retaining plate.

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Result The device has been disassembled from the protective transport bag and the retaining plate.

7.7 Disassembling the device from the portable unit

Follow the instructions for use of the portable unit.

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8 Hygienic reprocessing

The following sections set out the procedures necessary for hygienic reprocessing. Read this chapter in full before starting hygienic reprocessing. If you have any questions regarding hygienic reprocessing, contact the manufacturer WEINMANN Emergency, or a technician expressly authorized by it.

⚠ WARNING

Risk of infection resulting from poor hygienic reprocessing!
If the device, components or accessories are subjected to incorrect hygienic reprocessing, or to none at all, then in the case of skin contact infections may occur which may seriously or fatally injure the patient or the user. What is more, the device, components, and accessories may be damaged.

⇒ Subject the device, components, and accessories to hygienic reprocessing after every use.
⇒ Only reuse the device, components, and accessories if they have been subjected to hygienic reprocessing in accordance with the cleaning and disinfection plan.
⇒ Carry out hygienic reprocessing in accordance with the cleaning and disinfection plan (see "8.7 Cleaning and disinfection plan", page 240).
⇒ When reprocessing the device, components, and accessories, use only the recommended cleaning agents and disinfectants.
⇒ Follow the instructions for use of the cleaning agent and disinfectant being used.
⇒ Follow the instructions for use of the components and the accessories.
⇒ Wear suitable personal protective equipment.
⇒ Only have the device, components, and accessories reprocessed by those who have medical training and training in the care of emergency patients.
⇒ Only have the device, components, and accessories reprocessed by those who have been trained in hygienic reprocessing methods.

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⚠ WARNING

Disrupted and failed therapy due to incorrect use of disposables!

Reusing and reprocessing disposables might induce unpredictable reactions as a result of aging, embrittlement, wear, thermal stress, and chemical action. This may put the functionality and safety of the device at risk, and cause the patient and user serious or life-threatening injury.

⇒ Do not reuse disposables.

⇒ Do not subject disposables to hygienic reprocessing.

⚠ WARNING

Loss of mechanical or electrical safety resulting from reprocessing of the device and accessories with unsuitable cleaning agents and disinfectants!

Using incorrect cleaning agents and disinfectants may cause damage to the surface of the device and accessories, as well as impairing electrical and insulating properties. This may cause the user and the patient serious or life-threatening injury.

⇒ Never clean the device, components, and accessories with bleach, bleach solution or compounds containing phenols.

⇒ Only use the cleaning agents and disinfectants recommended in these instructions for use and in the instructions for use of the components and accessories (see "8.7 Cleaning and disinfection plan", page 240).

⚠ WARNING

Risk of injury and material damage from residues of disinfectants or cleaning agents in the device, components, and accessories!

Residues of disinfectants or cleaning agents or moisture may lead to short circuits in the device connections and thus impair device function. This may injure the user and the patient and lead to material damage.

⇒ After hygienic reprocessing, check the device, components, and accessories visually for any residues of cleaning agent or disinfectant and remove any residues as necessary.

⇒ Carry out a complete function check after every hygienic reprocessing operation.

⇒ Do not immerse the device, components, and accessories in liquids.

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⚠ WARNING

Failure of therapy due to disinfection by immersion, mechanical reprocessing and sterilization!
If the device, or components or accessories not designed for these processes are subjected to disinfection by immersion, mechanical reprocessing or sterilization, they may be damaged.
⇒ Never subject the device, or components or accessories not designed for these processes to disinfection by immersion, mechanical reprocessing or sterilization.

8.1 Intervals

Part	After every use*	At least 1x weekly
All parts	x	x

* In the event of visible dirt or suspected contamination.

8.2 Preparing hygienic reprocessing

Requirement

- The device is switched off (see "6.2 Switching the device off", page 119).
- The device is disconnected from the patient.
- Battery and SD card are in the device.
- SD card cover is closed.

1. If the device is connected to line power or to a 12 V on-board power supply: Disconnect the device from line power (see "7.1.2 Disconnecting the device from line power", page 219).

   Alternatively:

   Disconnect the device from the 12 V on-board power supply (see "7.1.2 Disconnecting the device from line power", page 219).
   When doing so, please note: The battery remains in the device for hygienic reprocessing.

2. Disassemble the defibrillation electrodes/paddles and master cable (see "7.2 Disassembling defibrillation electrodes/paddles and master cable", page 221).

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3. Disassemble the pulse oximetry sensor and pulse oximetry sensor connecting cable (see "7.3 Disassembling pulse oximetry sensor and pulse oximetry sensor connecting cable", page 222).
4. Disassemble the ECG cable (see "7.4 Disassembling ECG cable", page 224).
5. Disassemble the NIBP cuff and NIBP connecting tube (see "7.5 Disassembling the NIBP cuff and NIBP connecting tube", page 225).
6. Remove the remaining accessories from the device.
7. In the event of contamination or suspected contamination of inaccessible areas of the device, protective transport bag or portable unit: Disassemble the device from the protective transport bag and retaining plate (see "7.6 Disassembling the device from the protective transport bag and the retaining plate", page 227).

   Alternatively:

   Disassemble the device from the portable unit (see "7.7 Disassembling the device from the portable unit", page 229). When doing so, please note: Disassembly is described in the instructions for use of the portable unit.
8. Dispose of all disposables properly (see "16 Disposal", page 357).

Result All parts have been prepared for hygienic reprocessing.

8.3 Cleaning parts manually

Requirement

- The parts exhibit visible dirt.
- Hygienic reprocessing is prepared (see "8.2 Preparing hygienic reprocessing", page 232).

1. For parts approved for cleaning, refer to the cleaning and disinfection plan (see "8.7 Cleaning and disinfection plan", page 240).
2. For the agents, dose, and exposure time for the individual parts, refer to the cleaning and disinfection plan.

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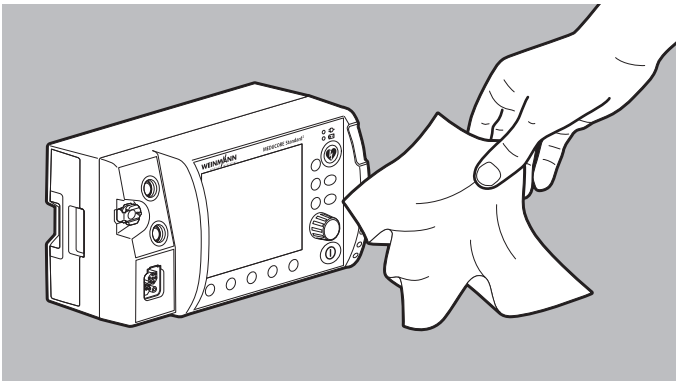
3. Prepare the cleaning solution as specified by the cleaning agent manufacturer.
4. To remove all visible dirt: Brush parts thoroughly using a commercially available soft brush suitable for plastic and wetted with the cleaning agent.
   When doing so, please note: Uneven surfaces and grooves (e.g. navigation knob) must be brushed especially thoroughly.



5. Wipe over parts with a clean, lint-free cloth moistened with cleaning solution until they look clean.
   When doing so, please note:
   - Use a new cloth for every cleaning process.
   - All surfaces must be wiped carefully.
   - All surfaces must be wetted with cleaning solution.
   - The exposure time specified in the cleaning and disinfection plan must be observed.
   - Uneven surfaces and grooves need wiping over especially carefully.
   - The inner surfaces of MCS2-SoftTip pulse oximetry sensors must be turned inside out for cleaning.
   - The attachments for large electrode surfaces (adults) must be left on the paddles.
   - The attachments for large electrode surfaces must be removed to clean the attachments for small electrode surfaces (children/infants).

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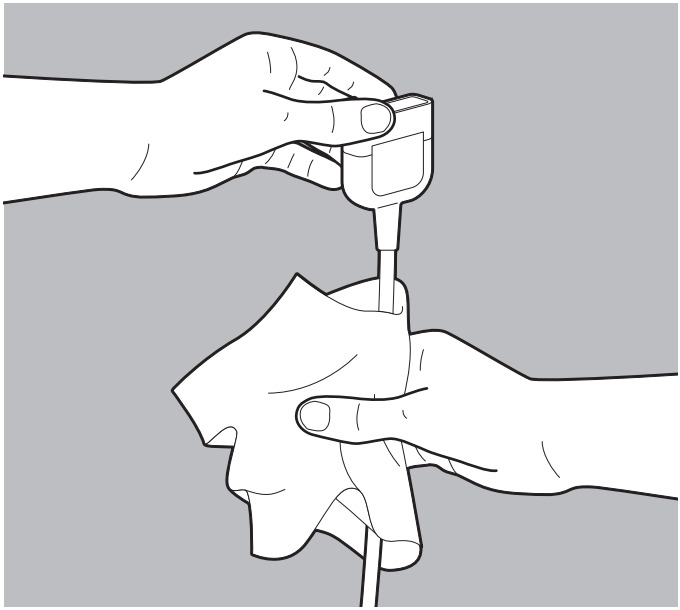


6. Surround cables/tubes firmly with the cloth and draw them through the cloth so that they are completely wetted.
   When doing so, please note: Stretch out coiled cables.
7. If visible dirt is still present: Repeat manual cleaning.
8. Wipe down parts with a damp cloth to remove residues of the cleaning agent.
9. Allow parts to dry completely at room temperature.
10. If required: Dry parts manually with a lint-free cloth.

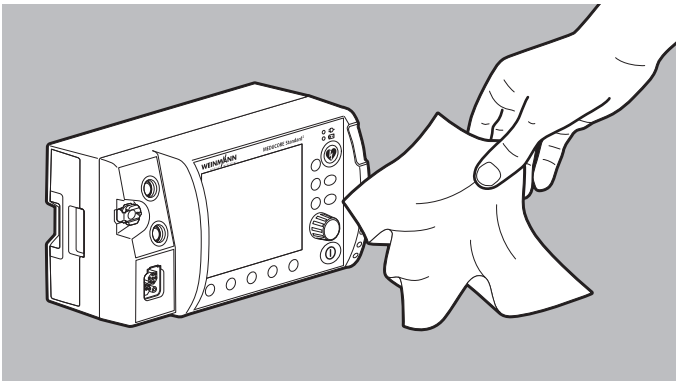
Result Parts have been cleaned manually.

8.4 Disinfecting parts by wiping

Requirement

- Hygienic reprocessing is prepared (see "8.2 Preparing hygienic reprocessing", page 232).
- The parts have been cleaned manually and look clean (see "8.3 Cleaning parts manually", page 233).

1. For parts approved for disinfection by wiping, refer to the cleaning and disinfection plan (see "8.7 Cleaning and disinfection plan", page 240).
2. For the agents, dose, and exposure time for the individual parts, refer to the cleaning and disinfection plan.
3. Prepare the solution for disinfection as specified by the disinfectant manufacturer.



4. Disinfect parts by wiping with one of the products listed. When doing so, please note:
   - Uneven surfaces and grooves (e.g. navigation knob) must be adequately wetted with disinfectant.
   - The exposure time specified by the manufacturer of the disinfectant must be observed.
   - The inner surfaces of MCS2-SoftTip pulse oximetry sensors must be turned inside out for cleaning.
   - The attachments for large electrode surfaces (adults) must be left on the paddles.

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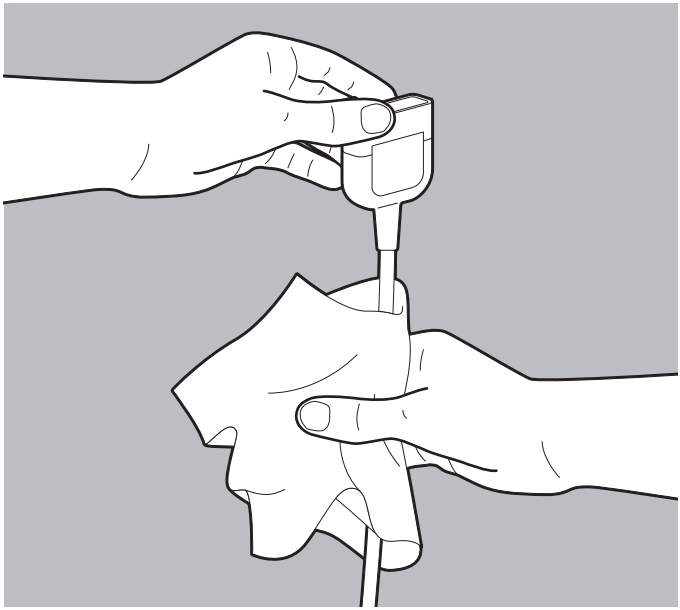
- The attachments for large electrode surfaces must be removed to clean the attachments for small electrode surfaces (children/infants).



5. Surround cables/tubes firmly with the cloth and draw them through the cloth so that they are completely wetted. When doing so, please note: Stretch out coiled cables.
6. Wait for the exposure time and allow parts to dry completely at room temperature.

Result The parts have been disinfected.

8.5 Subjecting bags to hygienic reprocessing

Requirement Hygienic reprocessing is prepared (see "8.2 Preparing hygienic reprocessing", page 232).

1. For the agents, dose, and exposure time for the bags, refer to the cleaning and disinfection plan.
2. Soak the bag in mains water for at least 10 minutes.
3. Brush contaminated areas under running mains water for at least 2 minutes using a cleaning brush until such areas look clean.
4. Rinse off cleaned areas under running mains water for 2 minutes.
5. Wash the open bag in a washing machine with cleaning agent and disinfectant but without a spin cycle:
   - Prewash: 5 min at 20 °C
   - Main wash: 30 min at 30 °C

Result A bag has been hygienically reprocessed.

8.6 Preparing parts for reuse

Requirement The parts have been subjected to hygienic reprocessing according to the cleaning and disinfection plan.

1. Check all parts for damage resulting from use (e.g. tension cracks or cable breaks).
2. Replace damaged parts.
3. When the device has been disassembled from the protective transport bag and the retaining plate: Mount the device in the protective transport bag (see "4.1.1 Mounting the device in the protective transport bag", page 74).

   Alternatively:

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When the device has been disassembled from the portable unit: Mount the device on the portable unit (see "4.1.2 Mounting the device on the portable unit", page 76).

4. Stow components and accessories in the protective transport bag (see "4.2.1 Stowing components and accessories in the protective transport bag", page 76).

   Alternatively:

   Stow components and accessories on the portable unit (see "4.2.2 Stowing components and accessories on the portable unit", page 83).

5. Connect the power supply (see "4.3 Connecting a power supply", page 83).
6. Carry out a function check (see "5 Function check", page 103).
7. If required: Store the device, components, and accessories in accordance with the conditions for storage (see "15 Storage", page 354).

Result The parts are ready for use again.

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8.7 Cleaning and disinfection plan

Carry out hygienic reprocessing according to the table below after **every** use:

Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Device					
Device	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Power information					
Accu-Pack battery	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
Adapter cable for 12 V on-board power supply/circular connector					
Power supply unit and charger	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Not necessary	Not permitted	Not permitted	Not permitted
Charging adapter					
Charging station for battery					

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Defibrillation/cardioversion					
MCS2-Connect master cable	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
MCS2-Hardpads paddles					
Function test resistor					
MCS2-Softpads defibrillation electrodes for children/adults (disposable)	Not permitted, as disposables				
Electrode gel (disposable)					

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Pulse oximetry monitoring					
MCS2-Adapt pulse oximetry sensor connecting cable	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
MCS2-SoftTip pulse oximetry sensor	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
MCS2-Wrap pulse oximetry sensor					
MCS2-Earclip pulse oximetry sensor					
Ear clip for MCS2-Earclip pulse oximetry sensor					
MCS2-Wrap pulse oximetry sensors (disposable)	Not permitted, as disposables				
Strap for attaching MCS2-Wrap pulse oximetry sensor (disposable)					

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
6-lead ECG monitoring/12-lead ECG recording and assessment					
MCS2-Line ECG cables (all versions) ECG cable separator	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
ECG electrodes for adults and children (disposable)	Not permitted, as disposables				
Non-invasive blood pressure measurement (NIBP monitoring)					
NIBP connecting tube Adapter tube for connecting NIBP disposable cuffs for newborns	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
NIBP cuffs (reusable)	Follow the instructions for use of the NIBP cuffs				
NIBP cuffs (disposable)	Not permitted, as disposables				

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Printing					
Printer	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
Printer battery					
Charging station for printer battery with power supply unit and charger					
Quadruple charging station for printer battery including power supply unit and charger					

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Bags and portable unit					
Printer case	Wipe down smooth surfaces with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Not permitted	Not permitted	Wash in a washing machine with no spin cycle. Prewash: 5 min at 20 °C Main wash: 30 min at 30 °C Cleaning agent: Turbo Usona (Ecolab) Disinfectant: Turbo Oxysan (Ecolab)	Not permitted
MCS2-Bag protective transport bag					
Retaining plate	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Wipe down all surfaces with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min	Not permitted	Not permitted	Not permitted
Portable unit	Follow the instructions for use of the portable unit				

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Part	Manual cleaning (only necessary in the event of visible dirt)	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing	Sterilization
Accessories for training					
ECG simulator, 6-lead ECG, shockable	Wipe down with neodisher® MediClean forte (Dr. Weigert). Dose: 10 ml/l Wipe down all surfaces at least 2x until they look clean.	Not necessary	Not permitted	Not permitted	Not permitted
ECG simulator, 12-lead ECG, shockable					
Adapter cable for connecting to Ambu/Laerdal practice manikin					
Adapter cable for connecting ShockLink®					

The applicable instructions are those in the instructions for use from the manufacturers of the individual components or parts. Follow these instructions for use.

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9 Application menu

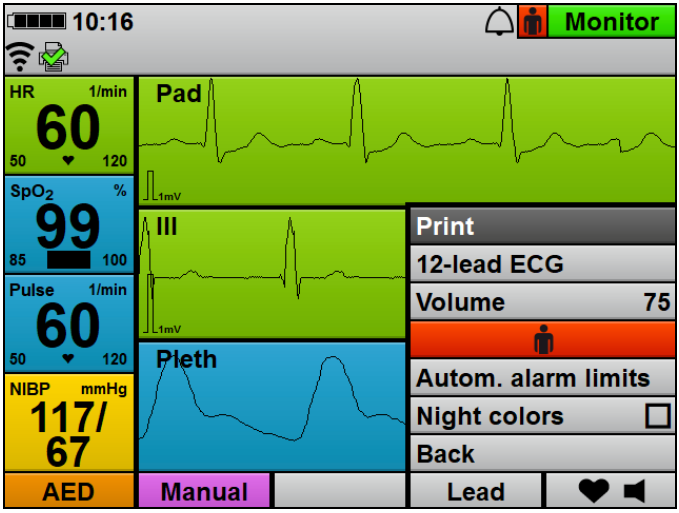
The application menu contains functions and settings which can be accessed quickly and easily during the session.

9.1 Navigating the application menu

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- The patient group is set (see "6.4 Selecting patient group", page 120).
- A mode is set.

1. To call up the application menu: Press the navigation knob. The application menu appears (example):



2. Select setting using the navigation knob.
3. Change setting using the navigation knob.

   Alternatively:

   Press the navigation knob to activate/deactivate a setting.

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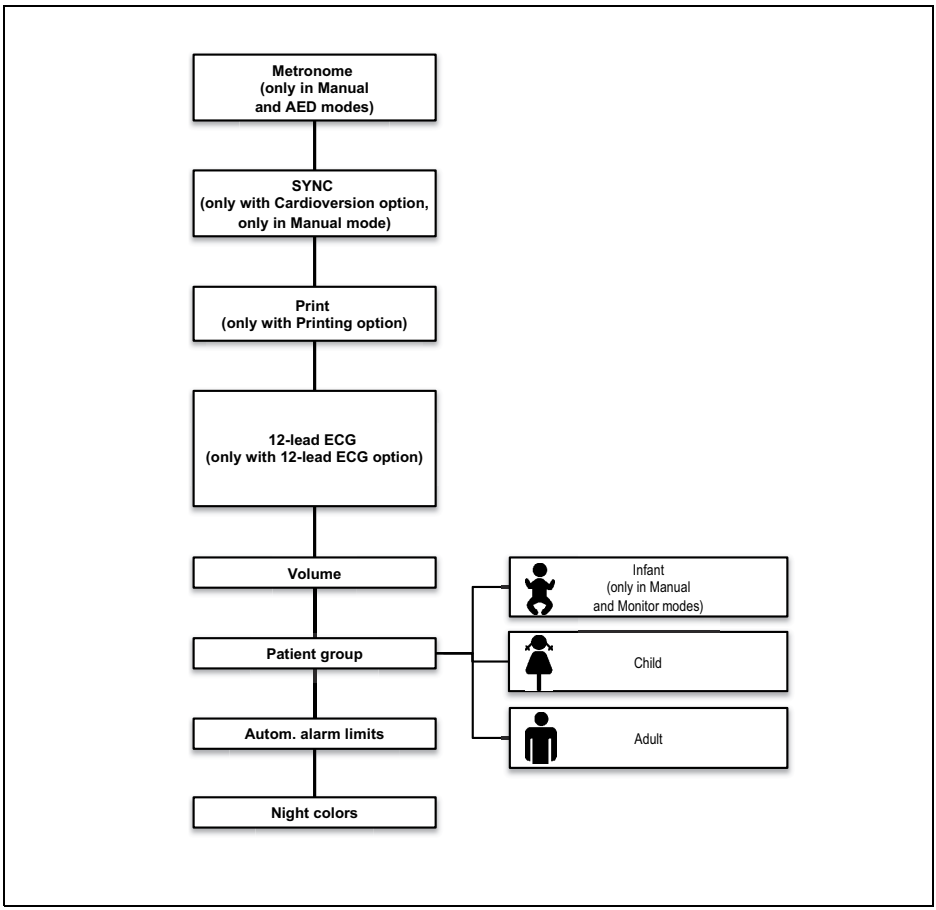
4. To exit the menu without making any entries:
   Select the **Back** menu item.

   Alternatively:

   Wait 3 seconds.

Result Functions are carried out or settings are made.

9.2 Menu structure



9-1 Application menu

9.3 Settings

Parameter	Possible values	Description	Factory setting
Metronome (only in manual and AED modes)	Off 15:2 (only in manual and AED modes, child) 30:2 (only in manual and AED modes, adult) 	Here you can set the metronome rhythm.	• AED mode adult: 30:2 • AED mode child: 15:2 • Manual mode: off
SYNC (only with Cardioversion option, only in manual mode)	Activated  Deactivated 	Here you can set whether shocks are to be delivered synchronized. Once a shock has been delivered, then depending on the settings in the operator menu (**Operator menu | Manual mode settings | Defibrillation after cardioversion**) another cardioversion or defibrillation can be carried out.	Deactivated
12-lead ECG (only with 12-lead ECG option)	-	Here you activate the 12-lead ECG function mode. If you start 12-lead ECG function mode from AED or manual mode, the device automatically switches to monitor mode in the background.	-
Print (only with Printing option)	-	Here you can print the following printouts: • Live printout • 12-lead ECG printout • Replay printout The **Printing** menu item is grayed out if the printer is not connected. When the printer is printing, the menu item is called **Stop print xx s**. A printing process can be finished prematurely by pressing this menu item. A counter indicates the time remaining until the end of printing.	-

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Parameter	Possible values	Description	Factory setting
Volume	25 % 50 % 75 % 100 %	Here you can set the volume of the device for the current session. The operator specifies minimum volume (see "13.12 System settings", page 342).	75 %
Patient group	Adult  Child  Infant (only in manual and monitor modes) 	Here you can select the patient group.	Adult 
Autom. alarm limits	-	The device automatically specifies the alarm limits for the physiological alarms. The alarm limit corridor is 10 %, 20 % or 30 % above or below the physiological values measured at the time of activation. The alarm limit corridor can be set in the user menu (see "10 User menu", page 252).	20 %
Night colors	Activated  Deactivated 	Here you can set whether the device is to display night colors.	Deactivated

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10 User menu

The user menu contains functions and settings which affect the current session and which are not saved permanently as device presets (except: date and time settings).

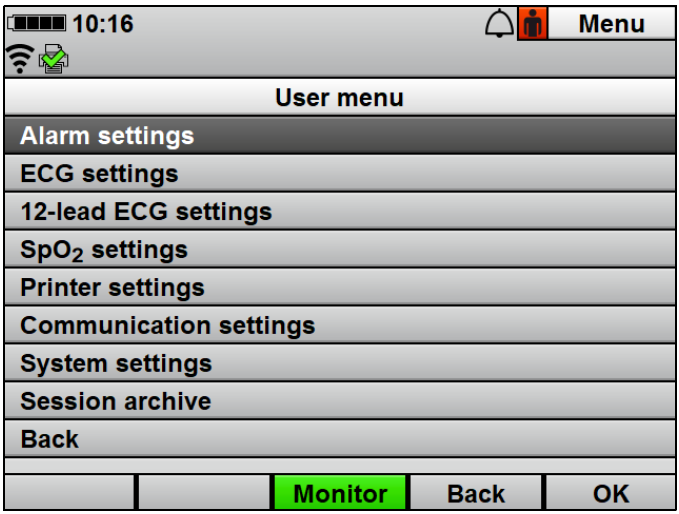
If the device was switched off for < 30 s and if, while switched on previously, patient measured values were determined or a manual event was saved, the settings made previously in the user menu are retained.

10.1 Navigating the user menu

Requirement

- The device is switched on (see "6.1 Switching on the device", page 118).
- The patient group is set (see "6.4 Selecting patient group", page 120).
- A mode is set.

1. Press the menu button .
   The user menu appears:



2. Select the setting with the navigation knob and confirm.

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3. Change the setting with the navigation knob and confirm.
4. To exit the menu: Select the **Back** function button.

   Alternatively:

   Press the menu button  .

Result Settings are made and apply to the current session.

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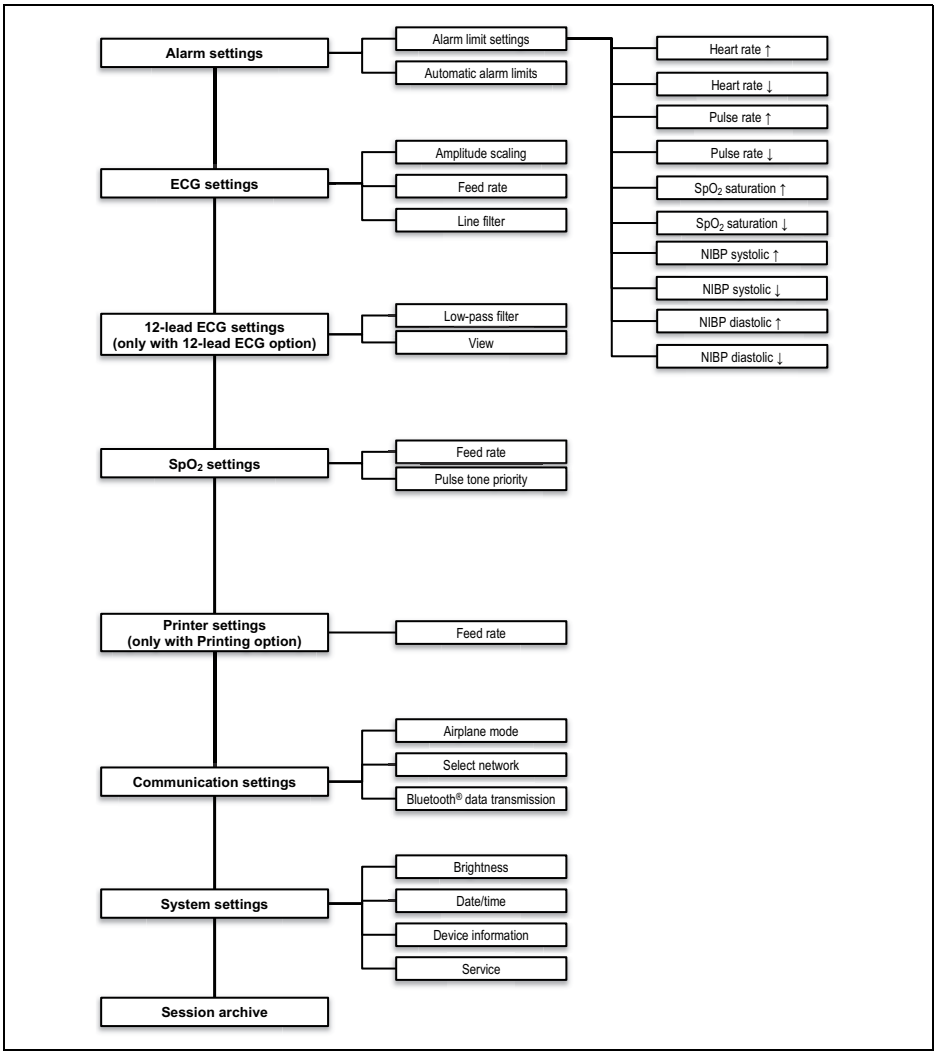
10.2 Menu structure



10-1 User menu

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10.3 Settings

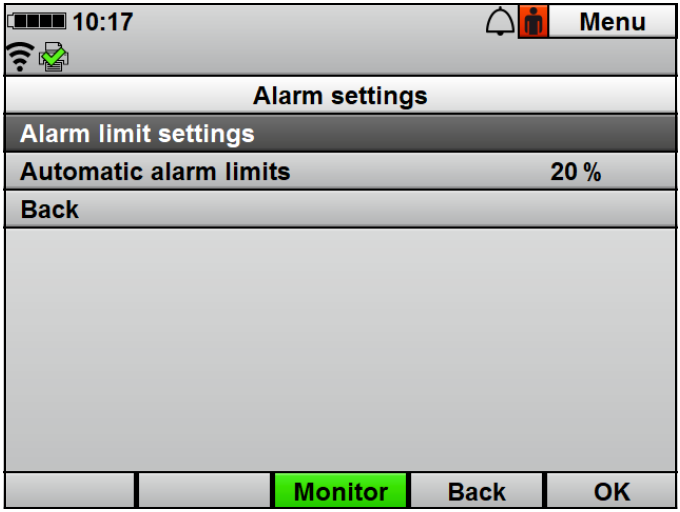
10.3.1 Alarm settings

⚠ WARNING

Risk of injury due to alarm limits which are too high or too low!

Alarm limits which are either too high or too low may prevent the device triggering an alarm, thereby putting the patient at risk.

⇒ Always set alarm limits which have been adapted to the patient.



*10-2 **Alarm settings** submenu*

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Parameter		Possible values	Description	Factory setting
Alarm limit settings Adult	Heart rate ↑	35/min - 250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limit values as of which the device is to trigger an alarm. According to the values set, the setting ranges of the upper and lower limit values depend on each other as follows: The setting range for the upper alarm limit ends at least one setting value above the set value for the lower alarm limit. The setting range for the lower alarm limit ends at least one setting value below the set value for the upper alarm limit.	120/min
	Heart rate ↓	30/min - 245/min, in increments of 5		50/min
	Pulse rate ↑	35/min - 250/min, in increments of 5		120/min
	Pulse rate ↓	30/min - 245/min, in increments of 5		50/min
	SpO_2 saturation ↑	66 % - 100 %		100 %
	SpO_2 saturation ↓	65 % - 99 %		85 %
	NIBP systolic ↑	45 mmHg - 260 mmHg, in increments of 5		220 mmHg
	NIBP systolic ↓	40 mmHg - 255 mmHg, in increments of 5		75 mmHg
	NIBP diastolic ↑	25 mmHg - 200 mmHg, in increments of 5		110 mmHg
	NIBP diastolic ↓	20 mmHg - 195 mmHg, in increments of 5		35 mmHg

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Parameter		Possible values	Description	Factory setting
Alarm limit settings Child	Heart rate ↑	35/min - 250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limit values as of which the device is to trigger an alarm. According to the values set, the setting ranges of the upper and lower limit values depend on each other as follows: The setting range for the upper alarm limit ends at least one setting value above the set value for the lower alarm limit. The setting range for the lower alarm limit ends at least one setting value below the set value for the upper alarm limit.	150/min
	Heart rate ↓	30/min - 245/min, in increments of 5		50/min
	Pulse rate ↑	35/min - 250/min, in increments of 5		150/min
	Pulse rate ↓	30/min - 245/min, in increments of 5		50/min
	SpO_2 saturation ↑	66 % - 100 %		100 %
	SpO_2 saturation ↓	65 % - 99 %		85 %
	NIBP systolic ↑	45 mmHg - 230 mmHg, in increments of 5		145 mmHg
	NIBP systolic ↓	40 mmHg - 225 mmHg, in increments of 5		75 mmHg
	NIBP diastolic ↑	25 mmHg - 160 mmHg, in increments of 5		100 mmHg
	NIBP diastolic ↓	20 mmHg - 155 mmHg, in increments of 5		35 mmHg

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Parameter		Possible values	Description	Factory setting
Alarm limit settings Infant	Heart rate ↑	35/min - 250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limit values as of which the device is to trigger an alarm. According to the values set, the setting ranges of the upper and lower limit values depend on each other as follows: The setting range for the upper alarm limit ends at least one setting value above the set value for the lower alarm limit. The setting range for the lower alarm limit ends at least one setting value below the set value for the upper alarm limit.	200/min
	Heart rate ↓	30/min - 245/min, in increments of 5		100/min
	Pulse rate ↑	35/min - 250/min, in increments of 5		200/min
	Pulse rate ↓	30/min - 245/min, in increments of 5		100/min
	SpO_2 saturation ↑	66 % - 100 %		95 %
	SpO_2 saturation ↓	65 % - 99 %		85 %
	SpO_2 saturation ↑	45 mmHg - 130 mmHg, in increments of 5		100 mmHg
	SpO_2 saturation ↓	40 mmHg - 125 mmHg, in increments of 5		50 mmHg
	NIBP systolic ↑	25 mmHg - 100 mmHg, in increments of 5		70 mmHg
	NIBP systolic ↓	20 mmHg - 95 mmHg, in increments of 5		30 mmHg
Automatic alarm limits	-	10 % 20 % 30 %	Here you can set the automatic alarm limits. The device automatically specifies the alarm limits for the physiological alarms. The deviation is 10 %, 20 % or 30 % from the measured values at the time of activation.	20 %

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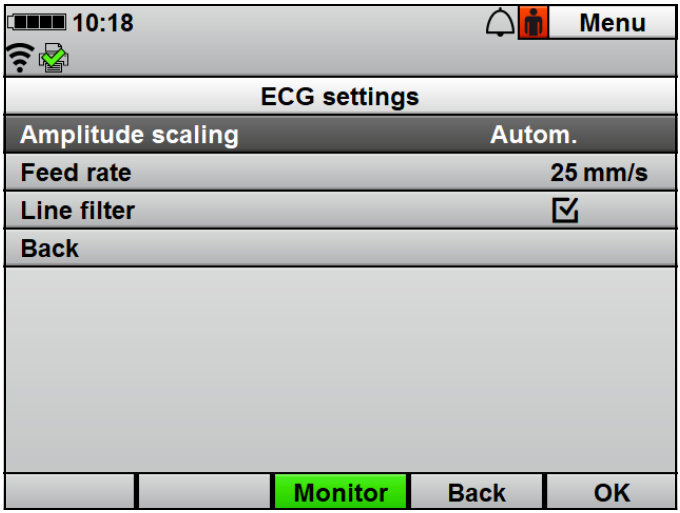
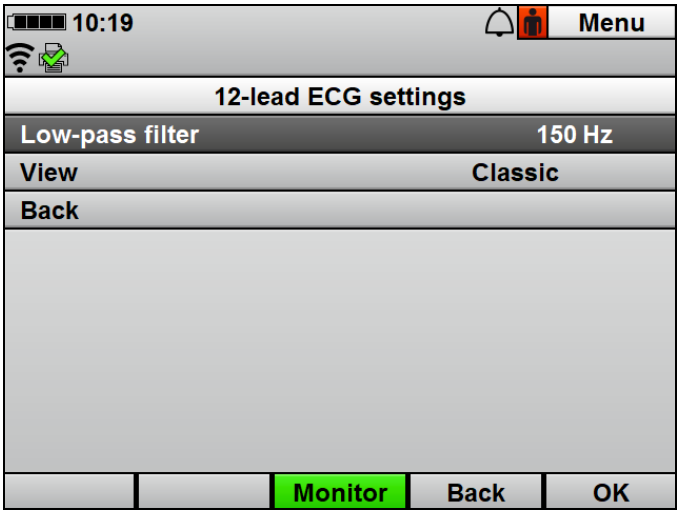
10.3.2 ECG settings



10-3 ***ECG settings*** *submenu*

Parameter	Possible values	Description	Factory setting
Amplitude scaling	Autom. 2 mm/mV 5 mm/mV 10 mm/mV 20 mm/mV	Here you can set the amplification of the ECG signal and thus the height of the ECG curve. If the **Autom.** setting has been selected, the amplification of the ECG signal and thus the height of the ECG curve are adapted automatically so that a maximum height for lead II is displayed.	Autom.
Feed rate	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the feed rate of the ECG curve display and so change the time resolution.	25 mm/s
Line filter	Activated ☑ Deactivated ☐	By activating the line filter, you can reduce ECG interference caused by the power supply network.	Activated

10.3.3 12-lead ECG settings (only with 12-lead ECG option)



10-4 ***12-lead ECG settings*** *submenu*

Parameter	Possible values	Description	Factory setting
Low-pass filter	50 Hz 150 Hz	Here you can set a low-pass filter to filter out artifacts.	150 Hz
View	Classic Cabrera	Here you can set the sequence in which the leads are displayed in 12-lead ECG function mode: • Classic: I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6 • Cabrera: aVL, I, -aVR, II, aVF, III, V1, V2, V3, V4, V5, V6	Classic

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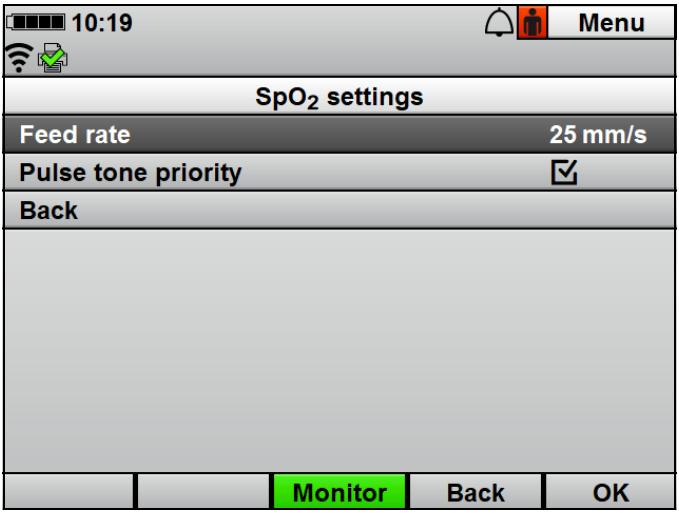
10.3.4 SpO_2 settings



*10-5 **SpO_2 settings** submenu*

Parameter	Possible values	Description	Factory setting
Feed rate	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the feed rate of the SpO_2 curve display and so change the time resolution.	25 mm/s
Pulse tone priority	Activated ☑ Deactivated ☐	Here you can set whether pulse tone is to take priority over heart rate tone. The tone level of the pulse tone is adapted to measured oxygen saturation.	Activated

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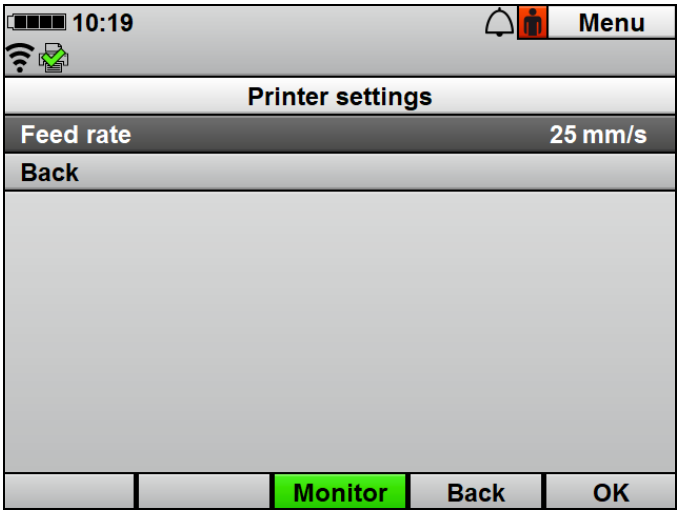
10.3.5 Printer settings (only with Printing option)



10-6 ***Printer settings*** *submenu*

Parameter	Possible values	Description	Factory setting
Feed rate	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the feed rate at which the printer prints a live printout and a replay printout.	25 mm/s

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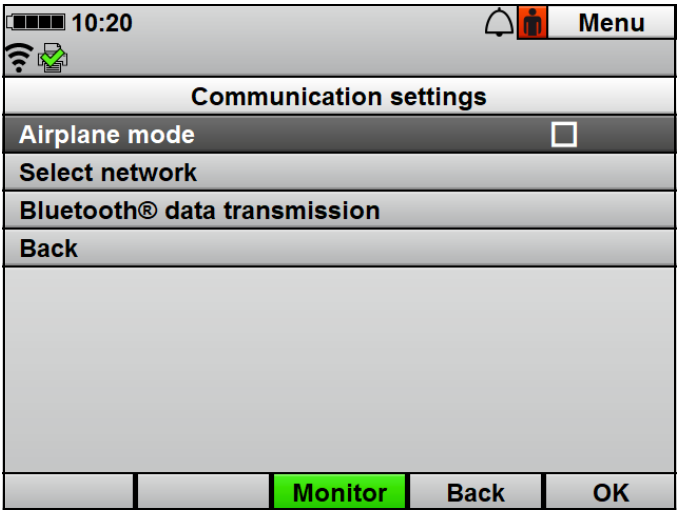
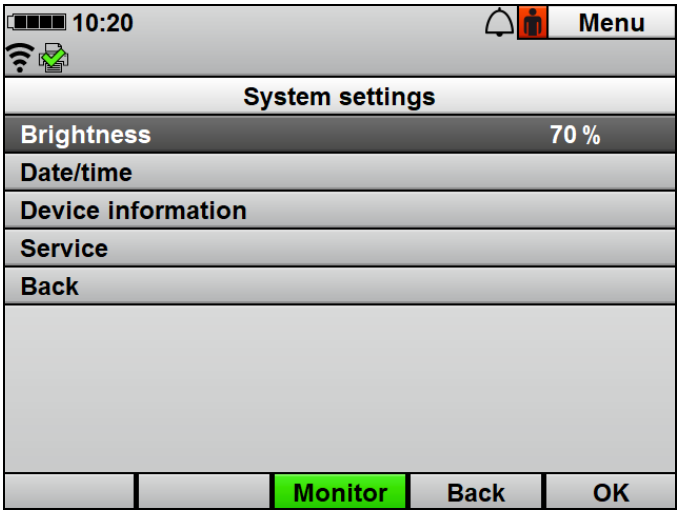
10.3.6 Communication settings



10-7 ***Communication settings*** *submenu*

Parameter	Possible values	Description	Factory setting
Airplane mode	Activated ☑ Deactivated ☐	Here you can activate or deactivate all the wireless interfaces of the device (example: WiFi interface).	Deactivated
Select network	-	Here you can select a network configured in the operator menu as the default network. If you cancel the process, the menu item is grayed out briefly.	-
Bluetooth® data transmission	-	Here you can make data available to a compatible system for digital patient data recording via the Bluetooth® interface. If you cancel the process, the menu item is grayed out briefly.	-

10.3.7 System settings



*10-8 **System settings** submenu*

Parameter		Possible values	Description	Factory setting
Brightness		10 %-100 %, in 10 % increments	Here you can set the display brightness.	70 %
Date/time	Year	-	Here you can set the date and time. The device adopts a new date or a new time only if it remains switched on for at least 1 min after the date or time have been changed. The change to date or time only takes effect once the device is switched on again.	-
	Month			-
	Day			-
	Hour			-
	Minute			-

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Parameter		Possible values	Description	Factory setting
Device information	Telephone contact	-	Here you can find out the telephone number the operator has assigned to the device (example: The number for a cellphone on the emergency vehicle).	-
	Serial number	-	Here you can find out the device serial number. This is also located on the device information label.	-
	Device ID	-	Here you can find out the device ID. This is required to purchase options.	-
	MAC Bluetooth® module (only with Printing and Bluetooth® data transmission options)	-	Here you can find out the MAC address of the Bluetooth® module.	-
	MAC WiFi module	-	Here you can find out the MAC address of the WiFi module.	-
	Last function check	-	Here you can find out when a function check was last carried out.	-
	Function check result	-	Here you can find out whether the last function check carried out was passed.	-
	Days until next service	-	Here you can find out how many days to go until the next service is due.	-
	Next service	-	Here you can find out when the next service is due.	-

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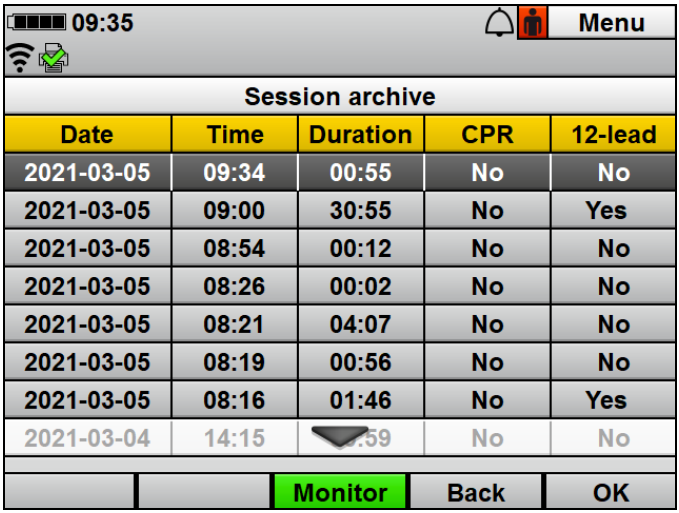
Parameter		Possible values	Description	Factory setting
Device information	Device software	-	Here you can find out which software version is currently installed on the device.	-
Service	Upload service data to WEINMANN	-	Here you can upload the device service data to WEINMANN Emergency. If you cancel the process, the menu item is grayed out briefly.	-
	Export service data to SD card	-	Here you can export the device service data to an SD card.	-

10.3.8 Session archive



*10-9 **Session archive** submenu*

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Parameter	Possible values	Description	Factory setting
Session archive	-	Here you can have all the sessions saved in the internal memory of the device displayed (approx. the last 9.5 h). The following actions are possible for any session: • Analyze the session in replay view on the device (only with Replay view option) (see 6.17.2, p. 207) • Analyze the 12-lead ECG of a session (only with 12-lead ECG option) (see 6.17.3, p. 209) • Print a session report (only with Printing option) (see 6.16.7, p. 204) The session archive is only available if at least one of the options mentioned is enabled.	-

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11 Alarms and faults

11.1 General instructions

The device emits an alarm as long as the cause continues to exist. Once the cause of the alarm no longer exists, the device no longer emits the alarm. Some alarms are excepted from this. The duration of these alarms is marked in the tables.

The device emits physiological and technical alarms. Every alarm has a certain priority:

Priority	Color in alarm line	Meaning
High priority	Red	High-priority alarms warn of imminent fatal or irreversible patient injuries or of device faults.
Medium priority	Yellow	Medium-priority alarms warn of immediate reversible patient injuries or of minor device faults.
Low priority	Turquoise	Low-priority alarms warn of delayed minor injuries or inconvenience to the patient or minor restrictions on the device.

If more than one alarm is active, the device handles this as follows:

- Multiple alarms of different priorities: The device displays the alarm with the highest priority. Alarms with a lower priority do not appear until the higher-priority alarms are no longer active.
- Multiple alarms of identical priorities: The device displays the alarms in turn.

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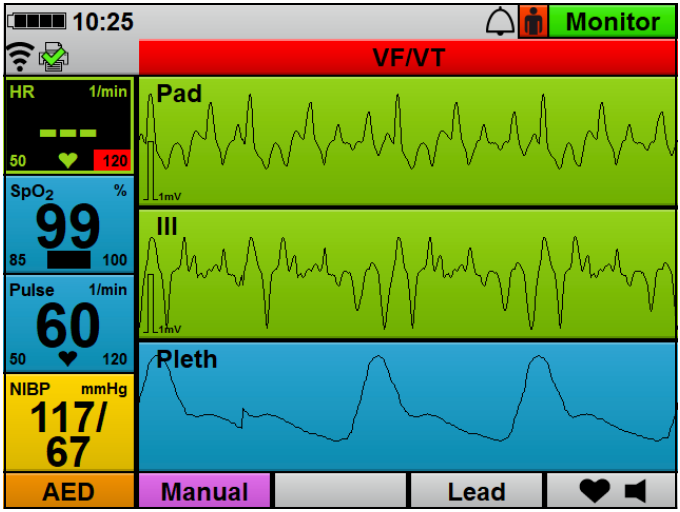

11-1 Alarm line with VF/VT alarm (example)

The device displays alarms as follows:

- As text in the alarm line in the display
- As audio alarm tones (via the loudspeaker)
- With the alarm light (in the top right-hand corner on the front of the device)

Alarms are outputted according to their priority:

Type of alarm signal	**High priority**	**Medium priority**	**Low priority**
Alarm line			
Flashing frequency	2 Hz	0.5 Hz	Not flashing (constantly on)
Size	90 mm x 5 mm		
Color	Red	Yellow	Turquoise
Signal ratio	1:1	1:1	100 % (on)

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Type of alarm signal	High priority	Medium priority	Low priority
Audio alarm			
Number of pulses	5	3	1
Duration of pulses	120 ms	200 ms	200 ms
Pulse interval	240 ms	200 ms	Not applicable
Pulse frequency	480 Hz	840 Hz	1200 Hz
Alarm light			
Color	Red	Off	Off
Frequency	2 Hz	Not applicable	Not applicable
Signal ratio	33 % on	Not applicable	Not applicable
Size	10 mm x 35 mm		

The device additionally displays physiological alarms by means of the respective parameter field flashing.

The device's alarm behavior depends on the mode selected:

- In AED mode, the device does not emit alarms. The device provides information by means of AED instructions and voice prompts about technical conditions which lead to AED mode being impaired.
- Audio alarm output is deactivated in manual mode. It can be reactivated at any time by pressing the alarm button. In the operator menu, the operator can specify whether audio alarm output is to be activated when manual mode is entered.

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11.2 Alarm messages

11.2.1 High-priority alarm (red)

Alarm	Cause	Remedy
Asystole	Asystole detected	Act in accordance with currently applicable guidelines.
		If medically indicated, carry out suitable treatment.
Battery defective	Battery defective	Let the device run on battery power without line power until it switches off. Fully recharge battery (see 4.4.2, p. 86). If the device continues to display the alarm: Change battery (see 4.4.4, p. 88).
Battery empty	Very low battery status	Change battery (see 4.4.4, p. 88).
		Connect device to line power (see 4.3, p. 83) and charge battery (see 4.4.2, p. 86).
Check defibrillation electrodes (Manual mode)	Defibrillation electrodes no longer attached/not attached correctly to the patient	Attach defibrillation electrodes to the patient correctly (see 6.5.1, p. 122).
Check patient contact	Paddles are not in contact/not correctly in contact with the patient	Check contact between paddles and patient. If the alarm persists: Cancel shock delivery.
Defibrillation module defective	Internal defibrillation module defective	Have the device repaired.
Insert battery (Manual mode)	Battery not inserted/not inserted correctly	Insert battery correctly (see 4.3, p. 83).
Plug in Pad connector (Manual mode)	Defibrillation electrodes not connected/not connected correctly to the master cable	Connect defibrillation electrodes to the master cable correctly (see 6.5.1, p. 122).
	Paddles not connected/not connected correctly to the master cable	Connect paddles to the master cable correctly (see 6.5.2, p. 126).
	Master cable not connected/not connected correctly to the device	Connect the master cable to the device correctly (see 6.5.1, p. 122).
Shock not successful (Manual mode)	No patient contact during shock delivery	Wait 10 seconds.
		Charge the shock capacitor again using the **Charge** function button.

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Alarm	Cause	Remedy
VF/VT*	Ventricular fibrillation or ventricular tachycardia detected	Act in accordance with currently applicable guidelines.
		Switch to AED mode or manual mode and carry out defibrillation, if medically indicated (see 6.5, p. 122).

* In the operator menu, the device can be preset so that the VF/VT alarm can be deactivated and activated by the user. It is also possible in the operator menu to preset whether the device is to start with the VF/VT alarm activated or deactivated.

11.2.2 Medium-priority alarm (yellow)

Alarm	Cause	Remedy
Battery weak	Low battery status	• Change battery (see 4.4.4, p. 88). • Connect the device to line power (see 4.3, p. 83).
Check defibrillation electrodes (Monitor mode)	Defibrillation electrodes no longer attached/not attached correctly to the patient	Attach defibrillation electrodes to the patient correctly (see 6.5.1, p. 122).
Check seating of ECG electrodes	ECG electrodes not attached/not attached correctly to the patient	Attach ECG electrodes to the patient correctly (see 6.10.1, p. 164).
	ECG cable not connected correctly to the ECG electrodes	Connect ECG cable to ECG electrodes correctly (see 6.10.1, p. 164).
Close paper compartment	Paper compartment cover of the printer open	Close the paper compartment cover.
Connection failed (Alarm deactivated after 60 s)	Device outside the range of the network selected in the operator menu	Bring the device within range of the selected network. If necessary: Select a different network in the operator menu (see 12.3, p. 292).
	Device unable to connect to the network selected in the operator menu	Check login data (see 12.3, p. 292).
		Check the signal strength of the selected network. If necessary: Select a different network in the operator menu (see 12.3, p. 292).

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Alarm	Cause	Remedy
ECG module defective	Internal ECG module defective	Have the device repaired.
E-mail delivery error (Alarm deactivated after 60 s)	Server not accessible	Check connection to network (see 12.3, p. 292).
	Connection between device and network interrupted	Check preset e-mail recipient (see 12.5, p. 299).
		Check connection to network (see 12.3, p. 292). If necessary: Select a different network.
		Check date/time (see 10.3.7, p. 264).
Excessive NIBP cuff pressure (Alarm deactivated after 10 s)	Pressure in the NIBP cuff increased to such a degree as a result of external influences that the safety valve opened	Check which influences resulted in the pressure increase and eliminate them before the next measurement.
Heart rate ↑	Measured heart rate is above the set upper alarm limit	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).
Heart rate > 250/min	Measured heart rate is above 250/min (device shows --- as heart rate)	If medically indicated, carry out suitable treatment.
Heart rate ↓	Measured heart rate is below the set lower alarm limit	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).
Heart rate < 30/min	Measured heart rate is below 30/min (device shows --- as heart rate)	If medically indicated, carry out suitable treatment.
Insert printer paper	Printer paper completely used up	Change printer paper (see 4.7.3, p. 98).
	No printer paper inserted	Change printer paper (see 4.7.3, p. 98).
Memory error	Internal memory module defective	Have the device repaired.
NIBP diastolic ↑ (Alarm deactivated after 10 s)	Measured diastolic blood pressure is above the set upper alarm limit	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).

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Alarm	Cause	Remedy
NIBP diastolic ↓ (Alarm deactivated after 10 s)	Measured diastolic blood pressure is below the set lower alarm limit	If medically indicated, carry out suitable treatment. Adapt alarm limits (see 10.3.1, p. 255).
NIBP measurement error (Alarm deactivated after 10 s)	NIBP measurement cannot be carried out	• Make sure that the patient lies still during the measurement. • Rule out the risk of patient vibration. • Use a suitable size of NIBP cuff. • Ensure that the NIBP cuff is properly attached. • Ensure that there is no clothing between the NIBP cuff and the patient.
NIBP module defective (Alarm active as long as the condition prevails)	Internal NIBP module defective	Have the device repaired.
NIBP outside measuring range (Alarm deactivated after 10 s)	Blood pressure cannot be measured and displayed as it is outside the device's measuring range	Use an alternative blood pressure measurement device with a larger measuring range.
No NIBP signal (Alarm deactivated after 10 s)	NIBP module unable to detect a pulse wave signal	• Make sure that the patient lies still during the measurement. • Rule out the risk of patient vibration. • Use a suitable size of NIBP cuff. • Ensure that the NIBP cuff is properly attached. • Ensure that there is no clothing between the NIBP cuff and the patient.
NIBP safety shutdown (Alarm deactivated after 10 s)	Pressure in the NIBP cuff is too high for too long	Remove the NIBP cuff from the patient. Have the device repaired.

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Alarm	Cause	Remedy
NIBP signal disrupted (Alarm deactivated after 10 s)	Unable to detect pulse wave signal for NIBP measurement reliably	• Make sure that the patient lies still during the measurement. • Rule out the risk of patient vibration. • Use a suitable size of NIBP cuff. • Ensure that the NIBP cuff is properly attached. • Ensure that there is no clothing between the NIBP cuff and the patient.
NIBP systolic ↑ (Alarm deactivated after 10 s)	Measured systolic blood pressure is above the set alarm limit	If medically indicated, carry out suitable treatment. Adapt alarm limits (see 10.3.1, p. 255).
NIBP systolic ↓ (Alarm deactivated after 10 s)	Measured systolic blood pressure is below the set alarm limit	If medically indicated, carry out suitable treatment. Adapt alarm limits (see 10.3.1, p. 255).
NIBP tube blocked (Alarm deactivated after 10 s)	NIBP connecting tube kinked or blocked	Check NIBP connecting tube and replace if necessary.
NIBP tube leaking (Alarm deactivated after 10 s)	NIBP connecting tube or NIBP cuff are leaking or incorrectly connected. Sufficient pressure cannot be built up.	Check NIBP connecting tube and NIBP cuff and replace if necessary.
No printer connected (Alarm deactivated after 10 s)	Connection between device and printer interrupted	Wait 10 seconds. Switch printer on again. Position the printer within range of the device.
Plug in ECG connector	ECG connector of the ECG cable not connected/not connected correctly to the device	Connect ECG connector of the ECG cable to the device correctly (see 6.10.1, p. 164).
Plug in Pad connector (Monitor mode)	Defibrillation electrodes not connected/not connected correctly to the master cable	Connect defibrillation electrodes to the master cable correctly (see 6.5.1, p. 122).
	Paddles not connected/not connected correctly to the master cable	Connect paddles to the master cable correctly (see 6.5.2, p. 126).
	Master cable not connected/not connected correctly to the device	Connect the master cable to the device correctly (see 6.5.1, p. 122).

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Alarm	Cause	Remedy
Pulse rate ↑	Measured pulse rate is above the set alarm limit	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).
Pulse rate ↓	Measured pulse rate is below the set alarm limit	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).
Server not accessible (Alarm deactivated after 60 s)	Server not accessible as there is no Internet connection	Check using an alternative network whether the configured network is the cause.
Settings lost	Settings had to be reset to factory settings.	Re-enter presets in the operator menu. If this recurs: Have the device repaired.
SpO_2 ↑	Measured oxygen saturation is above the set alarm limit and SpO_2 signal quality is ≥ 40 %	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).
SpO_2 ↓	Measured oxygen saturation is below the set alarm limit and SpO_2 signal quality is ≥ 40 %	If medically indicated, carry out suitable treatment.
		Adapt alarm limits (see 10.3.1, p. 255).
SpO_2 module defective	Internal SpO_2 module defective	Have the device repaired.
Unknown defibrillation electrodes	Unknown defibrillation electrodes connected to the master cable	Only use defibrillation electrodes from WEINMANN Emergency.
	Unknown paddles connected to the master cable	Only use paddles from WEINMANN Emergency.
Upload canceled (Alarm deactivated after 60 s)	Data transmission canceled by user	• Check date/time (see 10.3.7, p. 264). • Restart data transmission (see 12.5, p. 299).
	Data transmission interrupted during transmission	• Check date/time (see 10.3.7, p. 264). • Check connection settings (see 12.5, p. 299). • Restart data transmission (see 12.5, p. 299).
Upload failed	Connection to network interrupted	Check connection to network (see 12.3, p. 292). If necessary: Select a different network.

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11.2.3 Low-priority alarm (turquoise)

Alarm	Cause	Remedy
Battery operation (Alarm deactivated after 10 s)	Line power too low	Restore line power.
	Line power disconnected by removing from the wall mounting	
	Power outage	
Check seating of SpO_2 sensor	Pulse oximetry sensor not attached/not attached correctly to the patient	Attach pulse oximetry sensor to the patient correctly (see 6.9.1, p. 157).
Erroneous date	Date read-out error	Insert battery (see 4.3, p. 83).
		Reset date (see 10.3.7, p. 264).
	Internal module defective	If this recurs: Have the device repaired.
	Real Time Clock battery defective or empty	Have the device repaired.
Insert battery (Monitor mode)	Battery not inserted/not inserted correctly	Insert battery correctly (see 4.3, p. 83).
Insert SD card	No SD card present/detected	Insert new SD card (see 4.6.1, p. 92), switch off device (see 6.2, p. 119), and switch device back on after at least 30 s (see 6.1, p. 118).
Internal memory full	No SD card inserted and session duration > 4 h-10 h	To continue to record the session: Insert SD card (see 4.6.1, p. 92), copy data to SD card, and resume session with SD card.
		Resume session and do not record any more data.
Plug in SpO_2 sensor	SpO_2 connector of the pulse oximetry sensor connecting cable not connected/not connected correctly to the device	Connect SpO_2 connector of the pulse oximetry sensor connecting cable to the device correctly.
Printer battery empty	Status of printer battery very low	Change printer battery (see 4.7.2, p. 97).
		Charge printer battery (see 4.7.1, p. 94).

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Alarm	Cause	Remedy
SD card defective	SD card write/read error	Insert new SD card (see 4.6.1, p. 92), switch off device (see 6.2, p. 119), and switch device back on after at least 30 s (see 6.1, p. 118).
		Resume session and do not record any more data.
SD card full	SD card full	Insert new SD card (see 4.6.1, p. 92), switch off device (see 6.2, p. 119), and switch device back on after at least 30 s (see 6.1, p. 118).
		Erase data on current SD card.
SpO_2 sensor defective	Pulse oximetry sensor connecting cable defective	Replace pulse oximetry sensor connecting cable.
	Pulse oximetry sensor defective	Replace pulse oximetry sensor.
SpO_2 signal quality ↓ *	SpO_2 signal quality < 40 %	Attach pulse oximetry sensor to the patient correctly (see 6.9.1, p. 157).
		If medically indicated, carry out suitable treatment.
Update operator menu access code (Alarm deactivated after 10 s)	Access code for the operator menu is 000000 (status when device supplied)	Wait 10 seconds.
		Change operator menu access code (see "13.12 System settings", page 342).

* If the device outputs this alarm, it will no longer output a simultaneously occurring SpO_2 measured value alarm. If signal quality drops to < 20 %, the device will also stop displaying the SpO_2 measured value and the plethysmogram.

11.3 Faults

If you are unable to remedy faults with the aid of the table, you should contact the manufacturer WEINMANN Emergency, or technicians expressly authorized by WEINMANN Emergency, to have the device repaired. To avoid more serious damage, do not continue using the device.

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11.3.1 Device

Fault	Cause	Remedy
Device cannot be switched on	Battery not correctly inserted in device, or battery empty	Check battery.
	Battery empty and device not connected to line power	Check power supply.
	Device defective	Have the device repaired.
Device cannot be switched off	Operating error	Press and hold On/Off button ⏻ for at least 2 s.
	Device defective	• Disconnect the device from line power. • Remove the battery. • Have the device repaired.
Yellow display with **ERROR** and error code	Temporary device fault	• Switch device off (see 6.2, p. 119) and back on again (see 6.1, p. 118). • Carry out a function check (see 5.2, p. 104).
	Device defective	Have the device repaired.
Function check does not start	Battery weak or empty	• Insert a battery with a battery status of at least 2 LEDs. • Restart the function check.
	Master cable not detected	Connect master cable correctly.
	Master cable defective	Replace the master cable.
	Function test resistor not detected	Connect function test resistor correctly.
	Function test resistor defective	Replace the function test resistor.
	Pulse oximetry sensor connecting cable not detected	Connect pulse oximetry sensor connecting cable correctly.
	Pulse oximetry sensor connecting cable defective	Replace pulse oximetry sensor connecting cable.
	Pulse oximetry sensor not detected	Connect pulse oximetry sensor correctly.
	Pulse oximetry sensor defective	Replace pulse oximetry sensor.
Brightness of the display too low	Brightness of display set too low	Increase brightness of the display.
	Night colors activated	Deactivate night colors.

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Fault	Cause	Remedy
Alarm output too quiet	Volume set to 25 %	Increase volume in application menu (see 9, p. 248).
		Increase volume preset in operator menu (see 13.12, p. 342).
Energy failure/black screen	Battery empty and device not connected to line power	Check power supply.
	Temporary device fault	• Switch device off (see 6.2, p. 119) and back on again (see 6.1, p. 118). • Carry out a function check (see 5.2, p. 104).
	Device defective	Have the device repaired.
Settings cannot be made with the navigation knob	Loose contact on navigation knob	Have the device repaired.
	No gap between navigation knob and control panel membrane	
	Device defective	
Device failure • Alarm light flashing • Audio alarm output	Device defective	Have the device repaired.

11.3.2 Battery and charging station

Fault	Cause	Remedy
Red fault indicator on when status button on battery is pressed, or red battery status indicator on device on	Battery defective	Replace battery.
	Battery temperature outside the permitted range (> 70 °C)	Use battery within permitted temperature range (see 18.5, p. 371).
Battery does not respond when status button is pressed	Battery has run down completely and has shut down to prevent deep discharge	Charge battery in the device for 24 h (see 4.4.2, p. 86). After 24 h: • Green LED is on: Battery fully charged and ready for use. • Red LED or no LED on: Battery defective. Replace battery.
		Charge the battery in the charging station (see 4.4.3, p. 87): Charging process takes longer than usual.
Device runtime with battery operation too short	Battery has reached end of its service life	Replace battery.

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Fault	Cause	Remedy
Battery not charging although it is not full	Battery temperature < 0 °C or > 45 °C	Charge battery within permitted temperature range (see 18.5, p. 371).
	Battery defective	Replace battery.
Status LEDs are not flashing and battery is not charging	Battery not inserted correctly in charging station	Check battery.
		Insert battery correctly.
	Charging station not connected to the power supply	Connect the charging station to line power (see 4.5.3, p. 90).
		Connect the charging station to a 12 V on-board power supply (see 4.5.4, p. 90).
	Charging station defective	Have charging station repaired.
	Battery capacity at > 90 %	Press the status button on the battery to check battery status.

11.3.3 Defibrillation/cardioversion

Fault	Cause	Remedy
The **Check defibrillation electrodes** alarm occurs although the defibrillation electrodes are attached to both the patient and the device via the master cable	Defibrillation electrodes not attached correctly to the patient	Attach defibrillation electrodes to the patient correctly (see 6.5.1, p. 122).
	Defibrillation electrodes defective	Replace defibrillation electrodes.
	Pad connector not connected correctly to the master cable	Connect Pad connector of the defibrillation electrodes to the master cable correctly.
	Master cable not connected correctly to the device	Connect the master cable to the device correctly.
	Master cable defective	Replace the master cable.
	Defibrillation module defective	Have the device repaired.

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11.3.4 6-lead ECG monitoring/12-lead ECG recording and assessment

Fault	Cause	Remedy
The **Plug in ECG connector** alarm occurs although the ECG cable is connected to the device	Device not detecting connected ECG cable	Check plug connection.
		Change ECG cable.
		Have the device repaired.
The ECG cable is not connected to the device but the **Plug in ECG connector** alarm does not occur	Device incorrectly detecting ECG cable as connected	Have the device repaired.
	The alarm only occurs if an ECG has already been successfully derived since switching on	-
The **Check seating of ECG electrodes** alarm occurs although the ECG electrodes are attached to the patient	ECG electrodes not attached correctly to the patient	Attach ECG electrodes to the patient correctly (see 6.10.1, p. 164).
		Change ECG cable.
		Have the device repaired.
ECG cable not attached/not attached correctly to the patient, but the **Check seating of ECG electrodes** alarm does not occur	Device incorrectly detecting ECG cable as attached to the patient	Have the device repaired.
	The alarm only occurs if an ECG has already been successfully derived since switching on	-

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11.3.5 Pulse oximetry monitoring

Fault	Cause	Remedy
The **Plug in SpO_2 sensor** alarm occurs although the pulse oximetry sensor is connected to the device	Device does not detect connected pulse oximetry sensor	Check plug connection.
		Change pulse oximetry sensor connecting cable.
		Change pulse oximetry sensor.
		Have the device repaired.
The pulse oximetry sensor is not connected to the device but the **Plug in SpO_2 sensor** alarm does not occur	Device incorrectly detecting pulse oximetry sensor as connected	Have the device repaired.
	The alarm only occurs if an SpO_2 signal has already been successfully detected since switching on	-
The **Check seating of SpO_2 sensor** alarm occurs although the pulse oximetry sensor is attached to the patient	Pulse oximetry sensor not attached correctly to the patient	Attach pulse oximetry sensor to the patient correctly (see 6.9.1, p. 157).
		Change pulse oximetry sensor connecting cable.
		Change pulse oximetry sensor.
		Have the device repaired.
The pulse oximetry sensor not attached/not attached correctly to the patient, but the **Check seating of SpO_2 sensor** alarm does not occur	Device incorrectly detecting pulse oximetry sensor as attached to the patient	Have the device repaired.
	The alarm only occurs if an SpO_2 signal has already been successfully detected since switching on	-

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Fault	Cause	Remedy
Implausible measured values	Strong ambient light or direct light, UV light or infrared light	Remove or reduce light source.
		Protect pulse oximetry sensor from light incidence.
		Attach pulse oximetry sensor to another site which is better protected from light.
		Remove the patient and pulse oximetry sensor from the light.
		Cover the pulse oximetry sensor.
	Intravascular dyes (e.g. methylene blue)	Impairment of the measurement result cannot be remedied. Measures to treat patient based on medical indication.
	Nail varnish, artificial fingernails	• Rotate the pulse oximetry sensor by 90°. • Clean finger nail. • Select a different suitable measuring point.
	Significant patient movement	Fix pulse oximetry sensor connecting cable in a strain relief loop on patient using adhesive tape.

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11.3.6 Non-invasive blood pressure measurement (NIBP monitoring)

Fault	Cause	Remedy
Implausible measured values	NIBP cuff attached incorrectly	Reattach NIBP cuff (see 6.12.1, p. 182).
	NIBP cuff leaking	Replace the NIBP cuff.
	Adapter tube for connecting disposable NIBP cuffs not connected correctly	Connect adapter tube for connecting disposable NIBP cuffs correctly.
	Adapter tube for connecting disposable NIBP cuffs leaking	Replace the adapter tube for connecting disposable NIBP cuffs.
	Unsuitable patient position	Reposition the patient.
	NIBP module defective	Have the device repaired.
	NIBP cuff size not suitable (too large or too small)	Use a suitable NIBP cuff size.
	Device defective	Have the device repaired.
NIBP measurement cannot be started	NIBP cuff and/or NIBP connecting tube not connected correctly	Connect NIBP cuff and/or NIBP connecting tube correctly.
NIBP measurement keeps failing	NIBP cuff is constricted and cannot be inflated	Remedy NIBP cuff constriction.
	Movement results in artifacts	Reduce movements.
NIBP cuff cannot be fully inflated	NIBP cuff or NIBP connecting tube damaged	Replace NIBP cuff and/or NIBP connecting tube.
	Connection of NIBP cuff and/or NIBP connecting tube interrupted	Connect NIBP cuff and/or NIBP connecting tube.
	Adapter tube for connecting disposable NIBP cuffs not connected correctly	Connect adapter tube for connecting disposable NIBP cuffs correctly.
	Device defective	Have the device repaired.

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11.3.7 Printing

Fault	Cause	Remedy
Printer not connecting to the device	E-mail delivery 12-lead ECG or network data transmission occurring in parallel	Wait until e-mail delivery 12-lead ECG or network data transmission is finished. If necessary: Switch the printer on again.
	Poor reception quality	Put printer within range of the device.
	Feed button (FEED) pressed for longer than 10 s	Do not press feed button (FEED) for longer than 10 s.
Connection between device and printer fails	Poor reception quality	Put printer within range of the device.
Connection between printer and device is extremely slow		
Special characters in printout or printer fails in airplane mode	Electromagnetic radiation in airplane mode	Do not use the printer in airplane mode.
	Printer is at the limit of device range	Reduce the distance between device and printer.

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11.3.8 Data transmission

Fault	Cause	Remedy
E-mail with 12-lead ECG does not reach recipient	WiFi is deactivated	Activate network (see 12.3.1, p. 293).
	Airplane mode is activated	Deactivate airplane mode (see 10.3.6, p. 263).
	Unable to connect network	Bring device within range of the network. If necessary, activate a mobile network.
		Configure default network (see 12.3, p. 292).
		Check whether network is connected to the Internet.
		Check whether port 443 is enabled.
		Request connection data for the network from the system administrator.
	Device not registered with WEINMANN Connect	Register the device with WEINMANN Connect (see 12.4, p. 298).

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Fault	Cause	Remedy
Function check is not uploaded to WEINMANN Connect	WiFi is deactivated	Activate network (see 12.3.1, p. 293).
	Airplane mode is activated	Deactivate airplane mode (see 10.3.6, p. 263).
	Unable to connect network	Bring device within range of the network. If necessary, activate a mobile network.
		Configure default network (see 12.3, p. 292).
		Check whether network is connected to the Internet.
		Check whether port 443 is enabled.
		Request connection data for the network from the system administrator.
	Device not registered with WEINMANN Connect	Register the device with WEINMANN Connect (see 12.4, p. 298).
Session data are not uploaded to WEINMANN Connect	WiFi is deactivated	Activate network (see 12.3.1, p. 293).
	Airplane mode is activated	Deactivate airplane mode (see 10.3.6, p. 263).
	Unable to connect network	Bring device within range of the network. If necessary, activate a mobile network.
		Configure default network (see 12.3, p. 292).
		Check whether network is connected to the Internet.
		Check whether port 443 is enabled.
		Request connection data for the network from the system administrator.
	Device not registered with WEINMANN Connect	Register the device with WEINMANN Connect (see 12.4, p. 298).

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Fault	Cause	Remedy
Service data are not uploaded to WEINMANN Emergency	WiFi is deactivated	Activate network (see 12.3.1, p. 293).
	Airplane mode is activated	Deactivate airplane mode (see 10.3.6, p. 263).
	Unable to connect network	Bring device within range of the network. If necessary, activate a mobile network.
		Configure default network (see 12.3, p. 292).
		Check whether network is connected to the Internet.
		Check whether port 443 is enabled.
		Request connection data for the network from the system administrator.
	Device not registered with WEINMANN Connect	Register the device with WEINMANN Connect (see 12.4, p. 298).
E-mail with 12-lead ECG does not reach the recipient, or does so with a severe delay	E-mail with 12-lead ECG lands in spam/junk folder of the recipient's mailbox	Add sender's address to list of safe senders. If necessary: Contact system administrator.
	E-mail with 12-lead ECG blocked/ delayed by recipient's server	
E-mail does not contain a 12-lead ECG in the attachment	E-mail with 12-lead ECG blocked/ delayed by recipient's server	Add sender's address to list of safe senders. If necessary: Contact system administrator.

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12 Configuration by the operator

12.1 Enabling options

Requirement There is an enable code for a new option.

1. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
2. Select **System settings | Enable options | Enter enable code**.
3. Enter the enable code for the new option.
   The new option appears as a selection under **System settings | Enable options**.
4. Activate/deactivate a new option with a check mark.

Result A new option is enabled for use and activated/deactivated.

12.2 Pair printer with device (only with Printing option)

Requirement

- A charged printer battery is inserted (see "4.7.2 Inserting the printer battery", page 97).
- The printer paper is inserted (see "4.7.3 Inserting printer paper", page 98).
- The Printing option is enabled and activated (see "13.12 System settings", page 342).

1. Position the printer next to the device.
2. Press the On/Off button ⏻ of the printer for > 5 s.
   The status indicator of the printer is green and an audible signal sounds.
3. Switch on the device (see "6.1 Switching on the device", page 118).
   The start menu appears.
4. Activate the operator menu (see "13.1 Activating the operator menu", page 307).

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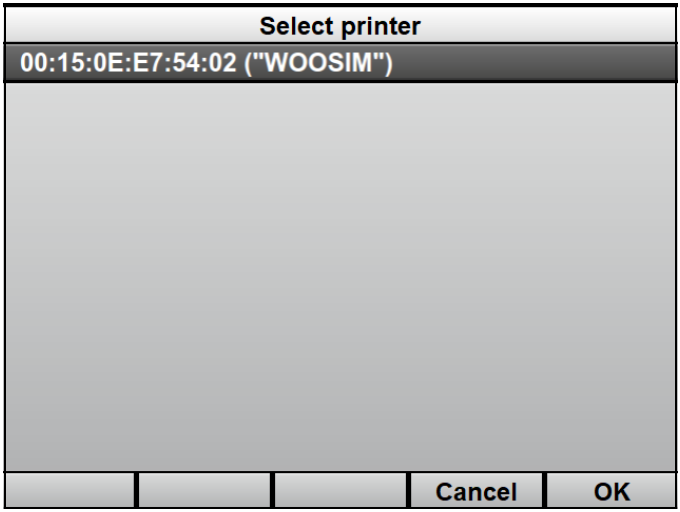
5. Select **Printer settings | Pair printer**.
   The device displays printers available in the vicinity.
6. If necessary: Cancel printer search and connection setup by pressing the **Cancel** function button.
7. If several printers are available: Briefly press the On/Off button ⏻ of the printer.
   The MAC address of the printer is shown in the printer display.
8. To identify the printer to be paired: Compare the MAC address in the printer display with the MAC addresses shown in the device.



9. Select the printer marked "WOOSIM" and the correct MAC address.
10. Check whether the PIN shown in the device display is shown in the printer display.
11. If the PIN is shown in the printer display: Confirm PIN with the printer's feed button (FEED).
12. Confirm the PIN in the device display with the **OK** function button.
    The connection to the printer is set up. The printer automatically prints a printer connection log.

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13. Check the printer connection log and confirm successful printout with the **OK** function button.
14. Exit operator menu.

Result A printer has been paired with the device. From now on, the device will always set up a connection to this printer automatically when the device and printer are switched on and are within range.

12.3 Configuring default network

⚠ WARNING

Risk of injury due to delayed delivery!
The user can deliver a 12-lead ECG to a teleconsultation service for further diagnosis. Delivering a 12-lead ECG is purely to obtain a second opinion, and does not replace adequately trained specialists at the session location. Specialist staff at the session location are responsible for treatment within the scope of their training and in accordance with the specifications of the operator. If the 12-lead ECG reaches the teleconsultation service very late or not at all for technical reasons, delayed treatment may result in a potentially life-threatening situation. The operator is responsible for ensuring that the necessary configuration for 12-lead ECG delivery has been carried out correctly.
⇒ When configuring e-mail delivery 12-lead ECG: Test e-mail delivery.
⇒ If the IT infrastructure permits it: Configure several networks for various devices or session locations so that if one network is unavailable, it is possible to select another network.
⇒ Check the configuration of the networks at regular intervals and update them if necessary.
⇒ Ensure that the e-mail addresses are correct and complete.
⇒ Check e-mail addresses at regular intervals and update them if necessary.

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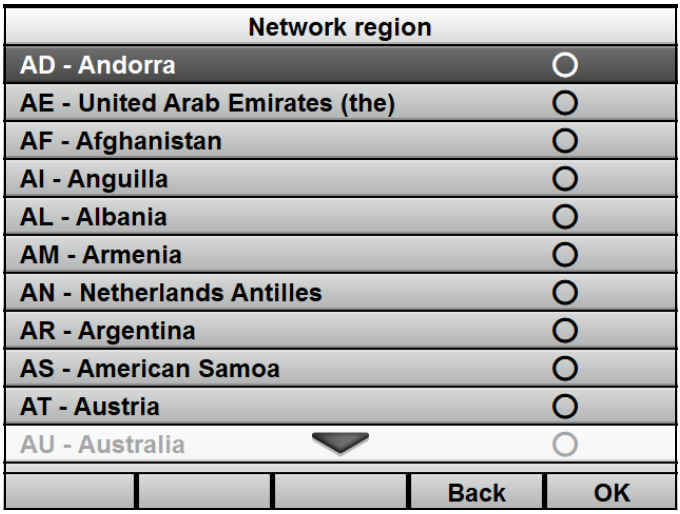
12.3.1 Activating the WiFi interface

1. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
2. Select **System settings | Regional settings | Network region**.

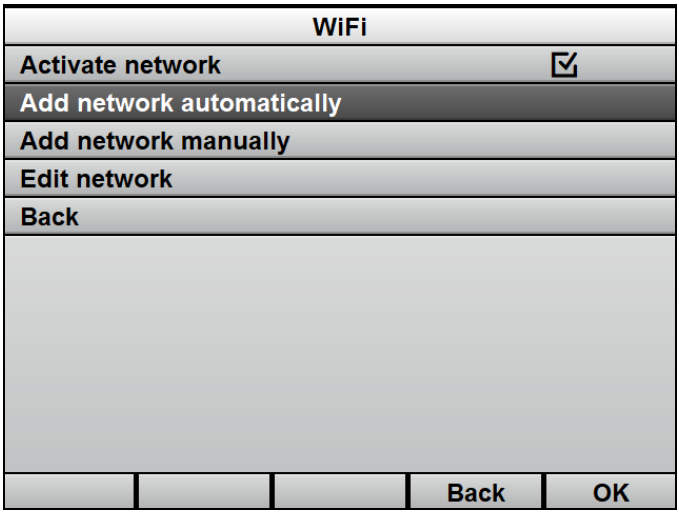


3. Select network region.
4. Select the **Back** function button 2x.
5. Select **Communication settings | WiFi**.
6. Select the **Activate network** menu item.

Result The WiFi interface of the device has been activated.

12.3.2 Add network automatically

Requirement The WiFi interface of the device has been activated (see "12.3.1 Activating the WiFi interface", page 293).



1. Select the **Add network automatically** menu item.
   When doing so, please note: Some smartphones automatically switch off the WiFi hotspot. In order to ensure that the device can use the smartphone's hotspot, the dialog for switching on the WiFi hotspot must be open in the smartphone whilst the device sets up the WiFi connection.

   All the networks in range of the device are displayed.

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⚠ WARNING

New risks from integrating the device in an IT network!
When integrating the device in an IT network, new risks may arise for patients, users or third parties which need to be determined, analyzed, and managed.
⇒ As the operator of the IT network, reassess changes to the IT network. When doing so, please note:

- Modified IT network configuration
- Connection of additional elements to the IT network
- Removal of additional elements from the IT network
- Updates of devices connected to the IT network
- Upgrades of devices connected to the IT network

⚠ WARNING

Delayed therapy due to integrating the device in a network with a login page!
If the device is integrated in a network with a login page, it is not possible to upload a 12-lead ECG by e-mail.
⇒ Do not use a network with a login page.

2. Select the desired network.
   When doing so, please note: The device must only be connected to an encrypted network. A password always has to be entered on an encrypted network.
3. Confirm with the **OK** function button.
4. Enter the password for the desired network.
   The device connects to the desired network.
5. In the event of problems setting up the network: Contact system administrator.

Result A network has been configured for the device automatically and specified as the default network.

From now on, the device always automatically sets up a connection to the default network set up when a WiFi connection is required. Following successful data transmission, the WiFi connection is disconnected.

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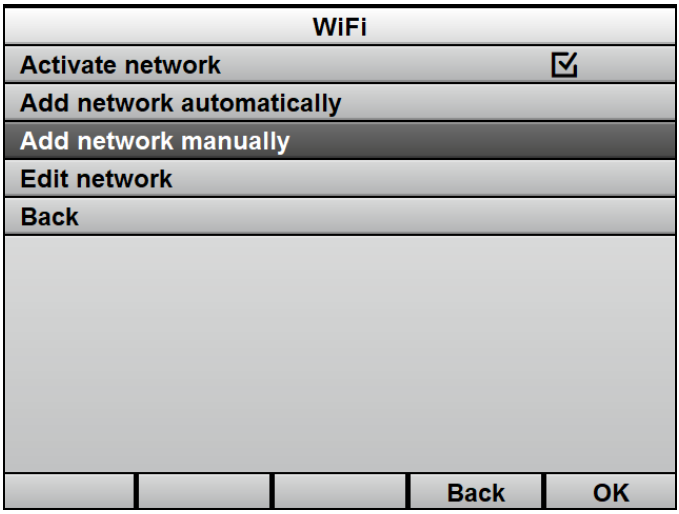
12.3.3 Adding network manually

Requirement

- The WiFi interface of the device has been activated (see "12.3.1 Activating the WiFi interface", page 293).
- The network configuration of the network to be added manually is known.



1. Select the **Add network manually** menu item.

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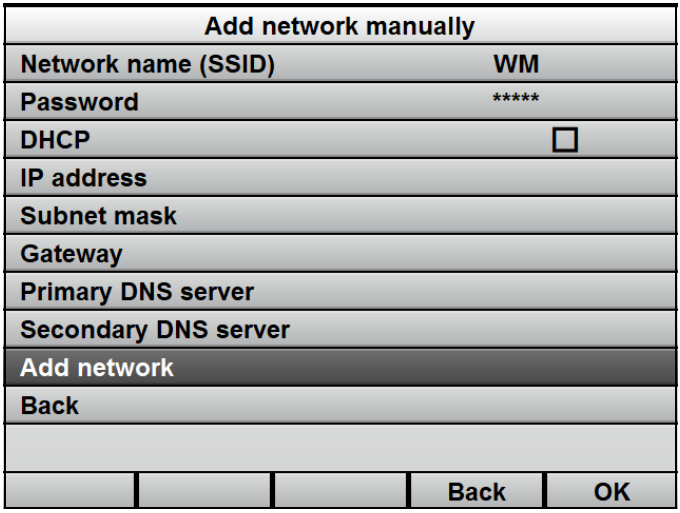


2. Make the settings for the network.
3. Select the **Add network** menu item.
4. Confirm with the **OK** function button.
   The network is added as an available network.

Result A network has been manually configured for the device.

12.3.4 Specifying a network as the default network

Requirement

- The WiFi interface of the device has been activated (see "12.3.1 Activating the WiFi interface", page 293).
- Several networks have been configured.

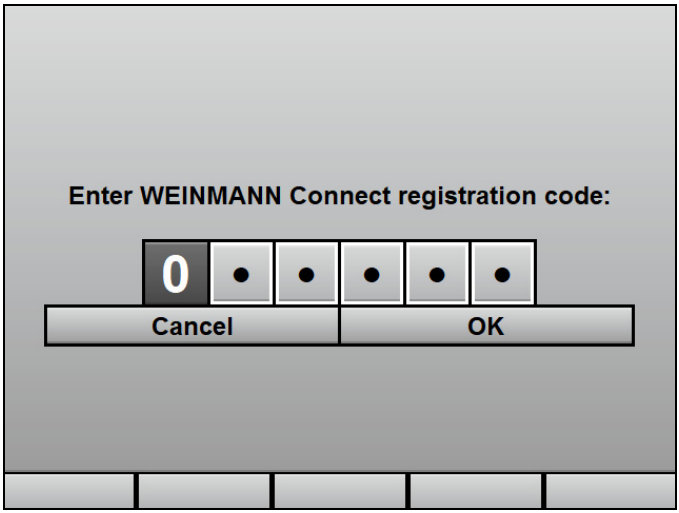
1. Select the **Edit network** menu item.
   All configured networks are displayed.
2. Select a network as the default network to be configured.
3. Select the **OK** function button.
4. Select the **Set network as default** menu item.
   The desired network is specified as the default network.
5. Restart device.

Result The selected network has been specified as the default network.

12.4 Registering the device with WEINMANN Connect

Requirement A default network has been configured (see "12.3 Configuring default network", page 292).

1. Apply to WEINMANN Emergency Customer Service for a user account for WEINMANN Connect by telephone or by e-mail.
2. Log in to WEINMANN Connect at www.weinmann-connect.com using the user account data (in accordance with the WEINMANN Connect user manual).
3. Add a new device to WEINMANN Connect in accordance with the WEINMANN Connect user manual.
   When doing so, please note: A WEINMANN Connect registration code is generated for the device.
4. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
5. Select **Communication settings | Register device with WEINMANN Connect**.



6. Enter the WEINMANN Connect registration code.
   The device is registered with WEINMANN Connect.

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7. When registration is successful: Confirm with **OK**.

Result The device has been registered with WEINMANN Connect. The device can upload data to WEINMANN Connect with immediate effect.

12.5 Configuring e-mail delivery 12-lead ECG (only with E-mail delivery 12-lead ECG option)

⚠ WARNING

Risk of injury due to delayed delivery!
The user can deliver a 12-lead ECG to a teleconsultation service for further diagnosis. Delivering a 12-lead ECG is purely to obtain a second opinion, and does not replace adequately trained specialists at the session location. Specialist staff at the session location are responsible for treatment within the scope of their training and in accordance with the specifications of the operator. If the 12-lead ECG reaches the teleconsultation service very late or not at all for technical reasons, delayed treatment may result in a potentially life-threatening situation. The operator is responsible for ensuring that the necessary configuration for 12-lead ECG delivery has been carried out correctly.
⇒ When configuring e-mail delivery 12-lead ECG: Test e-mail delivery.
⇒ If the IT infrastructure permits it: Configure several networks for various devices or session locations so that if one network is unavailable, it is possible to select another network.
⇒ Check the configuration of the networks at regular intervals and update them if necessary.
⇒ Ensure that the e-mail addresses are correct and complete.
⇒ Check e-mail addresses at regular intervals and update them if necessary.

Requirement

- The 12-lead ECG option is enabled and activated (see "13.12 System settings", page 342).
- The E-mail delivery 12-lead ECG option is enabled and activated (see "13.12 System settings", page 342).
- A default network has been configured (see "12.3 Configuring default network", page 292).

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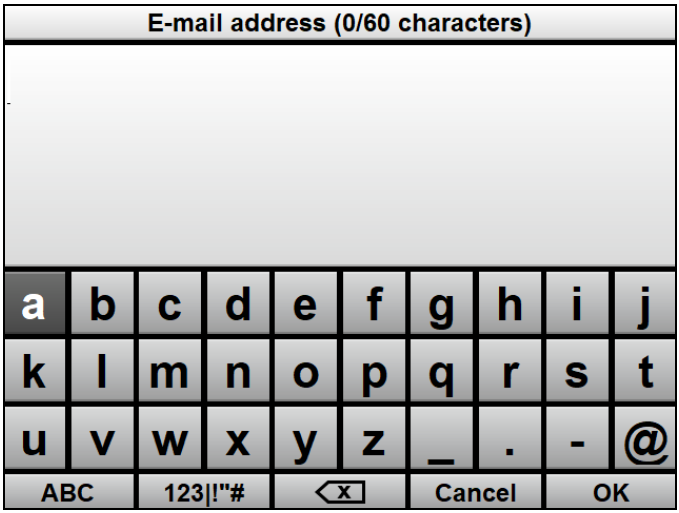
- The device has been registered with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298).

1. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
2. Select **Communication settings | E-mail delivery 12-lead ECG**.
3. Select **Contacts | New entry**.
4. In the **Recipient name** menu item, enter the name of the recipient.
5. Confirm with the **OK** function button.



6. In the **E-mail address** menu item, enter the e-mail address of the recipient using the navigation knob.
7. Confirm with the **OK** function button.

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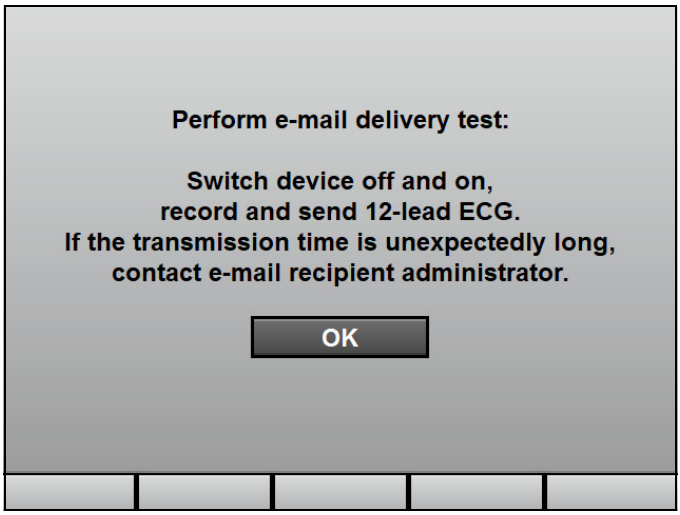

8. Test e-mail delivery in accordance with the instructions in the display.
   When doing so, please note: The duration for setting up the connection and delivering the e-mail may vary depending on reception quality.
9. Confirm with **OK**.
10. If the e-mail delivery was not successful: Check the setup of the network and e-mail delivery 12-lead ECG.
11. If the e-mail is delivered successfully but transmission time is unexpectedly long: Contact the system administrator of the e-mail recipient.
12. Select the **Back** function button 2x.
13. Make the following settings for the 12-lead ECG to be delivered:
    - Feed rate and duration
    - Amplitude scaling
    - View

Result E-mail delivery 12-lead ECG has been configured.

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12.6 Pairing the device with an external device via the Bluetooth® interface (only with Bluetooth® data transmission option)

Requirement

- The Bluetooth® data transmission option is enabled and activated (see "13.12 System settings", page 342).
- An external device with a Bluetooth® interface (Example: System for digital patient data recording) is within range.

1. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
2. Select **Communication settings | Pair Bluetooth® devices**. The device waits to pair with an external device.
3. Activate the Bluetooth® interface of the external device.
4. Check whether the PIN displayed on the device is shown on the external device.
5. If the PIN displayed on the device and on the external device are identical: Confirm the pairing on the device and the external device.
   Device and external device are paired.

Result The device and the external device are paired via the Bluetooth® interface. The external device can connect to the device and interrogate device data via the Bluetooth® interface.

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12.7 Transferring the device configuration to another device

Using the device's SD card, you can transfer device settings saved in the operator menu to another device.

⚠ WARNING

Risk of injury from different alarm presets in the same or similar devices!
Different alarm presets in the same or similar devices in different application areas may confuse the user and result in injury to the patient.
⇒ Select the same alarm presets in the same or similar devices.

1. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
2. Select **System settings | SD card | Export device configuration to SD card**.
3. Confirm with the **OK** function button.
   The export process starts.
4. Remove the SD card (see "4.6.2 Removing the SD card", page 93).
5. Insert the SD card into another device (see "4.6.1 Inserting an SD card", page 92).
6. Activate the operator menu of the other device (see "13.1 Activating the operator menu", page 307).
7. Select **System settings | SD card | Import device configuration from SD card**.
8. Confirm with the **OK** function button.
   The import process starts.

Result The device settings have been transferred to another device.

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12.8 Carrying out a software update

Requirement

- A charged battery is inserted in the device.
- The device is connected to line power.
- The device is switched off and an SD card with new software is in the SD card slot.

⚠ WARNING

Risk of injury due to lack of function check after software update!
If no function check is carried out following a software update, errors occurring during the software update may go undetected. This may cause the patient or the user serious or life-threatening injury.
⇒ Carry out a function check after every software update.

⚠ WARNING

Failure of therapy due to failure of the battery and lack of line power!
If the power supply to the device is cut during the software update due to a battery failure and lack of line power, the device may be damaged to such an extent that it needs to be repaired.
⇒ Always connect the device to line power with a charged battery for software updates.

1. If the software is provided as a ZIP file: Unzip the software.
2. Place the file in the SD card's root directory.
   When doing so, please note: The file must not be in a sub-folder.
3. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
4. Select **System settings | Software update**.
5. Select new software with the navigation knob.
6. Run the software update with the **Start** function button.
7. Wait until the software update has finished.
   After the end of the software update, the device displays the message **SUCCESS**.
8. Restart the device with the **Restart** function button.
   The device restarts.

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9. Activate the operator menu (see "13.1 Activating the operator menu", page 307).
10. Select **Device information | Device**.
    The device displays the installed software version.
11. Press and hold the On/Off button ⏻ for at least 2 s to switch off the device and save the settings.
12. Carry out a function check (see "5.2 Carrying out a function check", page 104).
13. If necessary: Set the date and time (see "10.3.7 System settings", page 264).

Result A software update has been carried out.

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13 Operator menu

⚠ WARNING

Risk of injury due to incorrectly set parameters or too few/too many enabled functions in the operator menu!
Incorrectly set parameters or too few/too many enabled functions in the operator menu may result in incorrect settings in the user menu or too limited/too extensive device functions. This may cause critical operating situations and injure the patient.
⇒ The operator menu should only be used by an operator familiar with the settings in the operator menu and their impact on the user menu and device functions.
⇒ Adapt the device functions to the user's know-how.
⇒ Protect the operator menu with a secure access code (at least one letter and one number).

⚠ WARNING

Risk of injury from incorrectly secured access to functions!
Too simple an access code gives the user access to functions with which he or she is not familiar or in which he or she is not trained. This may cause the patient or the user serious or life-threatening injury.
⇒ Protect functions with a secure access code (at least one letter and one number).

The operator menu contains device presets which are permanently stored. If the device was switched off for longer than 30 seconds and is switched on again, the operator menu device presets are loaded. If the device was switched off for less than 30 seconds and a patient was previously connected, the user menu settings are restored.

The operator menu also contains functions relevant solely to the operator and not to the user.

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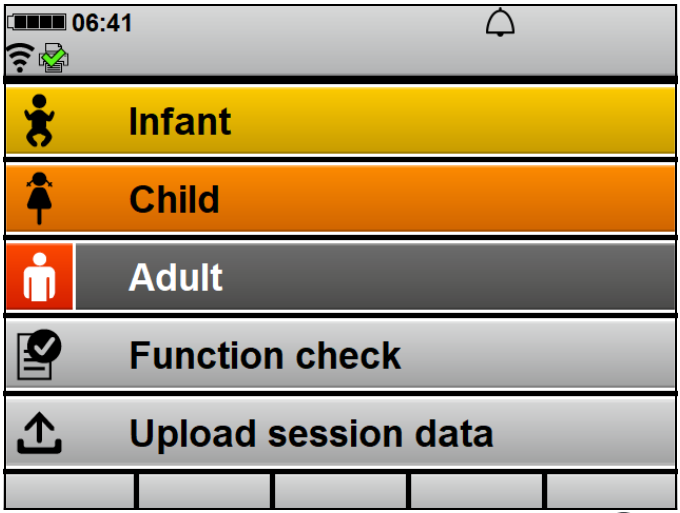
Examples:

- Enable options (see "12.1 Enabling options", page 290)
- Configure default network (see "12.3 Configuring default network", page 292)
- Configure e-mail delivery 12-lead ECG (see "12.5 Configuring e-mail delivery 12-lead ECG (only with E-mail delivery 12-lead ECG option)", page 299)
- Carry out software updates (see "12.8 Carrying out a software update", page 304)
- Disable functions

13.1 Activating the operator menu

Requirement A battery with a battery status of at least 2 LEDs is inserted in the device.

1. Switch on the device.
   The start menu appears:



2. When the start menu appears: Press the menu button .

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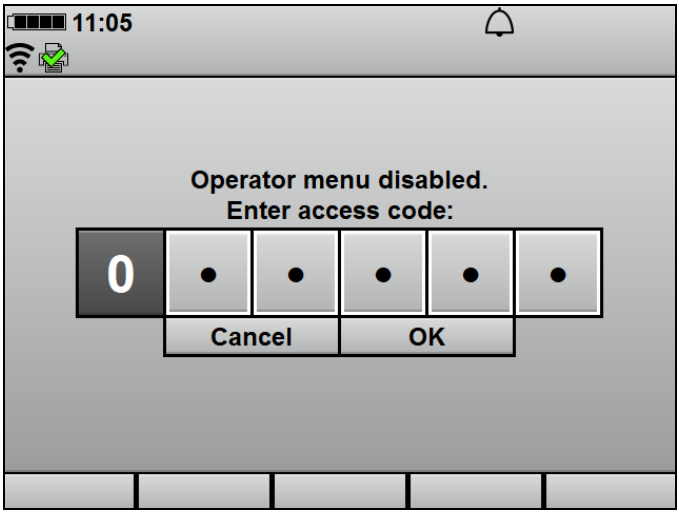
3. If the start menu disappears before the menu button is pressed and the device switches to normal mode: Restart device.

The operator menu is protected by an access code. When the device is supplied, this code is 000000. WEINMANN Emergency urgently recommends changing this access code when the device is put into operation. As long as the access code has not been changed, the **Update operator menu access code** alarm is outputted for 10 seconds.



4. Select the access code for the operator menu using the navigation knob.
   The operator menu appears:

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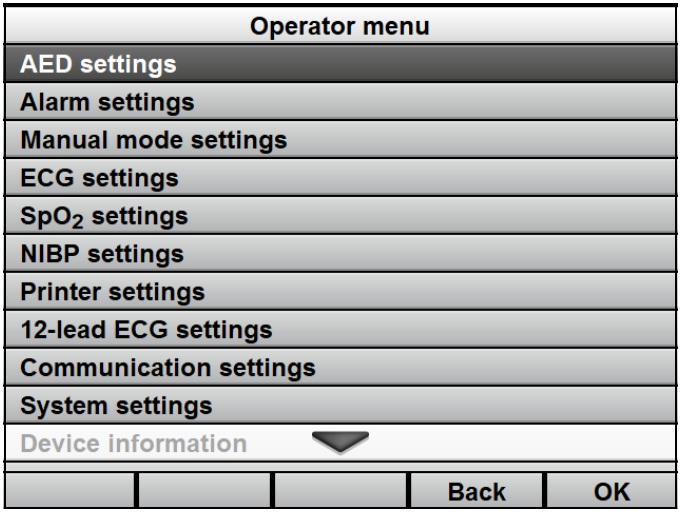


5. If any digit is entered incorrectly: Wait 5 s.

   Alternatively:

   Fill all fields with values and select **Cancel.**

   Alternatively:

   When input of all numerals is complete, select an individual digit and correct it.

Result The operator menu is activated.

13.2 Navigating the operator menu

Requirement The operator menu is activated (see "13.1 Activating the operator menu", page 307).

1. Select setting using the navigation knob.
2. Change setting using the navigation knob.
3. To exit the menu:
   Select the **Back** function button.

   Alternatively:

   Press the menu button .

4. Restart device.

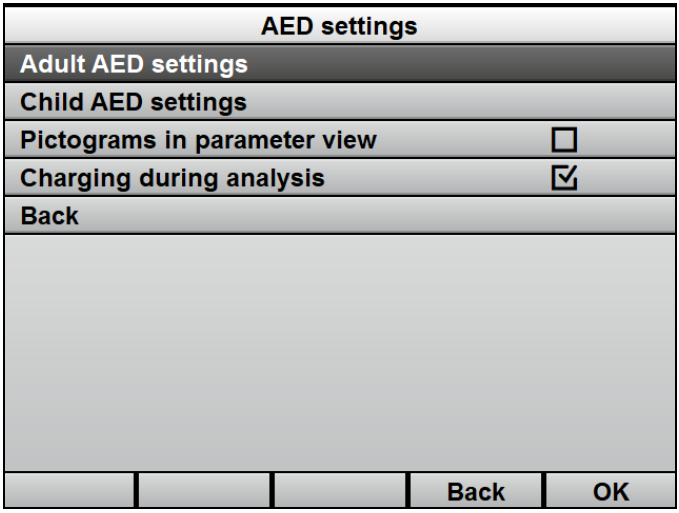
Result Settings have been made and apply to all sessions.

13.3 AED settings

You can make presets for AED mode in the **AED settings** submenu.

The factory settings are selected to meet currently applicable ERC guidelines. Adjustments to AED settings may result in the user no longer being supported in compliance with currently applicable ERC guidelines.

The AED settings enable you to adapt the device to the users' qualification level and to provide optimal support to users during resuscitation measures whilst taking regional features into account.



*13-1 **AED settings** submenu*

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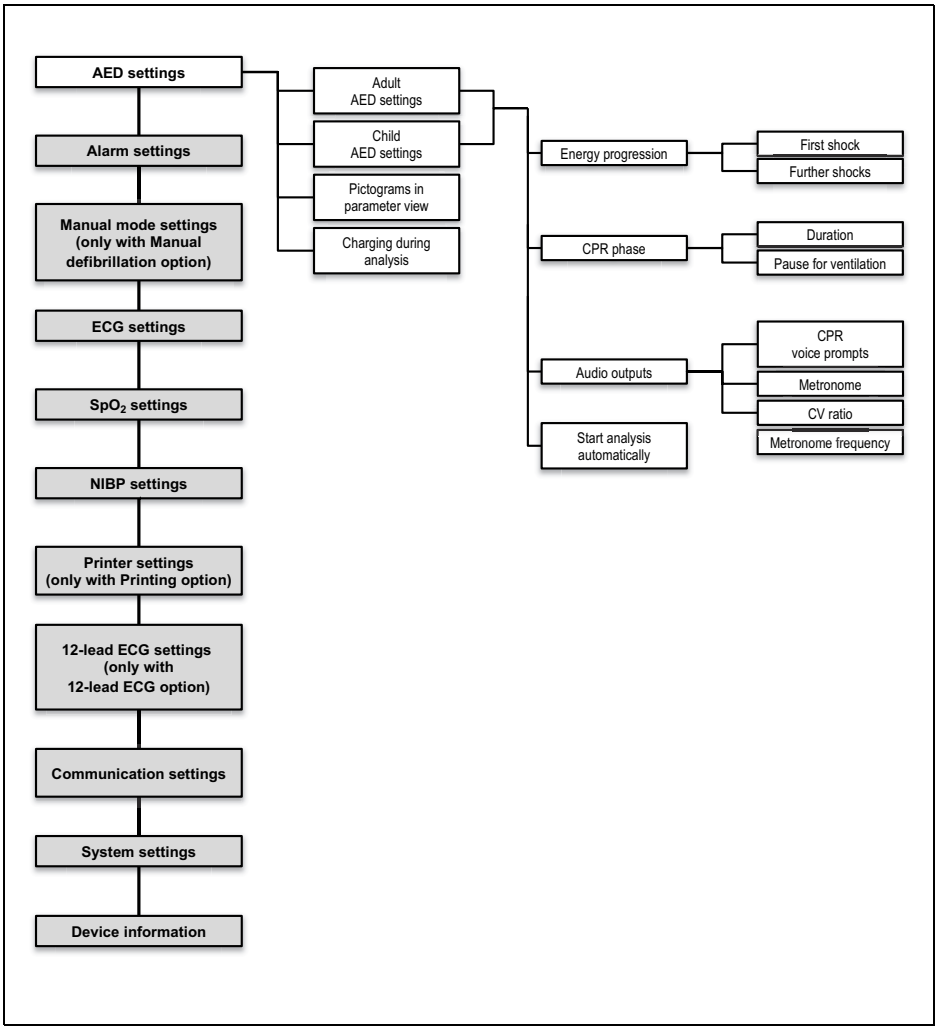
13.3.1 Menu structure



*13-2 Operator menu: **AED settings** submenu*

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13.3.2 Possible values

Parameter		Possible values	Description	Factory setting
Adult AED settings/Child AED settings				
Energy progression	First shock	1 J to 200 J	Here you can set the shock energy of the first shock in AED mode.	• AED mode adult: 150 J • AED mode child: 75 J
	Further shocks		Here you can set the shock energy of further shocks in AED mode.	• AED mode adult: 200 J • AED mode child: 75 J
CPR phase	Duration	120 s to 300 s	Here you can set the time interval between cardiac rhythm analyses. The device only outputs certain AED instructions and voice prompts after CPR is complete, as complete and correct carrying out of CPR takes priority.	120 s
	Pause for ventilation	3 s to 8 s	Here you can set the time interval for ventilation between chest compressions. When choosing a setting, consider whether voice prompts are deactivated: • When voice prompts are activated, the pause begins after the last metronome sound and ends when the voice prompts begin. • When voice prompts are deactivated, the pause begins after the last metronome sound and ends when the first metronome sound begins.	5 s

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Parameter		Possible values	Description	Factory setting
Adult AED settings/Child AED settings				
Audio outputs	CPR voice prompts	Activated ☑ Deactivated ☐	Here you can set whether the voice prompts for guiding chest compressions and for ventilation are to be given. The voice prompt *Ventilate twice* is only given if the metronome is set to the rhythm **15:2/30:2**.	Deactivated
	Metronome	off 15:2/30:2	Here you can set the metronome rhythm.	15:2/30:2
	CV ratio	30:2 15:2	Here you can set the compression/ventilation ratio. • 15:2: After 15 metronome beats, there is a pause to allow for ventilation. • 30:2: After 30 metronome beats there is a pause to allow for ventilation.	• AED mode adult: 30:2 • AED mode child: 15:2
	Metronome frequency	100/min to 120/min	Here you can set the metronome frequency.	100/min

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Parameter		Possible values	Description	Factory setting
Adult AED settings/Child AED settings				
Start analysis automatically	-	Activated ☑ Deactivated ☐	Here you can set whether cardiac rhythm analysis starts automatically, or manually at the touch of a button.	Activated
Pictograms in parameter view	-	Activated ☑ Deactivated ☐	Here you can set whether pictograms instead of parameters are displayed in parameter view in AED mode.	Deactivated
Charging during analysis	-	Activated ☑ Deactivated ☐	Here you can set whether the shock capacitor is to be charged at the same time as cardiac rhythm analysis, and so independently of the analysis result. If this setting is deactivated, the service life of the shock capacitor is extended.	Activated

13.4 Alarm settings

⚠ WARNING

Risk of injury due to alarm limits which are too high or too low!

Alarm limits which are either too high or too low may prevent the device triggering an alarm, thereby putting the patient at risk.

⇒ Always set alarm limits which have been adapted to the patient.

⚠ WARNING

Risk of injury from different alarm presets in the same or similar devices!

Different alarm presets in the same or similar devices in different application areas may confuse the user and result in injury to the patient.

⇒ Select the same alarm presets in the same or similar devices.

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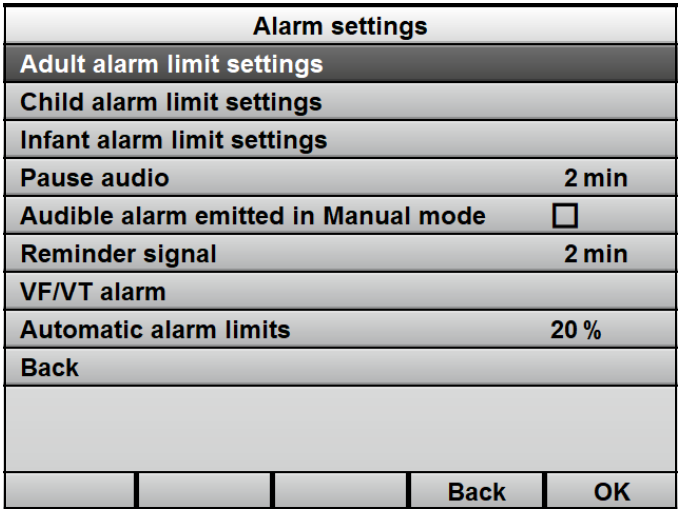
You can make presets for the alarm system in the **Alarm settings** submenu.

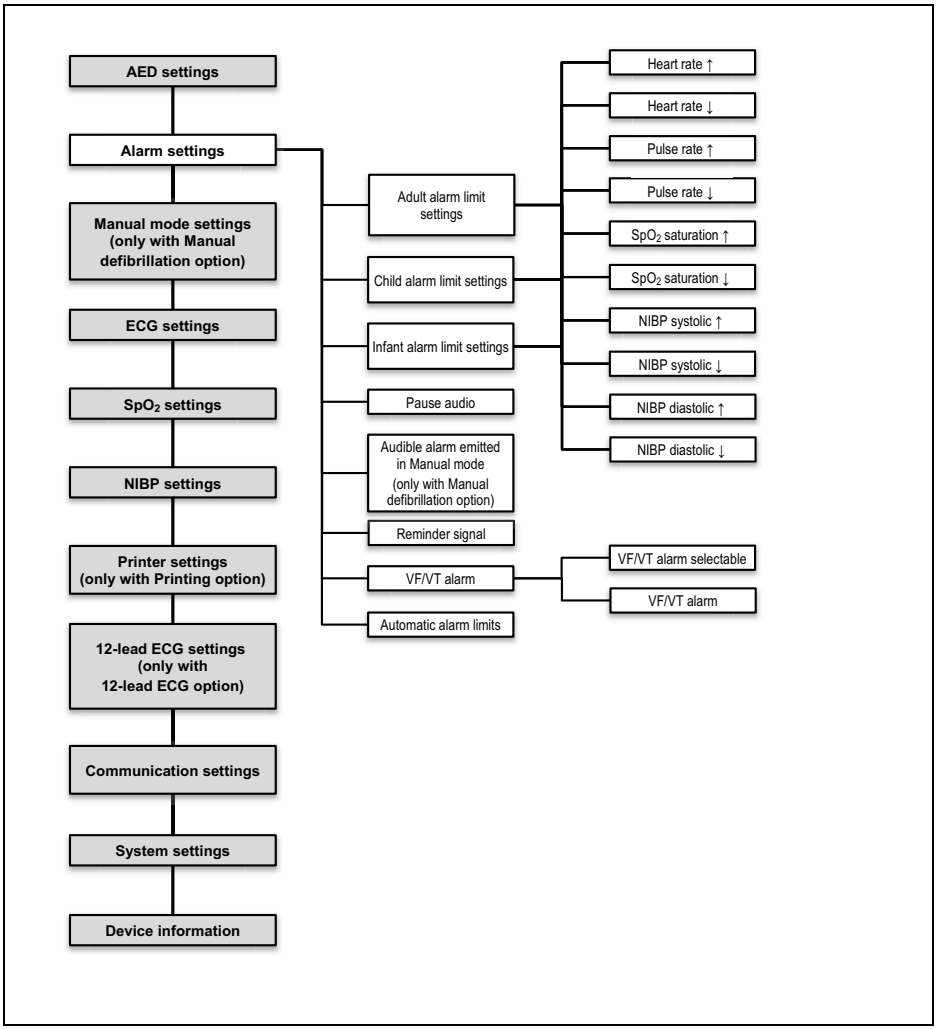
The factory settings are selected to meet the guidelines required by the standards and achieve a high level of safety. Changes to the alarm settings may lead to an increased risk for the user and the patient, for example if the alarm limit range is expanded or if **Pause audio** is extended.

You can adapt the device to the patient group and the application area using the relevant alarm settings.



*13-3 **Alarm settings** submenu*

13.4.1 Menu structure



13-4 Operator menu: ***Alarm settings*** *submenu*

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13.4.2 Possible values

Parameter		Possible values	Description	Factory setting
Adult alarm limit settings	Heart rate ↑	35/min - 250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limit values for the patient group as of which the device is to emit an alarm. According to the values set, the setting ranges of the upper and lower limit values depend on each other as follows: • The setting range for the upper alarm limit ends at least one setting value above the set value for the lower alarm limit. • The setting range for the lower alarm limit ends at least one setting value below the set value for the upper alarm limit.	120/min
	Heart rate ↓	30/min - 245/min, in increments of 5		50/min
	Pulse rate ↑	35/min - 250/min, in increments of 5		120/min
	Pulse rate ↓	30/min - 245/min, in increments of 5		50/min
	SpO_2 saturation ↑	66 % - 100 %		100 %
	SpO_2 saturation ↓	65 % - 99 %		85 %
	NIBP systolic ↑	45 mmHg - 260 mmHg, in increments of 5		220 mmHg
	NIBP systolic ↓	40 mmHg - 255 mmHg, in increments of 5		75 mmHg
	NIBP diastolic ↑	25 mmHg - 200 mmHg, in increments of 5		110 mmHg
	NIBP diastolic ↓	20 mmHg - 195 mmHg, in increments of 5		35 mmHg

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Parameter		Possible values	Description	Factory setting
Child alarm limit settings	Heart rate ↑	35/min - 250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limit values for the patient group as of which the device is to emit an alarm. According to the values set, the setting ranges of the upper and lower limit values depend on each other as follows: • The setting range for the upper alarm limit ends at least one setting value above the set value for the lower alarm limit. • The setting range for the lower alarm limit ends at least one setting value below the set value for the upper alarm limit.	150/min
	Heart rate ↓	30/min - 245/min, in increments of 5		50/min
	Pulse rate ↑	35/min - 250/min, in increments of 5		150/min
	Pulse rate ↓	30/min - 245/min, in increments of 5		50/min
	SpO_2 saturation ↑	66 % - 100 %		100 %
	SpO_2 saturation ↓	65 % - 99 %		85 %
	NIBP systolic ↑	45 mmHg - 230 mmHg, in increments of 5		145 mmHg
	NIBP systolic ↓	40 mmHg - 225 mmHg, in increments of 5		75 mmHg
	NIBP diastolic ↑	25 mmHg - 160 mmHg, in increments of 5		100 mmHg
	NIBP diastolic ↓	20 mmHg - 155 mmHg, in increments of 5		35 mmHg

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Parameter		Possible values	Description	Factory setting
Infant alarm limit settings	Heart rate ↑	35/min - 250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limit values for the patient group as of which the device is to emit an alarm. According to the values set, the setting ranges of the upper and lower limit values depend on each other as follows: • The setting range for the upper alarm limit ends at least one setting value above the set value for the lower alarm limit. • The setting range for the lower alarm limit ends at least one setting value below the set value for the upper alarm limit.	200/min
	Heart rate ↓	30/min - 245/min, in increments of 5		100/min
	Pulse rate ↑	35/min - 250/min, in increments of 5		200/min
	Pulse rate ↓	30/min - 245/min, in increments of 5		100/min
	SpO_2 saturation ↑	66 % - 100 %		95 %
	SpO_2 saturation ↓	65 % - 99 %		85 %
	NIBP systolic ↑	45 mmHg - 130 mmHg, in increments of 5		100 mmHg
	NIBP systolic ↓	40 mmHg - 125 mmHg, in increments of 5		50 mmHg
	NIBP diastolic ↑	25 mmHg - 100 mmHg, in increments of 5		70 mmHg
	NIBP diastolic ↓	20 mmHg - 95 mmHg, in increments of 5		30 mmHg
Pause audio	-	1 min 2 min 5 min 10 min ∞ (infinite)	Here you can set the length of time for which audio alarm output is paused. If you select ∞ (infinite), audio alarm output is paused permanently (audio alarm output is muted).	2 min
Audible alarm emitted in Manual mode (only with Manual defibrillation option)	-	Activated ☑ Deactivated ☐	Here you can set whether audio alarm output is active or inactive when the user calls up manual mode.	Deactivated

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Parameter		Possible values	Description	Factory setting
Reminder signal	-	Off 1 min 2 min 5 min	Here you can set the time after which a reminder signal is to remind you that audio alarm output is paused or muted.	2 min
VF/VT alarm	VF/VT alarm selectable	Activated ☑ Deactivated ☐	Here you can set whether the VF/VT alarm can be activated/deactivated by the user in the user menu.	Deactivated
	VF/VT alarm	Activated ☑ Deactivated ☐	Here you can set whether the VF/VT alarm is to be activated when the device starts.	Activated
Automatic alarm limits	-	10 % 20 % 30 %	Here you can set the automatic alarm limits. The device automatically specifies the alarm limits for the physiological alarms. The deviation is 10 %, 20 % or 30 % from the measured values at the time of activation.	20 %

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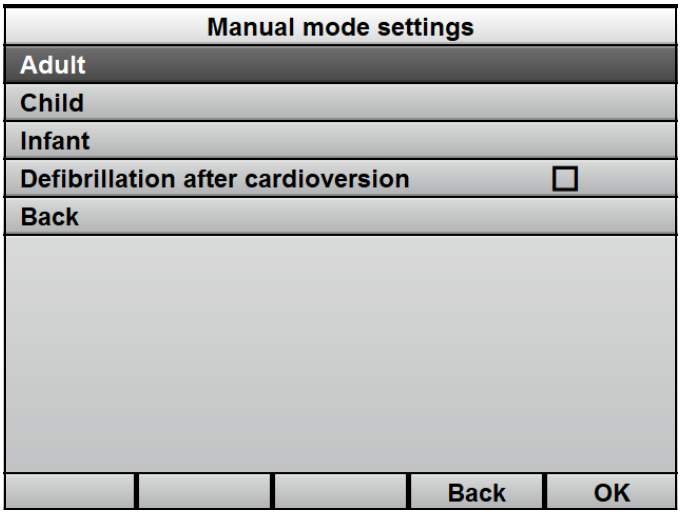
13.5 Manual mode settings (only with Manual defibrillation option)

You can make presets for shock energies in the **Manual mode settings** submenu.

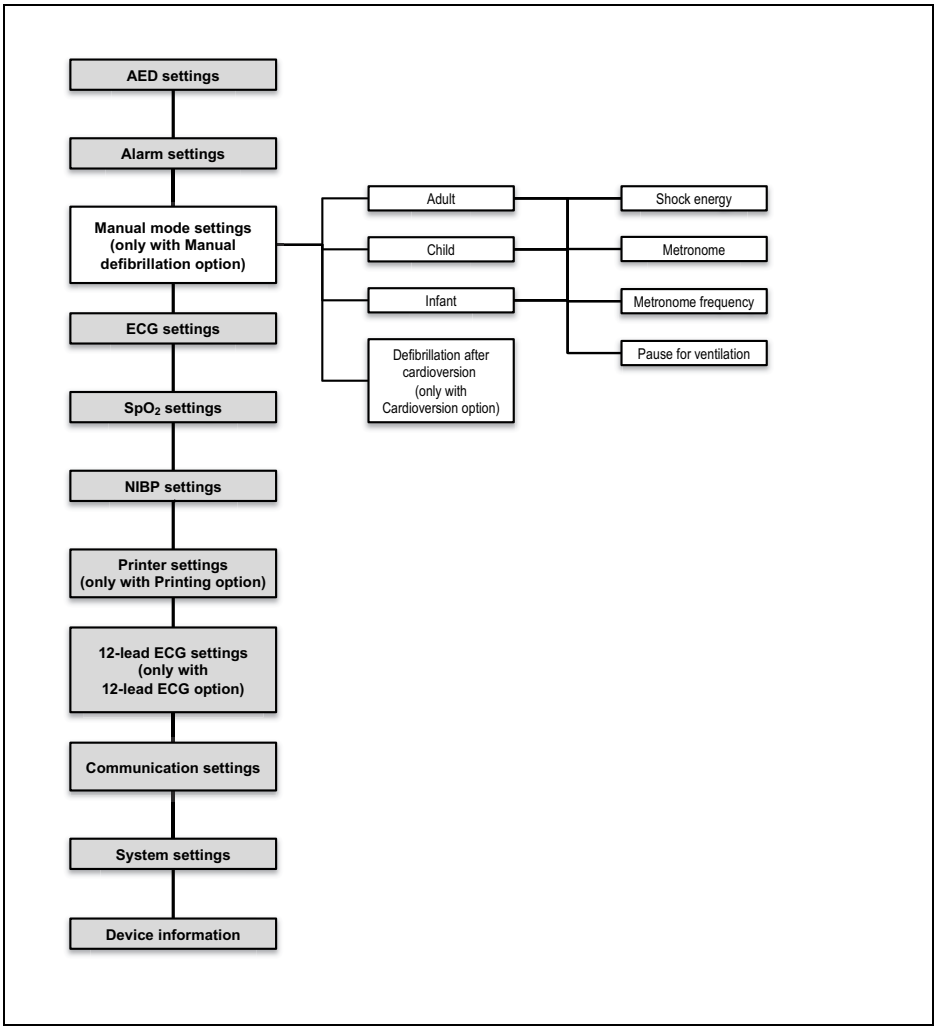
The factory settings are selected to meet currently applicable ERC guidelines. Adjustments to manual mode settings may result in the user no longer being supported in compliance with currently applicable ERC guidelines.

You can adapt the device to the patient group using the respective settings for manual mode.



*13-5 **Manual mode settings** submenu*

13.5.1 Menu structure



13-6 Operator menu: ***Manual mode settings*** *submenu*

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13.5.2 Possible values

Parameter		Possible values	Description	Factory setting
Adult	Shock energy	1 J to 200 J	Here you can set what defibrillation energy is to be preset in manual mode.	150 J
	Metronome	off 15:2 30:2 	Here you can set the metronome rhythm.	off
	Metronome frequency	100/min to 120/min	Here you can set the metronome frequency.	100/min
	Pause for ventilation	3 s to 8 s	Here you can set the time interval for ventilation between chest compressions.	5 s
Child Infant	Shock energy	1 J to 200 J	Here you can set what defibrillation energy is to be preset in manual mode.	75 J
	Metronome	off 15:2 30:2 	Here you can set the metronome rhythm.	off
	Metronome frequency	100/min to 120/min	Here you can set the metronome frequency.	100/min
	Pause for ventilation	3 s to 8 s	Here you can set the time interval for ventilation between chest compressions.	5 s
Defibrillation after cardioversion (only with Cardioversion option)	-	Activated  Deactivated 	Here you can set whether defibrillation is to follow cardioversion (box checked) or cardioversion is to follow cardioversion (box unchecked).	Deactivated

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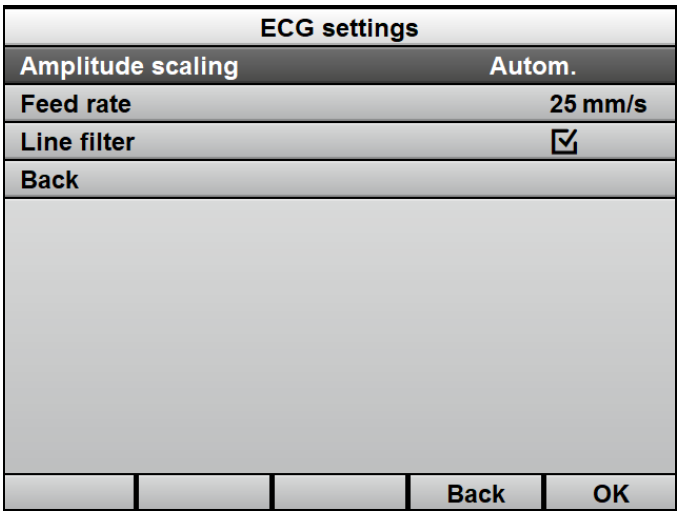
13.6 ECG settings

In the **ECG settings** submenu, you can make the presets for showing ECG curves in the display.



*13-7 **ECG settings** submenu*

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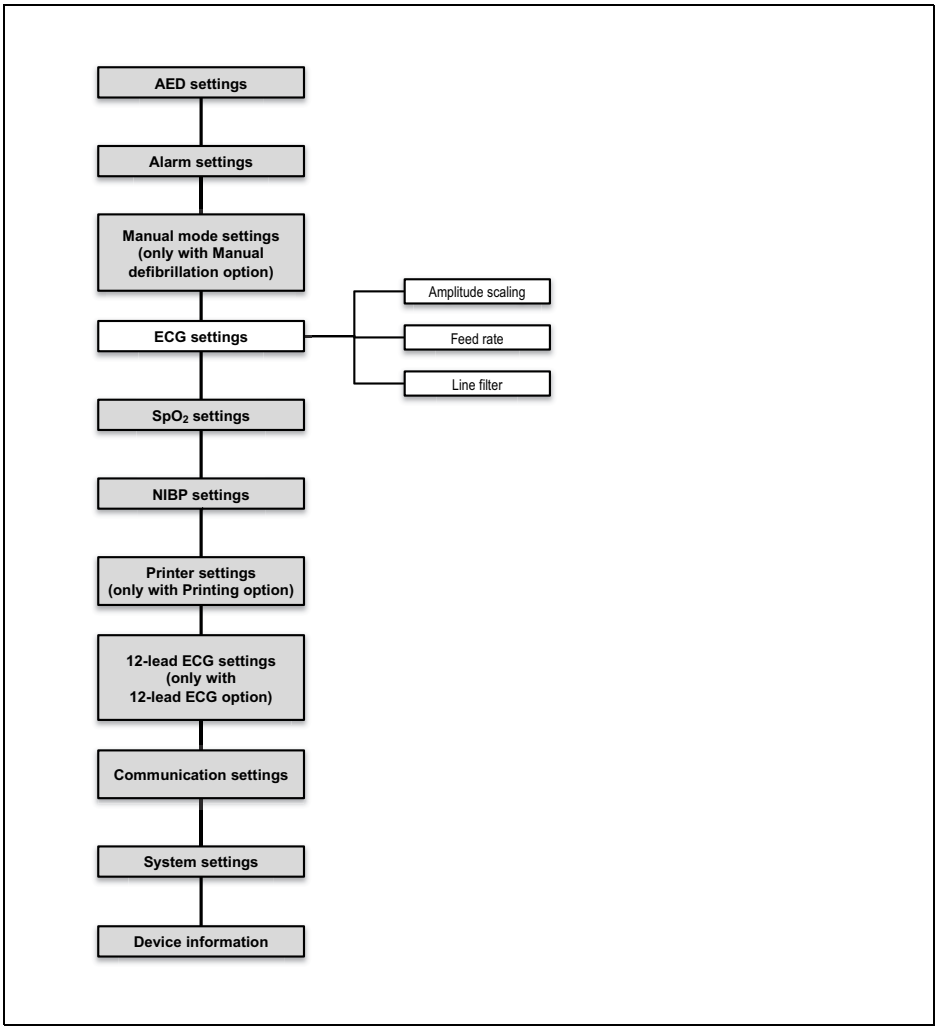
13.6.1 Menu structure



13-8 Operator menu: ***ECG settings*** *submenu*

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13.6.2 Possible values

Parameter	Possible values	Description	Factory setting
Amplitude scaling	Autom. 2 mm/mV 5 mm/mV 10 mm/mV 20 mm/mV	Here you can set the amplification of the ECG signal and thus the height of the ECG curve.	Autom.
Feed rate	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the feed rate of the ECG curve display and so change the time resolution.	25 mm/s
Line filter	Activated ☑ Deactivated ☐	By activating the line filter, you can reduce ECG interference caused by the power supply network.	Activated

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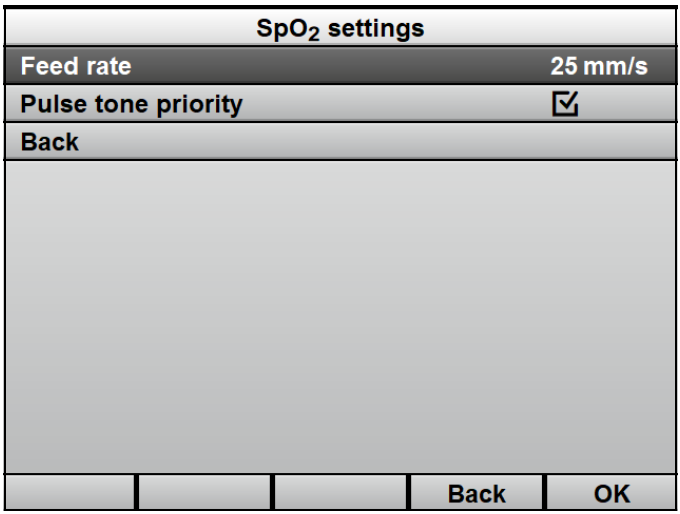
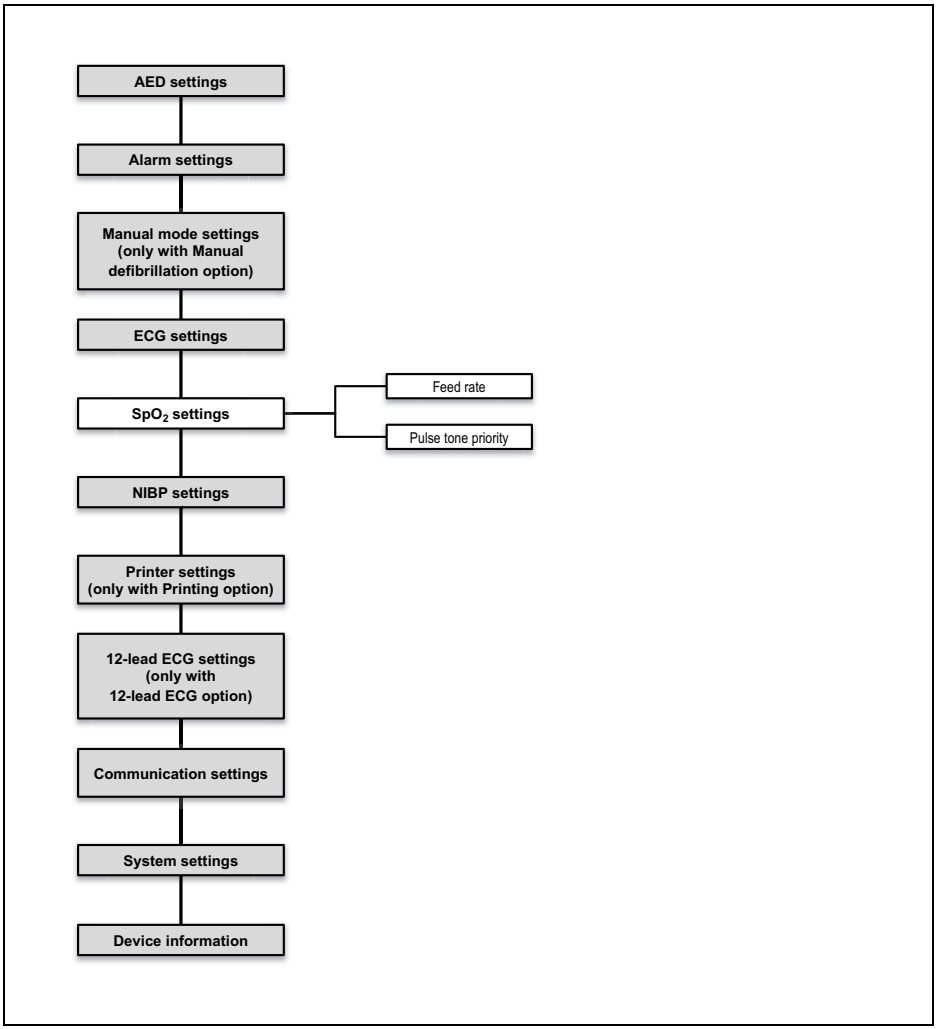
13.7 SpO_2 settings

In the **SpO_2 settings** submenu, you can make the presets for display of the plethysmogram and output of the pulse tone.



*13-9 **SpO_2 settings** submenu*

13.7.1 Menu structure



*13-10 Operator menu: **SpO_2 settings** submenu*

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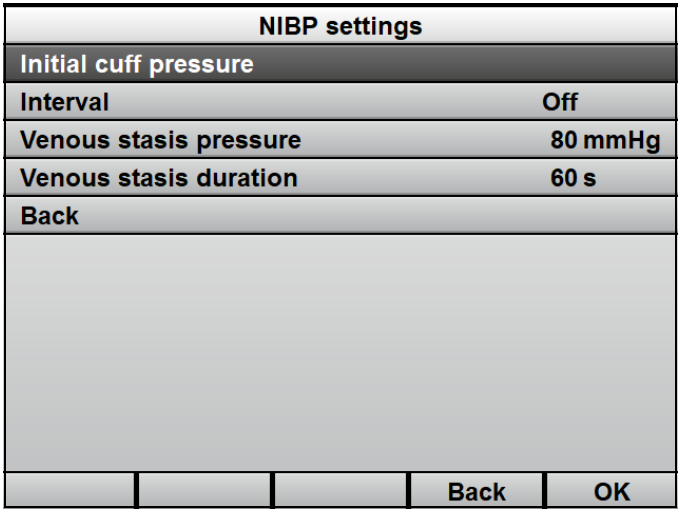
13.7.2 Possible values

Parameter	Possible values	Description	Factory setting
Feed rate	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the feed rate of the SpO_2 curve display and so change the time resolution.	25 mm/s
Pulse tone priority	Activated ☑ Deactivated ☐	Here you can set whether pulse tone is to take priority over heart rate tone. The tone level of the pulse tone is adapted to measured oxygen saturation.	Activated

13.8 NIBP settings

In the **NIBP settings** submenu, you can make the presets for blood pressure measurement and venous stasis. You can adapt the device to the patient group using the specific NIBP settings.



*13-11 **NIBP settings** submenu*

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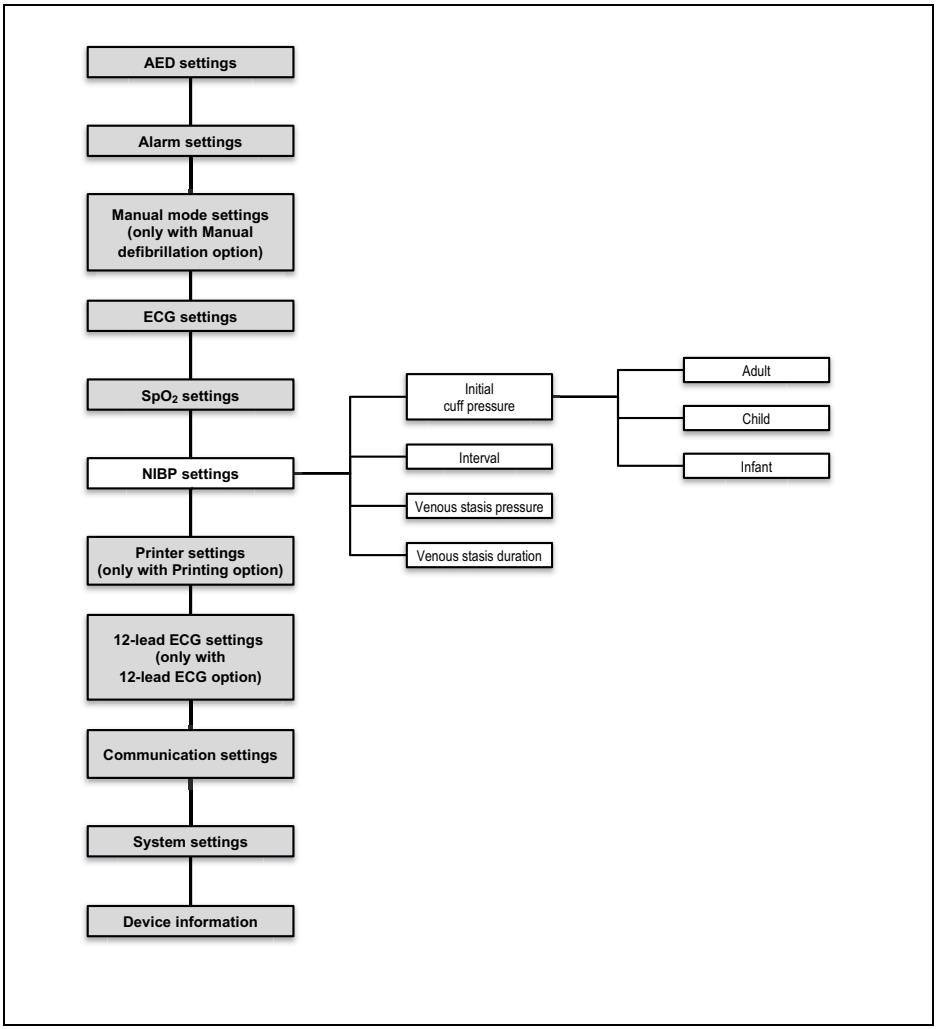
13.8.1 Menu structure



13-12 Operator menu: ***NIBP settings*** *submenu*

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13.8.2 Possible values

Parameter		Possible values	Description	Factory setting
Initial cuff pressure	Adult	120 mmHg - 280 mmHg, in increments of 5	Here you can set the NIBP cuff pressure to which the device must inflate the NIBP cuff for a particular patient group.	180 mmHg
	Child	80 mmHg - 170 mmHg, in increments of 5		120 mmHg
	Infant	60 mmHg - 140 mmHg, in increments of 5		90 mmHg
Interval	-	Off 0:30 min 0:45 min 1:00 min 1:15 min 1:30 min 1:45 min 2:00 min 3:00 min 5:00 min 10:00 min 15:00 min 30:00 min 60:00 min	Here you can set after how long another NIBP measurement is to be started automatically.	Off
Venous stasis pressure	-	60 mmHg - 140 mmHg, in increments of 5	Here you can set the pressure to which the NIBP cuff is inflated for venous stasis (**IV** function button).	80 mmHg
Venous stasis duration	-	10 s - 120 s	Here you can set for venous stasis (**IV** function button) the time for which pressure is to be maintained in the NIBP cuff.	60 s

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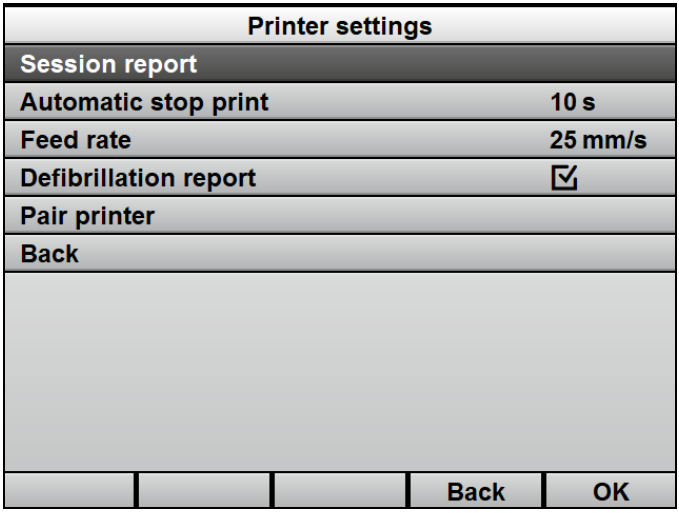
13.9 Printer settings (only with Printing option)

In the **Printer settings** submenu, you can make the presets for the printer and connect the device to a printer.



*13-13 **Printer settings** submenu*

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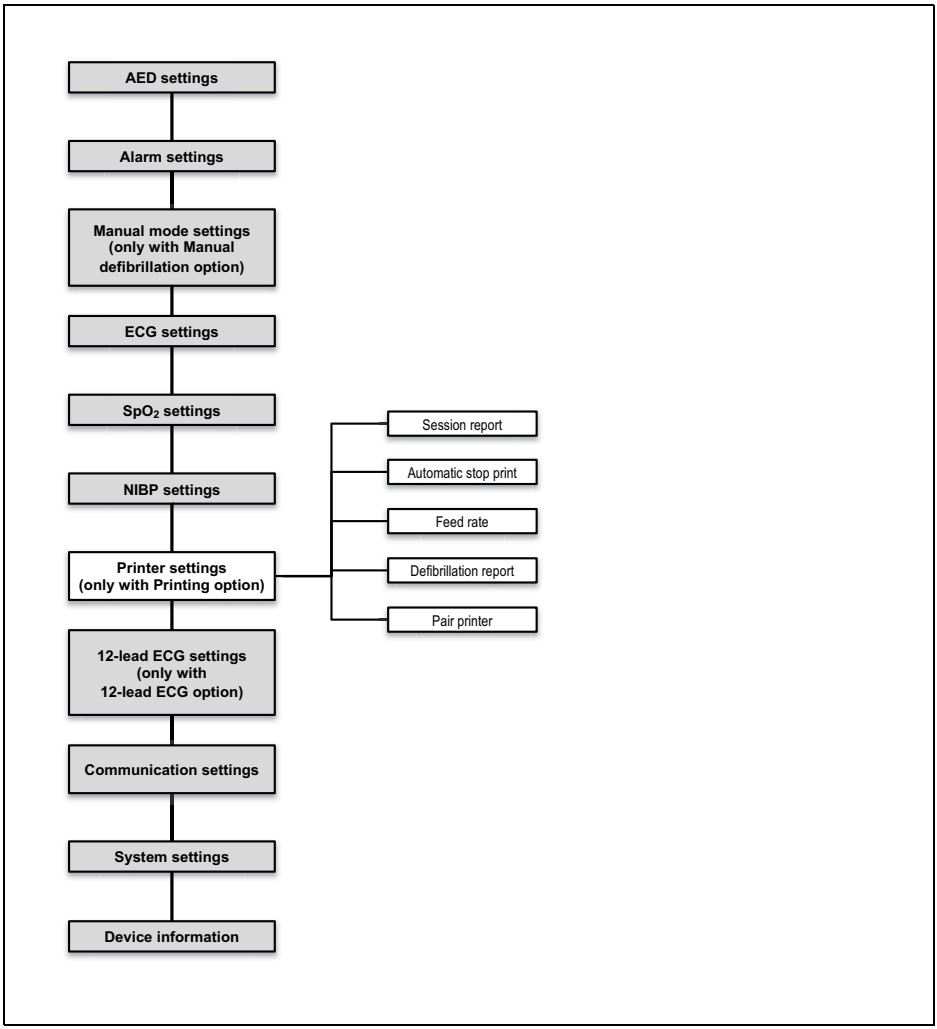
13.9.1 Menu structure



*13-14 Operator menu: **Printer settings** submenu*

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13.9.2 Possible values

Parameter		Possible values	Description	Factory setting
Session report	-	Resuscitation report Vital signs Events Events and vital signs	Here you can set the details the session report contains.	Resuscitation report Vital signs Events
Automatic stop print	-	5 s to 120 s	Here you can set the time after which printing of a live printout or replay printout finishes automatically.	10 s
Feed rate	-	12.5 mm/s 25 mm/s 50 mm/s	Here you can preset the feed rate at which the printer prints a live printout and a replay printout.	25 mm/s
Defibrillation report	-	Activated ☑ Deactivated ☐	Here you can set whether a defibrillation report is printed in the event of defibrillation or cardioversion (only with the Cardioversion option) if the printer is connected to the device and is ready for use.	Activated
Pair printer	-	-	Here you can pair the printer with a device (see "12.2 Pair printer with device (only with Printing option)", page 290). The connection is always set up automatically whenever the device and printer are switched on and are within range.	-

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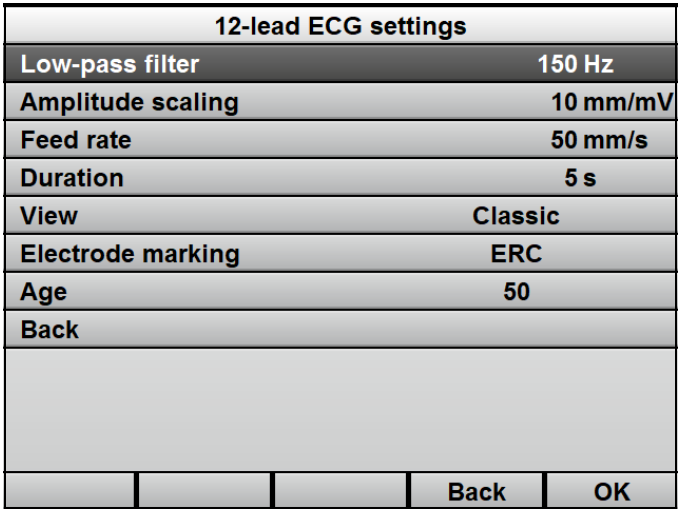
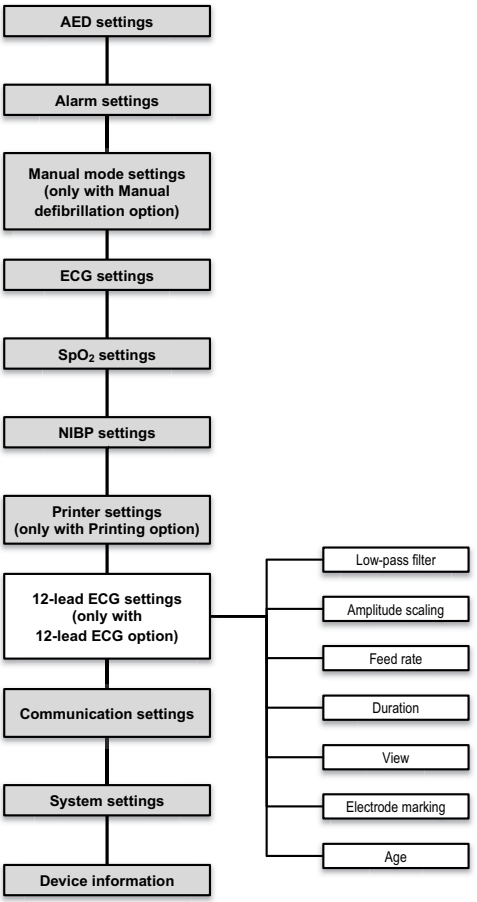
13.10 12-lead ECG settings (only with 12-lead ECG option)

You can make presets for the 12-lead ECG in the **12-lead ECG settings** submenu.



*13-15 **12-lead ECG settings** submenu*

13.10.1 Menu structure



13-16 Operator menu: ***12-lead ECG settings*** *submenu*

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13.10.2 Possible values

Parameter		Possible values	Description	Factory setting
Low-pass filter	-	50 Hz 150 Hz	Here you can set a low-pass filter to filter out artifacts.	150 Hz
Amplitude scaling	-	2 mm/mV 5 mm/mV 10 mm/mV 20 mm/mV	Here you can set the amplification of the ECG signal and thus the height of the ECG curve.	10 mm/mV
Feed rate	-	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the feed rate of the ECG curve display and so change the time resolution.	50 mm/s
Duration	-	5 s 10 s	Here you can set the recording duration of the 12-lead ECG.	5 s
View	-	Classic Cabrera	Here you can set the sequence in which the leads are displayed in the 12-lead ECG.	Classic
Electrode marking	-	ERC AHA	Here you can set whether the positions of the ECG electrodes in 12-lead ECG function mode are named in accordance with European (ERC) or American (AHA) coding and the colors assigned accordingly.	ERC
Age	-	0 to 99 years	Here you can set the patient's age.	50

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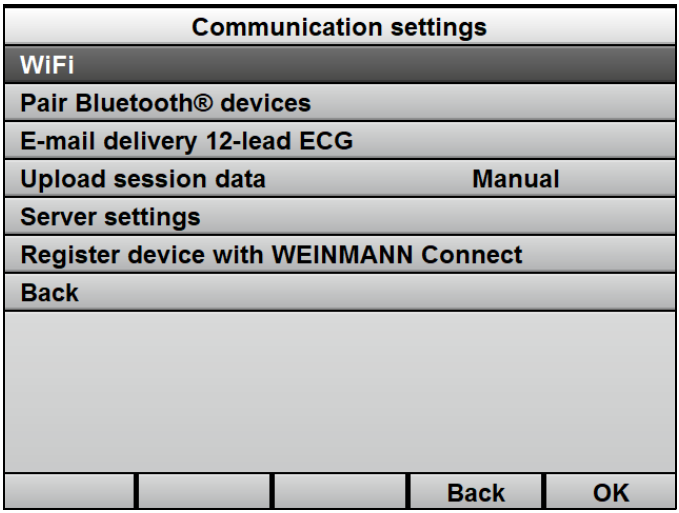
13.11 Communication settings

You can make presets for the following functions in the **Communication settings** submenu:

- Configure default network (see "12.3 Configuring default network", page 292)
- Pair the device with an external device via the Bluetooth® interface (see "12.6 Pairing the device with an external device via the Bluetooth® interface (only with Bluetooth® data transmission option)", page 302)
- Deliver 12-lead ECGs by e-mail (see "12.5 Configuring e-mail delivery 12-lead ECG (only with E-mail delivery 12-lead ECG option)", page 299)
- Upload session data to WEINMANN Connect (see "6.20.2 Uploading session data to WEINMANN Connect (only with Upload session data option)", page 214)
- Register the device with WEINMANN Connect (see "12.4 Registering the device with WEINMANN Connect", page 298)



13-17 ***Communication settings*** *submenu*

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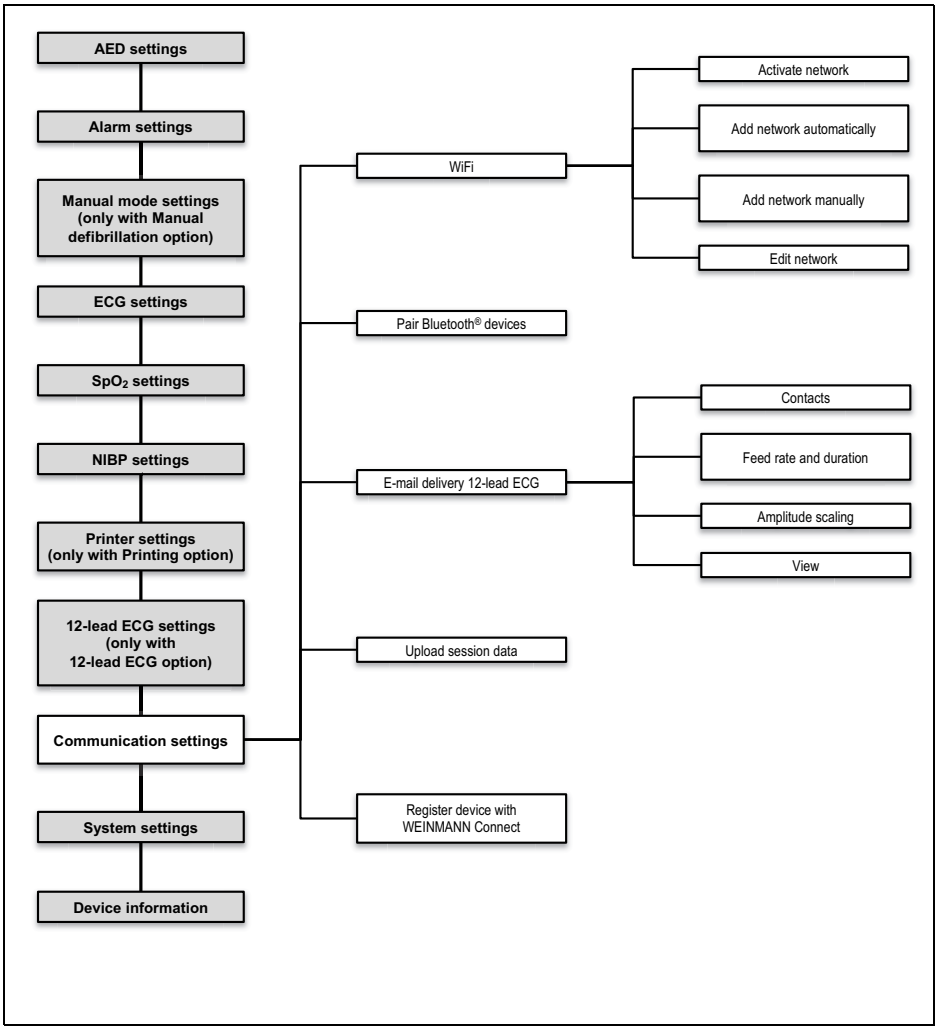
13.11.1 Menu structure



13-18 Operator menu: ***Communication settings*** *submenu*

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13.11.2 Possible values

Parameter		Possible values	Description	Factory setting
WiFi	Activate network	Activated ☑ Deactivated ☐	Here you can activate or deactivate the WiFi interface of your device.	Deactivated
	Add network automatically	-	Here you can search for an available network and automatically add it as the default network.	-
	Add network manually	-	Here you can configure a network manually. Contact your IT system administrator for required information about the settings.	-
	Edit network	-	Here you can edit the settings for a network already configured and specify a network as the default network.	-
Pair Bluetooth® devices	-	-	Here you can pair your device with a compatible system for digital patient data recording. If you cancel the process, the menu item is grayed out briefly.	-

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Parameter		Possible values	Description	Factory setting
E-mail delivery 12-lead ECG	Contacts	-	Here you can enter the names and e-mail addresses for e-mail delivery 12-lead ECG.	-
	Feed rate and duration	Feed: 50 mm/s | Duration: 5 s Feed: 25 mm/s | Duration: 5 s Feed: 25 mm/s | Duration: 10 s	Here you can set whether a single-sided or double-sided PDF of the 12-lead ECG is generated. Single-sided PDF: Feed: 25 mm/s | Duration: 5 s Double-sided PDF: • Feed: 50 mm/s | Duration: 5 s • Feed: 25 mm/s | Duration: 10 s	Single-sided PDF with feed: Feed: 50 mm/s | Duration: 5 s
	Amplitude scaling	2 mm/mV 5 mm/mV 10 mm/mV 20 mm/mV	Here you can set the amplification of the ECG signal and thus the height of the ECG curve for e-mail delivery 12-lead ECG.	10 mm/mV
	View	Classic Cabrera	Here you can set the sequence of ECG leads for e-mail delivery 12-lead ECG.	Classic
Upload session data	-	Manual Automatic	Here you can set whether all session data or only session data you select are automatically uploaded to WEINMANN Connect.	Manual
Register device with WEINMANN Connect	-	-	Here you can enter the registration code generated by WEINMANN Connect in order to register your device with WEINMANN Connect.	-

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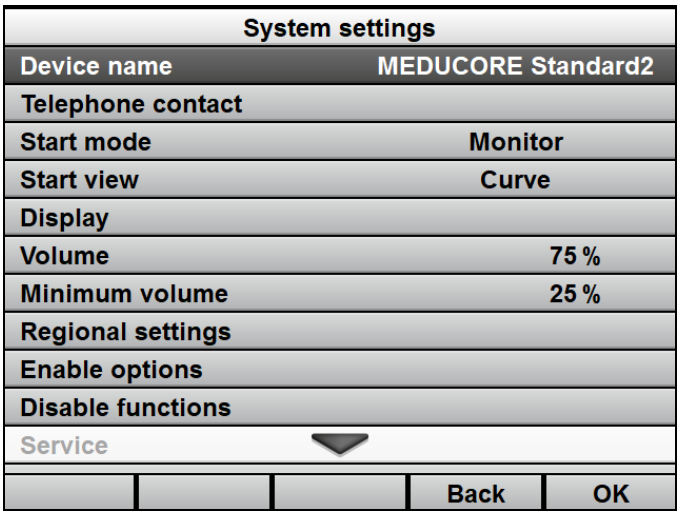
13.12 System settings

You can make presets for the system in the **System settings** submenu.



*13-19 **System settings** submenu*

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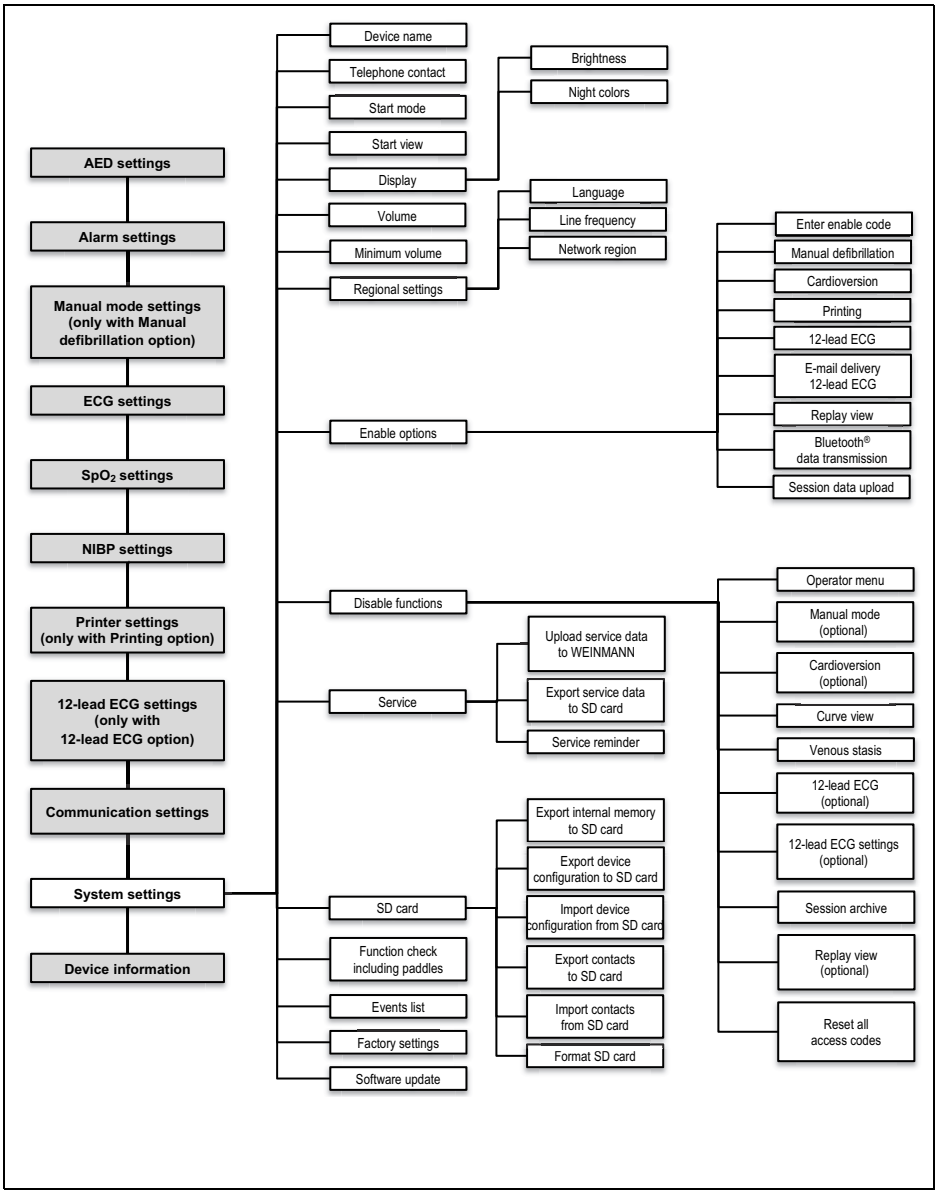
13.12.1 Menu structure



13-20 Operator menu: ***System settings*** *submenu*

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13.12.2 Possible values

Parameter		Possible values	Description	Factory setting
Device name	-	-	Here you can enter the device name, the location of the device or some other identification. The device name appears on the printout and in the PDF of the 12-lead ECG. It assigns the 12-lead ECG to the device with which the 12-lead ECG was created.	MEDUCORE Standard2
Telephone contact	-	-	Here you can enter a telephone number for queries. The telephone contact appears in the **Device information** menu item and in the PDF of the 12-lead ECG.	-
Start mode	-	Monitor AED Manual	Here you can set in which mode the device is to start. Manual mode is not available if parameter view has been selected as the start view.	Monitor
Start view	-	Curve Parameter	Here you can set in which view the device is to start. Parameter view is not available if manual mode has been selected as the start mode.	Curve
Display	Brightness	10 %-100 %, in increments of 10	Here you can set the display brightness.	70 %
	Night colors	Activated ☑ Deactivated ☐	Here you can set whether the device is to start with night colors.	Deactivated

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Parameter		Possible values	Description	Factory setting
Volume	-	25 % - 100 %, in increments of 25	Here you can set the volume of the device.	75 %
Minimum volume	-	25 % - 100 %, in increments of 25	Here you can specify the minimum volume which can be set by the user.	25 %
Regional settings	Language	Languages available in the device (depends on software version)	Here you can set the language of display texts and voice prompts. The device shows the available languages in their own respective language and with their international language abbreviation (e.g. for English: English (en US)).	Customer-specific
	Line frequency	50 Hz 60 Hz	Here you can select the ECG filter in order to suppress interference caused by your regional power supply network.	50 Hz
	Network region	All available network regions	Here you can specify your network region.	WORLD (default)
Enable options	-	-	Here you can enable options and activate and deactivate them after enabling them (see "3.10 Options", page 72). The following options are possible: • Manual defibrillation • Cardioversion • Printing • 12-lead ECG • E-mail delivery 12-lead ECG • Replay view • Bluetooth® data transmission • Upload session data	-

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Parameter		Possible values	Description	Factory setting
Disable functions	Operator menu	-	Here you can disable functions for the user and protect them from unauthorized access using an individual access code. When doing so, please note: • Manual mode cannot be disabled if it has been selected as the start mode. • Curve view cannot be disabled if it has been selected as the start view. • If manual mode and curve view are disabled at the same time, then when manual mode is enabled in the session, curve view is automatically enabled at the same time. • The access code request in the operator menu cannot be removed.	Functions not disabled Access code: 000000
	Manual mode (only with Manual defibrillation option)	-		
	Cardioversion (only with Cardioversion option)	-		
	Curve view	-		
	Venous stasis	-		
	12-lead ECG (only with 12-lead ECG option)	-		
	12-lead ECG settings (only with 12-lead ECG option)	-		
	Session archive	-		
	Replay view (only with Replay view option)	-		
	Reset all access codes	-	Here you can reset all access codes to the factory setting 000000.	-

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Parameter		Possible values	Description	Factory setting
Service	Upload service data to WEINMANN	-	Here you can upload your device service data to WEINMANN Emergency. If you cancel the process, the menu item is grayed out briefly.	-
	Export service data to SD card	-	Here you can export your device service data to an SD card.	-
	Service reminder	Activated ☑ Deactivated ☐	Here you can set whether the device is to remind you of the next service ≤ 30 days before the next service.	Activated
SD card	Export internal memory to SD card	-	Here you can export the internal device memory to the SD card.	-
	Export device configuration to SD card	-	Here you can export the current settings of the operator menu to the SD card so that they can be imported by another device.	-
	Import device configuration from SD card	-	Here you can have the settings copied to an SD card from the operator menu imported to another device.	-
	Export contacts to SD card (only with E-mail delivery 12-lead ECG option)	-	Here you can export the contacts you have configured for e-mail delivery 12-lead ECG from your device to an SD card in order to have them imported by another device.	-
	Import contacts from SD card (only with E-mail delivery 12-lead ECG option)	-	Here you can import the contacts you have configured for e-mail delivery 12-lead ECG from an SD card to your device.	-
	Format SD card	-	Here you can format the inserted SD card. This deletes all data from the SD card.	-

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Parameter		Possible values	Description	Factory setting
Function check including paddles	-	Activated ☑ Deactivated ☐	Here you can set whether the paddles are included in the function check. If you activate paddles on the device, the function check including paddles will be activated automatically.	Deactivated
Events list	Number of events	1 to 50	Here you can set the number of events which can be selected.	28 events preset
	Event 1 to 50 (28 preset)	-	Here you can adapt the separate events individually (maximum 15 characters). The two top events are recorded and counted in the session report.	Epinephrine Amiodarone CPR Intubation IV access Transport Oxygen Infusion Glucose Nitroglycerin ASA Heparin Urapidil Adenosine Atropine Lidocaine Furosemide Midazolam Albuterol Atrovent Prednisolone Clemastine Morphine Fentanyl Ketamine Ondansetron Butylscopolamine Metamizole
Factory settings	-	-	Here you can reset the device to its factory settings.	-
Software update	-	-	Here you can carry out a software update.	-

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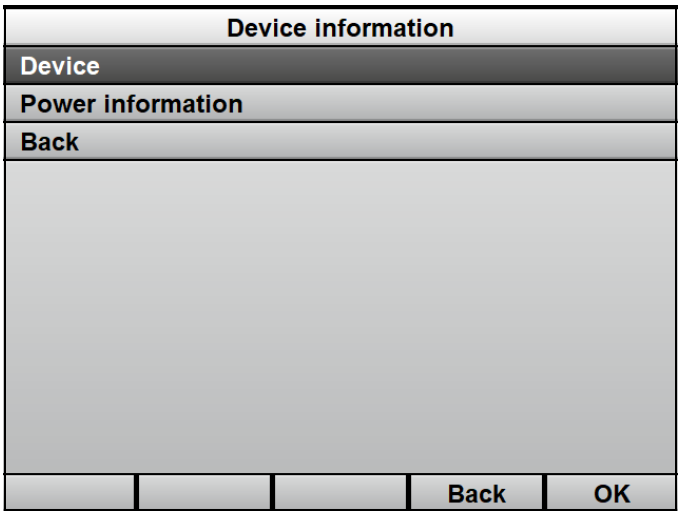
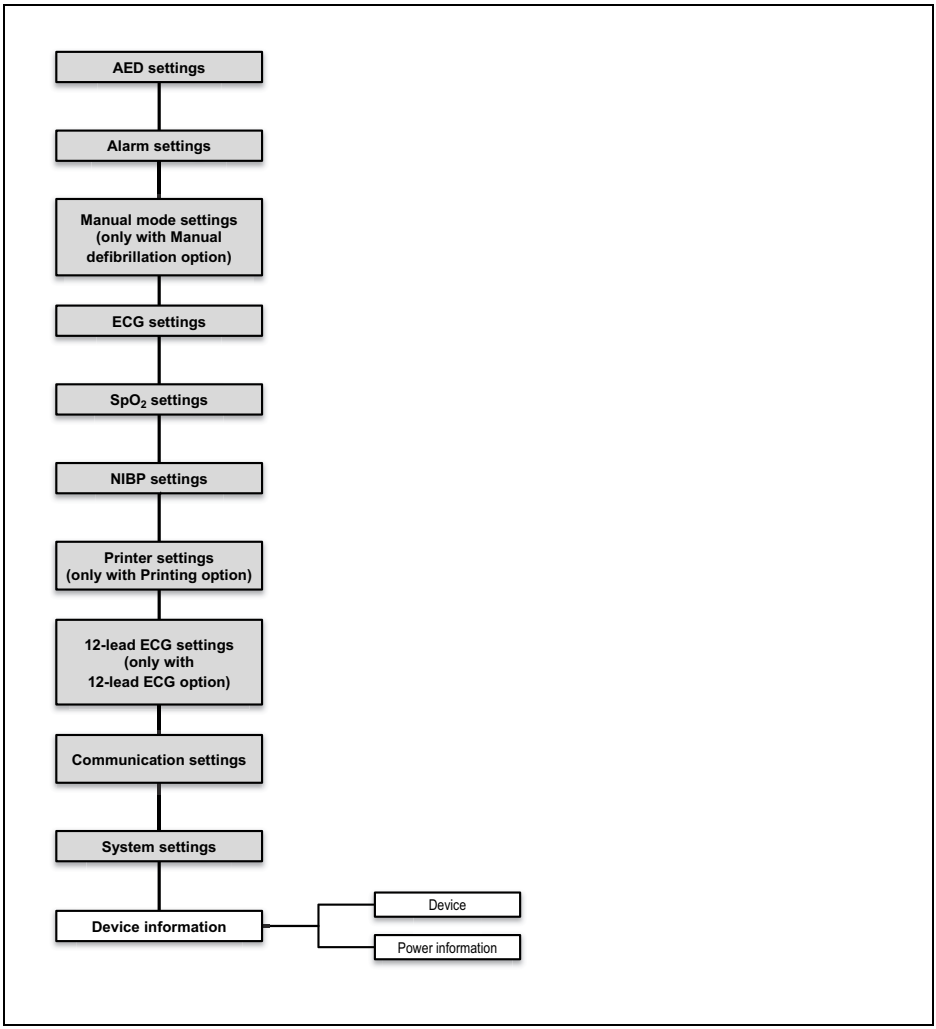
13.13 Device information

You will find information about the device and the battery in the **Device information** submenu.



*13-21 **Device information** submenu*

13.13.1 Menu structure



13-22 Operator menu: ***Device information*** *submenu*

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13.13.2 Information displayed

Information displayed	Description
Device	
Telephone contact	Here you can find out the telephone number which the operator has assigned to the device for teleconsulting queries.
Serial number	Here you can find out the device serial number. This is also located on the device information label.
Device ID	Here you can find out the device ID. This is required to purchase options.
MAC Bluetooth® module (only with Printing and Bluetooth® data transmission options)	Here you can find out the MAC address of the Bluetooth® module.
MAC WiFi module	Here you can find out the MAC address of the WiFi module.
Last function check	Here you can find out when a function check was last carried out.
Function check result	Here you can find out whether the last function check carried out was passed.
Days until next service	Here you can find out how many days to go until the next service is due.
Next service	Here you can find out when the next service is due.
Device software	Here you can find out which software version is currently installed on the device.
Power information	
Here you can find out information about the battery and the line voltage. This information may be of use for remote diagnoses.	

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14 Maintenance

⚠ WARNING

Risk of injury from impaired device functions or defects, lack of testing and excessive service life!
If the device is not correctly tested, or is operated for too long, impaired device functions, deviations or defects may occur. The device cannot be used correctly, and may injure the patient and the user.
⇒ Observe the intervals for maintenance, for Technical Safety Check ("Sicherheitstechnische Kontrolle" in accordance with § 11 of the German regulation MPBetreibV), and for metrological check.
⇒ Do not operate the device for longer than 10 years.

14.1 General instructions

Maintenance, Technical Safety Check (in Germany only), and measures such as inspections and repairs must only be carried out by the manufacturer or by a technician expressly authorized by it.

14.2 Intervals

Part concerned	Interval	Maintenance by
Device	Maintenance-free	
	Technical Safety Check every year	Manufacturer or a technician expressly authorized by manufacturer
	Metrological check every two years	
Battery	Maintenance-free When stored in the device: Charge every 3 months. When not stored in the device: Charge batteries with serial numbers < 20,000 every 5 months and batteries with serial numbers ≥ 20,000 every 9 months. Recommendation: Replace battery after 2 years.	
Charging station	Maintenance-free Recommendation: Replace charging station after 12 years	

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Part concerned	Interval	Maintenance by
Accessories*	Please follow the instructions for use supplied with the accessories. Should the accessories not come with their own instructions for use, the same intervals as for the device apply.	

*Additional information for Germany:
In accordance with the Technical Safety Check ("Sicherheitstechnische Kontrolle" in accordance with § 11 of the German regulation MPBetreibV), we as the manufacturer recommend that all accessories for use of the MEDUCORE Standard^2 that are connected to it likewise be subject to a safety check (STK) at the same interval as the device.

14.3 Sending in the device

⚠ WARNING

Risk of infection from contaminated parts!
The device, accessories, and other parts may be contaminated, and infect technicians with bacteria and viruses. Parts sent in which are clearly contaminated will be disposed of at the cost of the sender by WEINMANN Emergency or by technicians authorized by WEINMANN Emergency.
⇒ Clean and disinfect parts before sending them in.
⇒ Do not send in parts which are potentially contaminated.

1. Disassemble parts.
2. Clean and disinfect parts (see "8 Hygienic reprocessing", page 230).
3. Send parts to WEINMANN Emergency or to technicians expressly authorized by WEINMANN Emergency.

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15 Storage

⚠ WARNING

Disrupted or failed therapy due to device being defective or not ready for use following incorrect storage!
Incorrect storage may damage the device, components, and accessories, and lead to disruption or failure of therapy. This may cause serious or life-threatening injury to the patient.
⇒ Observe storage conditions and storage times (see "18 Technical data", page 367).
⇒ Store the device and accessories in a dry location.
⇒ Following storage at extreme ambient conditions outside ambient operating conditions: Store the device, components, and accessories at room temperature for at least 12 hours before starting to use them.
⇒ Protect the device, components, and accessories from UV light and direct sunlight.

15.1 Storing the device

1. Switch off the device (see "6.2 Switching the device off", page 119).
2. Disassemble the power supply (see "7.1 Disassembling the power supply", page 218).
3. Clean and disinfect the device (see "8 Hygienic reprocessing", page 230).
4. Store the device in a dry place.

Result The device is stored in a dry place.

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15.2 Storing the battery

Requirement

- The device and the battery have been cleaned and disinfected (see "8 Hygienic reprocessing", page 230).
- The battery is fully charged.
- If available: The replacement battery is fully charged.

1. Insert the battery in the battery compartment and store the device in a dry place.

   Alternatively:

   Store the battery in a dry place outside the device.

⚠ WARNING

No therapy due to extended storage of the battery without recharging!
Storing the battery for an extended period of time without recharging may result in the rapid shutdown of and irreparable damage to the battery.
⇒ When the battery is stored in the device without a power supply: Charge battery every 3 months.
⇒ If the battery is not stored in the device: Charge batteries with serial numbers < 20,000 every 5 months and batteries with serial numbers ≥ 20,000 every 9 months.

2. Charge battery at regular intervals:

Type of storage	Charging interval
In device without a power supply	Every 3 months
Outside the device	• Batteries with serial numbers < 20,000: Charge every 5 months. • Batteries with serial numbers ≥ 20,000: Charge every 9 months.

Result The battery is stored in a dry place and is ready for use.

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15.3 Storing printer

⚠ CAUTION

Delayed therapy due to incorrect storage of the printer!
Storage outside the specified ambient conditions may lead to printer malfunctions or damage the printer. This may delay the patient's therapy.
⇒ Always store the printer within the specified ambient conditions.
⇒ In the event of problems with the printer: Carry out a function check of the printer (see "5.6 Carrying out a function check on the printer (only with Printing option)", page 117).

15.4 Storing printer battery

1. If the printer is not being used for an extended period: Charge printer battery (see "4.7.1 Charging the printer battery", page 94).
2. Store the printer battery **separately** from the printer.
3. Charge the printer battery after no more than 12 months.

Result The printer battery is stored in a dry place and ready for use.

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16 Disposal

16.1 Electronic waste

⚠ CAUTION

Environmental hazard from electronic waste!
Electronic waste poses an environmental hazard, and must be subjected to proper disposal.
⇒ Do not dispose of electronic waste in domestic waste.
⇒ Contact WEINMANN Emergency or a licensed, certified electronic waste dealer for proper disposal.

The following products are categorized as electronic waste:

- Device
- Master cable
- Defibrillation electrodes
- Paddles
- Pulse oximetry sensor connecting cable
- Pulse oximetry sensor
- ECG cable
- ECG electrodes
- Power supply unit and charger
- Charging station
- Function test resistor
- Printer
- Charging station for printer battery
- Power supply unit and charger for charging stations for printer battery

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16.2 Battery/printer battery

⚠ CAUTION

Environmental hazard from used batteries!
Used batteries are a risk to the environment and must be subjected to proper disposal.
⇒ Do not dispose of used batteries in domestic waste.
⇒ Contact WEINMANN Emergency or a licensed, certified electronic waste dealer for proper disposal.

16.3 Plastics

Dispose of plastics in a proper manner applicable to plastics at the end of their useful lives.

16.4 Contaminated parts

Do not dispose of contaminated parts in domestic waste. Use a licensed, certified specialist waste management contractor to dispose of contaminated parts properly.

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17 Scope of supply

17.1 Version supplied (example)

This sub-section describes just one version supplied. Functions, accessories, and other parts depend on the version purchased, and are not available in every case.

Medical devices and accessories are marked with a UDI-DI. Other parts do not have a UDI-DI. For parts made by other manufacturers (third-party products) you can request the UDI-DI from the manufacturer.

Designation	Supplementary information	UDI-DI	Article no.
MEDUCORE Standard^2, basic device	–	04054685271510	WM 45310
Accu-Pack rechargeable battery	–	04054685157616	WM 45045
MCS2-Connect master cable	–	04054685267162	WM 45397
MCS2-Softpads defibrillation electrodes for adults	Third-party product	–	WM 45418
MCS2-SoftTip pulse oximetry sensor, size M	Reusable	04054685265977	WM 45432
MCS2-Adapt pulse oximetry sensor connecting cable	–	04054685265953	WM 45430
MCS2-Line ECG cable, ERC, 2 m	–	04054685265205	WM 45451
ECG cable separator	–	–	WM 45450
Set of 50, ECG electrodes for adults and children	Third-party product	–	WM 45201
NIBP connecting tube, 2 m	Third-party product	–	WM 45481
NIBP cuff, adult plus, 28-40 cm arm circumference	• Third-party product • Reusable	–	WM 45464
Kit, mounting elements	–	–	WM 17806

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Designation	Supplementary information	UDI-DI	Article no.
SD card, 32 GB	–	–	WM 39510
Function test resistor	–	–	WM 45428
MEDUCORE Standard^2 instructions for use	–	–	WM 68401

17.2 Accessories and other parts

This sub-section describes accessories and other parts in accordance with the Medical Device Regulation (MDR). Accessories are marked with a UDI-DI. Other parts do not have a UDI-DI. For parts made by other manufacturers (third-party products) you can request the UDI-DI from the manufacturer.

Designation	Supplementary information	UDI-DI	Article no.
Options			
Manual defibrillation option	–	–	WM 45499
Cardioversion option	Requirement: Manual defibrillation option is enabled	–	WM 45620
Printing option	–	–	WM 45621
12-lead ECG option	–	–	WM 45622
E-mail delivery 12-lead ECG option	Requirement: 12-lead ECG option is enabled	–	WM 45626
Replay view option	–	–	WM 45628
Bluetooth® data transmission option	–	–	WM 45624
Upload session data option	–	–	WM 45627

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Designation	Supplementary information	UDI-DI	Article no.
Power supply			
Accu-Pack battery	–	04054685157616	WM 45045
Charging station for battery WM 45045		–	WM 45190
Power supply unit and charger 100 W	Third-party product	–	WM 28937
Charging adapter for charging with power supply unit and charger or 12 V adapter cable	–	–	WM 28979
Adapter cable for 12 V on-board power supply/ circular connector	–	–	WM 28356
Defibrillation/cardioversion (WEINMANN Emergency)			
MCS2-Connect master cable	–	04054685267162	WM 45397
MCS2-Hardpads paddles	–	04054685281618	WM 45498
Defibrillation/cardioversion (other manufacturers)			
MCS2-Softpads defibrillation electrodes for adults	–	–	WM 45418
MCS2-Softpads defibrillation electrodes for children	–	–	WM 45419
Set of 12, electrode gel	–	–	WM 14292
Pulse oximetry monitoring (WEINMANN Emergency)			
MCS2-Adapt pulse oximetry sensor connecting cable	–	04054685265953	WM 45430
MCS2-SoftTip pulse oximetry sensor, size S	Reusable	04054685265960	WM 45431
MCS2-SoftTip pulse oximetry sensor, size M	Reusable	04054685265977	WM 45432
MCS2-SoftTip pulse oximetry sensor, size L	Reusable	04054685265984	WM 45433

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Designation	Supplementary information	UDI-DI	Article no.
Set of 24, MCS2-Wrap pulse oximetry sensor, adult	Disposable	04054685266776	WM 45436
Set of 24, MCS2-Wrap pulse oximetry sensor, infant	Disposable	04054685266783	WM 45437
Set of 24, MCS2-Wrap pulse oximetry sensor, child	Disposable	04054685266790	WM 45439
MCS2-Wrap pulse oximetry sensor	Reusable	04054685265991	WM 45434
Set of 10, strap for fastening MCS2-Wrap pulse oximetry sensor	Disposable	04054685267230	WM 45442
MCS2-Earclip pulse oximetry sensor	Reusable	04054685266004	WM 45435
Set of 5, ear clip for MCS2-Earclip pulse oximetry sensor	–	–	WM 45443
6-lead ECG monitoring/12-lead ECG recording and assessment			
ECG cable separator	–	–	WM 45450
Set of 50, ECG electrodes for adults and children	Third-party product	–	WM 45201
MCS2-Line ECG cable, ERC, 2 m	–	04054685265205	WM 45451
MCS2-Line ECG cable, ERC, 3 m	–	04054685265212	WM 45452
MCS2-Line ECG cable with connection for 12-lead ECG extension cable, ERC, 2.4 m	–	04054685275099	WM 45455
MCS2-Line ECG cable with connection for 12-lead ECG extension cable, ERC, 3.4 m	–	04054685275105	WM 45456
MCS2-Line 12-lead ECG extension cable, ERC	–	04054685275075	WM 45447

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Designation	Supplementary information	UDI-DI	Article no.
MCS2-Line ECG cable, AHA, 2 m	–	04054685265229	WM 45453
MCS2-Line ECG cable, AHA, 3 m	–	04054685265236	WM 45454
MCS2-Line ECG cable with connection for 12-lead ECG extension cable, AHA, 2.4 m	–	04054685275112	WM 45457
MCS2-Line ECG cable with connection for 12-lead ECG extension cable, AHA, 3.4 m	–	04054685275129	WM 45458
MCS2-Line 12-lead ECG extension cable, AHA	–	04054685275082	WM 45448
ECG simulator, 6-lead ECG, shockable*	–	–	WM 45444
ECG simulator, 12-lead ECG, shockable*	–	–	WM 45445
Non-invasive blood pressure measurement (NIBP monitoring) (other manufacturers)			
NIBP connecting tube, 2 m	–	–	WM 45481
NIBP connecting tube, 3 m	–	–	WM 45482
NIBP cuff, infant, 8-13 cm arm circumference	Reusable	–	WM 45460
NIBP cuff, child, 12-19 cm arm circumference	Reusable	–	WM 45461
NIBP cuff, small adult, 7-25 cm arm circumference	Reusable	–	WM 45462
NIBP cuff, adult, 23-33 cm arm circumference	Reusable	–	WM 45463
NIBP cuff, adult plus, 28-40 cm arm circumference	Reusable	–	WM 45464
NIBP cuff, large adult plus, 40-55 cm arm circumference	Reusable	–	WM 45465

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Designation	Supplementary information	UDI-DI	Article no.
NIBP cuff, adult, 38-50 cm thigh circumference	Reusable	–	WM 45466
Adapter tube for connecting NIBP disposable cuffs for neonates	–	–	WM 45467
Set of 20, NIBP cuff, neonate, size 1, 3-6 cm arm circumference	Disposable	–	WM 45468
Set of 20, NIBP cuff, neonate, size 2, 4-8 cm arm circumference	Disposable	–	WM 45469
Set of 20, NIBP cuff, neonate, size 3, 6-11 cm arm circumference	Disposable	–	WM 45470
Set of 20, NIBP cuff, neonate, size 4, 7-13 cm arm circumference	Disposable	–	WM 45471
Set of 20, NIBP cuff, neonate, size 5, 8-15 cm arm circumference	Disposable	–	WM 45472

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Designation	Supplementary information	UDI-DI	Article no.
Printing			
Set, printer*	–	–	WM 45640
Comprising:			
Printer	Third-party product	–	
Printer battery	Third-party product	–	
Charging station for printer battery with power supply unit and charger	–	–	
Printer case	–	–	
Printer battery*	Third-party product	–	WM 45616
Charging station for printer battery with power supply unit and charger*	–	–	WM 45617
Charging station for printer battery with power supply unit and charger*, quadruple	–	–	WM 45618
Printer case	–	–	WM 45619
Set of 10, printer paper	–	–	WM 14698
Portable units/protective transport bags			
MCS2-Bag protective transport bag	–	04054685268473	WM 45490
MCS2-Bag protective transport bag, large	–	04054685281623	WM 45590
Insert for accommodating MCS2-Hardpads paddles in MCS2-Bag protective transport bag, large	–	–	WM 45202
LIFE-BASE portable unit	–	UDI-DI on request	Article no. on request
Miscellaneous			
Function test resistor	–	–	WM 45428
Retaining plate	–	–	WM 9714

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Designation	Supplementary information	UDI-DI	Article no.
Raised countersunk head screw ISO 7047 M4 x 8	–	–	WM 51398
DEFIview PC software	–	–	WM 45120
Kit, mounting elements	–	–	WM 17806
SD card, 32 GB	–	–	WM 39510
Adapter cable for connecting to Ambu/ Laerdal practice manikin*	Third-party product	–	WM 45424
Adapter cable for connecting ShockLink®	–	–	WM 45369

* Not suitable for use in the vicinity of the patient. Printer and printer battery must only be used in the vicinity of the patient if they are in the printer case.

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18 Technical data

18.1 Device

⚠ WARNING

Risk of injury due to ignoring the technical data of components and accessories!
The technical data of components and accessories may differ from device technical data. Ignoring the technical data of components and accessories may injure the patient, the user, and bystanders.
⇒ Observe the technical data of components and accessories.
⇒ Follow the instructions for use of the components and accessories.

Specification	Device
Product class according to Directive 93/42/EEC	IIb
Dimensions (W x H x D)	242 mm x 137 mm x 130 mm
Weight: Without battery With battery	 2.25 kg 2.75 kg
Continuous operation: • Temperature range • Humidity • Air pressure • Altitude above mean sea level Unless stated otherwise, these conditions also apply to all components and all accessories.	 0 °C to +40 °C 15 % rh to 95 % rh, no condensation 540 hPa to 1100 hPa -500 m to 5000 m
Transient operation (temporary operation at the session location): • Temperature range • Humidity • Air pressure • Altitude above mean sea level Unless stated otherwise, these conditions also apply to all components and all accessories.	 -20 °C to +55 °C 15 % rh to 95 % rh, no condensation 540 hPa to 1100 hPa -500 m to 5000 m

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Specification	Device
Storage/transport (see "15 Storage", page 354): • Temperature range • Humidity • Air pressure • Altitude above mean sea level Unless stated otherwise, these conditions also apply to all components and all accessories.	 -40 °C to +70 °C 15 % rh to 95 % rh, no condensation 540 hPa to 1100 hPa -500 m to 5000 m
Electrical connection (rated voltage)	12 V to 15.1 V
Max. power consumption	30 W
Disconnection from line power	Pulling out the power plug disconnects the device from line power on all poles.
Operation with on-board power supply: • Rated voltage • Max. internal resistance of on-board power supply • Maximum current consumption	 12 V 500 mΩ < 3 A
Operating mode	Continuous duty
Classification acc. to EN 60601-1: • Type of protection against elec. shock • Degree of protection against elec. shock (pulse oximetry sensor) • Degree of protection against elec. shock (ECG electrodes) • Degree of protection against elec. shock (defibrillation electrodes/ paddles) • Degree of protection against elec. shock (NIBP cuff)	 Protection class II Degree of protection BF - defibrillation-proof Degree of protection CF - defibrillation-proof Degree of protection BF - defibrillation-proof Degree of protection BF - defibrillation-proof
Degree of protection against • Ingress of solid objects • Ingress of dust • Ingress of water with harmful effect	 IP55: Protected against dust and water jets
Mechanical resistance to falls	1 m
Electromagnetic compatibility (EMC) acc. to EN 60601-1-2: Radio interference suppression Radio interference immunity	Test parameters and limit values can be requested from the manufacturer WEINMANN Emergency if required. EN 55011 EN 61000-4 (parts 2 to 6, 8, and 11)

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Specification	Device
Electromagnetic compatibility (EMC) in accordance with EN 60601-12 and EUROCAE ED-14G (RTCA DO 160 G)	EUROCAE ED-14G (RTCA DO 160 G), Section 21, Category M EUROCAE ED-14G (RTCA DO 160 G), Section 20, Category T The device is not intended for connection to the power supply network in aircraft in accordance with RTCA DO 160 G.
Frequency band	WiFi: 2.4 GHz to 2.5 GHz Bluetooth® interface: 2.4 GHz to 2.4835 GHz
Transmission power	WiFi: maximum 18 dBm ± 1 dB Bluetooth® interface: maximum 7 dBm
Types of modulation of Bluetooth® interface	1 Mbps: GFSK (BDR) 2 Mbps: π/4-DQPSK (EDR) 3 Mbps: 8-DPSK (EDR)
Types of modulation of WiFi interface	Modulation 802.11b CCK and DSSS 802.11a/g/n OFDM
Display	5.7" TFT color display Resolution VGA 640 pixels x 480 pixels
Sound pressure level range for alarms	39 dBA to 83 dBA
Sound pressure level range for QRS beeps	35 dBA to 77 dBA
Sound pressure level range for pulse tones	43 dBA to 83 dBA
Mechanical resistance to shock and vibration	• EN 1789 • EN 60601-1-12 (Categories: Secured in a rescue vehicle, secured in an airplane, secured in a helicopter, portable at the site of the emergency) • EUROCAE ED-14G (RTCA DO 160 G) (Section 7 - Shock and Crash Cat. A; Section 8 - Vibration Fixed-Wing Airplanes Cat. S and Helicopters Cat. U2)
Type of emergency vehicle	Secured in rescue vehicle, airplane and helicopter as well as portable at the site of the emergency

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Specification	Device
Standards used	EN 60601-1 EN 60601-1-2 EN 60601-1-6 EN 60601-1-8 EN 60601-1-12 EN 60601-2-4 EN 60601-2-25 EN 60601-2-27 EN 60601-2-49 EN 80601-2-30 EN 80601-2-61 EN 1789 EUROCAE ED-14G (RTCA DO 160 G) MIL-STD 810 G
Resuscitation report	ERC 2015
Service life	10 years
CE marking	CE 0197
The right to make design modifications is reserved	

18.2 Defibrillation electrodes

Specification	Defibrillation electrodes
Conductive surface of the defibrillation electrodes	Per defibrillation electrode for adults: 86 cm^2 Per defibrillation electrode for children: 54 cm^2
Temperature range for storage	0 °C to 50 °C
Temperature range for operation	0 °C to 50 °C

18.3 Paddles

Specification	Paddles
Conductive surface of the paddles	Per paddle for adults: 75 cm^2 Per paddle for children: 19.6 cm^2
Temperature range for storage	-40 °C to +55 °C

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18.4 Master cable

Specification	Master cable
Service life	5000 connector/connection cycles

18.5 Battery

Specification	Battery
Type	Li-ion
Dimensions (W x H x D)	97 mm x 127 mm x 33 mm
Weight	450 g
Shock capacity (at 20 °C with new and fully charged battery)	350 shocks at 200 J
Monitoring capacity	Approx. 5 h
Battery operating time for resuscitation	4 h with shocks of 200 J
Rated capacity	4.2 Ah (45.6 Wh/46.4 Wh/46.8 Wh)
Rated voltage	10.8 V
Charging time (0 % to 90 %)	Approx. 3.5 h
Charging temperature	0 °C to +45 °C
Service life	At least 300 cycles or 2 years
Storage	Storage above 60 °C maximum 1 week

18.6 Power supply unit and charger

Specification	Power supply unit and charger
Manufacturer	PROTEK POWER
Type	PMP120F-13-K24
Operation: • Temperature range • Humidity • Air pressure • Altitude above mean sea level	 0 °C to +40 °C 5 % rh to 95 % rh, no condensation 700 hPa to 1100 hPa -500 m to 3000 m
Input current	1.4 A to 0.6 A
Input voltage	100 V-240 V~/50 Hz-60 Hz
Rated voltage output	15 V
Disconnection from line power	Pulling out the power plug disconnects the device from line power on all poles.

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18.7 Charging station

Specification	Charging station
Dimensions (W x H x D)	175 mm x 46 mm x 135 mm
Supply voltage	12 V to 15.1 V direct voltage
Weight	380 g (tare weight)
Operation: • Temperature range • Humidity	 0 °C to +45 °C 5 % rh to 95 % rh, no condensation
Storage: • Temperature range • Humidity	 -30 °C to +70 °C 5 % rh to 95 % rh, no condensation
Short circuit resistance	Yes
Connection to power supply network	• WEINMANN Emergency-specific plug connection • Hard-wired power connection on the rear of the charging station for on-board power supply
Electromagnetic compatibility (EMC) acc. to EN 60601-1-2: Radio interference suppression Radio interference immunity	RTCA DO 160 F EN 55011 EN 61000-4 (Parts 2 and 3) EN 1789
Degree of protection against ingress of drips	IPX1
Power consumption	Maximum 30 W, on standby maximum 0.4 W

18.8 Printer and printer paper

Specification	Printer and printer paper
Printer	
Manufacturer	Woosim Systems Inc.
Type	WSP-i350
Size	120 mm x 130.5 mm x 58.4 mm
Weight	424 g
Print method	Direct thermal printing
Resolution	203 dpi: 8 dots/mm
Bluetooth® interface	• Bluetooth® interface: Version 3.0 • Class: 2 • Frequency band: 2402 MHz to 2480 MHz
Range	1 m

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Specification	Printer and printer paper
Display	• LCD display with blue background illumination • Resolution 128 pixels x 32 pixels
Printer	
Degree of protection against • Ingress of solid objects • Ingress of dust • Ingress of water with harmful effect	IP54: Protected against dust and splashes
Mechanical resistance to falls	1.5 m
Operation: • Temperature range • Humidity	 -10 °C to +50 °C 30 % rh to 80 % rh, no condensation
Storage: • Temperature range • Humidity	 -10 °C to +70 °C 10 % rh to 90 % rh, no condensation
Printer battery	Li-ion Rechargeable 7.4 V DC 1800 mAh 13.32 Wh
Maximum printing time with printer battery	14 sessions (1 session: 60 min standby, 2 live printouts and 2 12-lead ECG printouts)
Power supply unit and charger for charging station for printer battery	• Input: 100 V-250 V~/50 Hz-60 Hz • Output: 8.4 V DC/0.8 A
Charging time, printer battery	4 h (fully charged)
Printer paper	
Printer paper	• Type of paper: Thermal paper • Paper width: 80 mm • Paper thickness: 60 ± 5 µm • Roll diameter: up to Ø 50 mm
Operation: • Temperature range • Humidity	 -10 °C to +50 °C 30 % rh to 80 % rh, no condensation
Transport < 48 h: • Temperature range • Humidity	 -10 °C to +50 °C 30 % rh to 80 % rh, no condensation
Storage > 48 h: • Temperature range • Humidity	 18 °C to 28 °C 40 % rh to 60 % rh, no condensation

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18.9 CARDIObiphasic defibrillation system

Specification	Defibrillation system
Operating mode	Semi-automatic (AED mode) Manual (manual mode)
Shock form	Biphasic, current-limited, impedance-compensated
Patient impedance: Maximum Minimum	 200 Ω 5 Ω
Shock sequence	Adjustable: Energy progression: • First shock: 1 J to 200 J • Further shocks: 1 J to 200 J
Analysis time	8 s under typical conditions
Duration of analysis and shock charging in AED mode: With fully charged source of energy After 15 discharges After 6 discharges	 8 s to 15 s 8 s to 15 s 8 s to 15 s
Duration of switching on device, analysis, and shock charging in AED mode: With fully charged source of energy After 15 discharges After 6 discharges	 < 25 s < 25 s < 25 s
CPR phase adjustable	120 s to 300 s
Energy level adjustable	1 J to 200 J (see "18.18 The CARDIObiphasic shock pulse", page 386)
Duration of shock charging in manual mode	2 s to 9 s (depending on the selected shock energy)
Impedance compensation	Yes
Defibrillator voltage	2 kV
Recovery time for derivation of defibrillation electrodes after a defibrillation shock	5 s
Analysis unit	Shock capacitor charging is canceled in AED mode if a shockable signal was detected during the analysis, but a non-shockable signal is detected during subsequent charging.

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18.10 6-lead ECG monitoring/12-lead ECG recording and assessment

Specification	6-lead ECG monitoring/12-lead ECG recording and assessment
Maximum patient impedance	500 kΩ
Detected heart rate (with ECG derivation via ECG cable or derivation via defibrillation electrodes)	30 bpm to 250 bpm
Suitability for direct use on the heart	Type CF
Displayed heart rates with pacemaker pulses (with ECG derivation via ECG cable)	If pacemaker pulses are detected, "-" is displayed instead of the heart rate.
Pacemaker pulses detected by the device: Amplitude Pulse width Overshoots	 2 mV to 700 mV 0.5 ms to 2 ms Detectable at the quoted amplitude and pulse width in lead I. Pacemaker pulse marking displayed in all ECG leads.
Device operating mode in the event of a power supply interruption < 30 s	The device saves all user settings and restores them when the device is restarted.
Detection of detached electrodes	Yes
Noise suppression	Yes
Respiration detection	No
Max. T wave suppression	0.9 mV
Delay time between R wave detection and shock delivery	< 60 ms (measured with Fluke Impulse 7000DP)
Detection range for R wave detection	30 bpm to 180 bpm 0.5 mV to 4.5 mV
Heart rate averaging	The mean heart rate is obtained by averaging up to 7 heartbeat intervals, updated with every heartbeat or at least every second.
Heart rate accuracy (handling irregular cardiac rhythms)	All complexes are detected. The heart rate display is between the shortest and the longest RR interval detected.
Inputs and input impedance	< 2.5 MΩ
Alarm time for tachycardia (acc. to 60601-2-27)	• Signal B1: 1 mV, 206/min: 11 s • Signal B1: 0.5 mV, 206/min: 11 s • Signal B1: 2 mV, 206/min: 10 s • Signal B2: 2 mV, 195/min: 9 s • Signal B2: 1 mV, 195/min: 9 s • Signal B2: 4 mV, 195/min: 8 s

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Specification	6-lead ECG monitoring/12-lead ECG recording and assessment
Response time of heart rate display: Steep rise Steep drop	 80/min to 120/min: 4.5 s 80/min to 40/min: 8 s
Displayed heart rate for varying ECG complexes according to 60601-2-27, Section 201.7.9.2.9.101	• Signal A1: 40/min • Signal A2: 30/min • Signal A3: 60/min • Signal A4: 70/min to 95/min
Recovery time after a defibrillation shock	3 s
Band width: ECG in monitor mode ECG in 12-lead ECG function mode	 0.03 Hz to 150 Hz (ECG leads I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6) 0.34 Hz to 45 Hz (Pad ECG lead) 0.03 Hz to 50 Hz or 0.03 Hz to 150 Hz for all ECG leads displayed (depending on setting in user menu)
Protection against malfunction caused by electrosurgery	Yes
Leakage currents	Leakage currents may add up.
Feed rate of ECG curve (display and printout)	6-lead ECG: 12.5 mm/s, 25 mm/s, 50 mm/s 12-lead ECG: 25 mm/s, 50 mm/s

18.11 CARDIOlogic ECG analysis system

Specification	ECG analysis system
Analysis time (VF/VT)	• Duration of analysis in AED mode: 8 s under typical conditions • Duration of analysis for VF/VT alarm: 8 s with continuous measurement
ECG derivation used for analysis	Lead II of the defibrillation electrodes is primarily used for analysis. If the defibrillation electrodes are not connected, lead II of the ECG electrodes is used.
Impedance measurement	Checks electrode contact
Response to implanted cardiac pacemakers	Pulses from implanted pacemakers may affect or prevent correct detection of arrhythmia. As a result, not all rhythms which can be defibrillated may be detected, and the device may not recommend shock delivery under certain circumstances.
Asystole threshold	0.2 mV

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The performance of the rhythm detector was validated with a representative cross-section of ECG data from the following databases:

- Creighton University Ventricular Tachyarrhythmia Database
- American Heart Association ECG Database
- MIT-BIH Malignant Ventricular Arrhythmia Database

Effectiveness results are shown in the tables below:

Rhythms	**Scope of sample**	**Objectives for effectiveness**	**Sensitivity in %**	**Specificity in %**
Shockable				
Coarse VF (Amplitude > 0.35 mV)	944	> 90 %	98.31 %	-
Rapid VT (f > 180/min)	252	> 75 %	94.05 %	-
Non-shockable				
Non-shockable rhythms	3070	> 99 %	-	99.64 %

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These parameters were determined on the basis of the following data:

	Shockable signals	**Non-shockable rhythms (normal sinus rhythm (NSR), supraventricular tachycardia (SVT), atrial fibrillation/flutter (AF), ventricular extrasystoles (PVC), pacemaker ECG)**
Shock	1165 (A)	11 (B)
No shock	31 (C)	3059 (D)

A = Number of correct positive decisions

B = Number of false positive decisions

C = Number of false negative decisions

D = Number of correct negative decisions

This results in the following values:

	Formula for the calculation	**Calculation**	**Result**
Sensitivity	$\frac{A}{A + C}$	$\frac{1165}{1165 + 31}$	97.41 %
Specificity	$\frac{D}{B + D}$	$\frac{3059}{11 + 3059}$	99.64 %
Precision	$\frac{A + D}{A + B + C + D}$	$\frac{1165 + 3059}{1165 + 11 + 31 + 3059}$	99.02 %
False positive rate	$\frac{B}{B + D}$	$\frac{11}{11 + 3059}$	0.36 %
True forecast value	$\frac{A}{A + B}$	$\frac{1165}{1165 + 11}$	99.06 %

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18.12 Pulse oximetry monitoring

The statistical distribution of the measured values of pulse oximetry sensors means that an average of two-thirds of all measurements are within the $\pm A_{rms}$ value of CO-oximeters as a reference method (see table). To determine bpm accuracy, comparative measurements were carried out with an original sensor and original monitor.

Specification	**Pulse oximetry**
SpO_2 display range	45 % to 100 %
Accuracy (for all the pulse oximetry sensors quoted in these instructions for use)	70 % to 100 %: ≤ 2 % 45 % to 70 %: Not specified
Signal quality display	Alarm output if SpO_2 signal quality is < 40 %
Pulse rate	30 bpm to 300 bpm ± 3 bpm at SpO_2 > 45 %
Reference methods for determining accuracy of pulse rate	Oxitest simulator testing
Wavelengths at maximum intensity	660 nm/890 nm (2.5 mW to 4.5 mW)
Curve form	Normalized
Feed rate for plethysmogram (display and printout)	12.5 mm/s 25 mm/s 50 mm/s
Update rate of SpO_2 mean	8 s (It may take up to 16 s for the correct SpO_2 value to be displayed.)
Averaging	12 s
Delay in data updating	500 ms
Delay in alarm condition	20 s
Delay in alarm generation	< 1 s
Functional oxygen saturation	The pulse oximetry sensor is calibrated to display functional oxygen saturation, and must not be calibrated with a function tester.
Biocompatibility	• The pulse oximetry sensor is latex-free. No material used in its production contains latex protein. The materials with which the patient comes into contact have undergone extensive biocompatibility tests. Further information is available on request. • Acc. to EN ISO 10993-10

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18.13 Non-invasive blood pressure measurement (NIBP monitoring)

Specification	Non-invasive blood pressure measurement
Manufacturer	SunTech Medical
Measuring method	Oscillometric, diastolic values correspond to phase 5 Korotkoff sounds
Measurement range (systolic): • Adults • Children • Infants	 40 mmHg to 260 mmHg 40 mmHg to 230 mmHg 40 mmHg to 130 mmHg
Measurement range (diastolic): • Adults • Children • Infants	 20 mmHg to 200 mmHg 20 mmHg to 160 mmHg 20 mmHg to 100 mmHg
Accuracy (during operation between 0 °C and 50 °C)	±3 mmHg

18.14 Operation/data management

Specification	Operation/data management
Display	• Illuminated symbols • Device status indicators
Audio output	• Voice prompts • Alarm tones • Audible signals
Session documentation	Automatic recording of measured values for ECG, SpO_2 and NIBP and of event data
Data transmission via SD card	SD card with 32 GB
Data transmission via WiFi	• Data transfer types: 12-lead ECG, function check results, session data, service data • WiFi: 802.11a/b/g/n • Security: WPA2-PSK • Protocol: https • Port: 443
Data transmission via Bluetooth® interface	Data transfer type: Session data
Data evaluation	Via DEFIview PC software

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18.15 Alarm delay times

Alarm	Delay time
Battery defective	10.0 s
Insert battery	10.0 s
Asystole • Patient is connected with this condition • Patient already connected	 9.6 s 8.5 s
ECG module defective	10.0 s
Heart rate ↑ (with derivation via defibrillation electrodes) • Patient is connected with this condition • Patient already connected	 3.0 s 1.7 s
Heart rate ↓ (with derivation via defibrillation electrodes) • Patient is connected with this condition • Patient already connected	 9.7 s 6.0 s
Heart rate ↑ (with derivation via ECG electrodes) • Patient is connected with this condition • Patient already connected	 8.0 s 2.0 s
Heart rate ↓ (with derivation via ECG electrodes) • Patient is connected with this condition • Patient already connected	 14.9 s 5.0 s
Pulse rate ↑	10.0 s
Pulse rate ↓	10.0 s
SpO_2 saturation ↑	10.0 s
SpO_2 saturation ↓	10.0 s
VF/VT • Patient is connected with this condition • Patient already connected	 11.3 s 5.3 s

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18.16 Saving of session data

Storage medium	Memory hours assuming typical use
Internal device memory (100 MB)*	9 h 30 min
SD card WM 39510 (32 GB)*	1675 h

* Since different curve forms can be compressed to differing degrees, the actual number of storage hours may deviate. The data are typical values.

18.17 Electromagnetic compatibility (EMC)

Medical electrical equipment is subject to special precautions in relation to electromagnetic compatibility (EMC). It must be installed and put into operation in accordance with the EMC information contained in the accompanying documentation.

In addition to the performance defined in the standard, this device has the following essential performance:

- Delivery of a current pulse for defibrillation and cardioversion
- Distinction between cardiac rhythms to be defibrillated and not to be defibrillated
- Display of electrocardiogram (ECG)
- Display of plethysmogram and hemoglobin oxygen saturation (SpO_2)
- Display of systolic and diastolic arterial blood pressure (NIBP)

⚠ WARNING

Delay in treatment due to power supply network disruption!
Disruptions to the power supply network may cause visible disruptions to the ECG. This may lead to incorrect measurement results and alarms and in AED mode, lead to shock delivery at the wrong time. This may delay therapy and injure the patient.
⇒ If there is major disruption to the power supply network, only operate the device with a battery.

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⚠ WARNING

Risk of injury from overly powerful high-frequency interference signals or electromagnetic fields!

Overly strong high-frequency interference signals from portable high-frequency communications equipment (e.g. radios) or electromagnetic fields may lead to incorrect analysis, incorrect measurement results, and incorrect alarms, and thus impair the functioning of the device and injure the patient.

⇒ Maintain separation distances.

⇒ With portable high-frequency communications devices, maintain a minimum distance of 30 cm from the device, components, and accessories.

Recommended separation distances between portable and mobile HF telecommunications devices and MEDUCORE Standard^2

MEDUCORE Standard^2 is intended for use in an electromagnetic environment in which HF interference variables are controlled. The customer or user of the MEDUCORE Standard^2 can avoid electromagnetic interference by maintaining a minimum distance between portable and mobile HF telecommunications equipment (transmitters) and MEDUCORE Standard^2 (depending on the output power of the HF telecommunications equipment, see below).

Rated power of HF device in W	Separation distance depending on transmission frequency in m			
	150 kHz - 80 MHz	150 kHz - 80 MHz in the ISM bands	When used as a monitor	
			80 MHz - 800 MHz	800 MHz - 2.5 GHz
0.01	0.12	0.12	0.4	0.77
0.1	0.38	0.38	1.3	2.4
1	1.2	1.2	4	7.7
10	3.8	3.8	13	24
100	12	12	40	77

Recommended separation distances between portable and mobile HF telecommunications devices and MEDUCORE Standard^2

Rated power of HF device in W	Separation distance depending on transmission frequency in m			
	When used as a defibrillator		Defibrillator: No unintended energy delivery	
	150 kHz - 80 MHz	150 kHz - 80 MHz in the ISM bands	80 MHz - 800 MHz	800 MHz - 2.5 GHz
0.01	0.12	0.27	0.06	0.12
0.1	0.38	0.66	0.15	0.38
1	1.2	2.7	0.6	1.2
10	3.8	6.6	1.5	3.8
100	12	27	6	12

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Electromagnetic emission

Electromagnetic emission		
MEDUCORE Standard^2 is designed for operation in the electromagnetic environment described below. The operator or the user must ensure that he or she operates MEDUCORE Standard^2 in an environment of this kind.		
Emission measurements	**Compliance**	**Electromagnetic environment guidelines**
HF emissions according to CISPR 11	Group 1	MEDUCORE Standard^2 uses high-frequency energy exclusively for internal functions. As the high-frequency emission is very low, interference with electronic devices in the vicinity from MEDUCORE Standard^2 is unlikely.
	Class B	MEDUCORE Standard^2 is suitable for use in the following areas: • In all facilities, including those in residential settings which are connected directly to a public power supply network • In automobiles, airplanes and ships

Electromagnetic immunity

Electromagnetic immunity		
MEDUCORE Standard^2 is designed for operation in the electromagnetic environment described below. The operator or the user must ensure that he or she operates MEDUCORE Standard^2 in an environment of this kind.		
Interference immunity tests	**IEC 60601 test level**	**Compliance level**
Electrostatic discharge (ESD) acc. to IEC 61000-4-2	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air	± 8 kV contact ± 2 kV, ± 4 kV, ± 8 kV, ± 15 kV air
Radiated HF interference acc. to IEC 61000-4-3	20 V/m 80 MHz to 2.7 GHz	20 V/m
Rapid transients/bursts acc. to IEC 61000-4-4	± 2 kV 100 kHz spike frequency	± 2 kV 100 kHz spike frequency
Surges acc. to IEC 61000-4-5	± 0.5 kV, ± 1 kV conductor/ conductor ± 0.5 kV, ± 1 kV, ± 2 kV conductor/ground	± 0.5 kV, ± 1 kV conductor/ conductor ± 0.5 kV, ± 1 kV, ± 2 kV conductor/ground

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Electromagnetic immunity		
Conducted interference induced by high-frequency fields acc. to IEC 61000-4-6	3 V 0.15 MHz to 80 MHz 6 V in the ISM bands between 0.15 MHz and 80 MHz 80 % AM at 1 kHz	3 V 0.15 MHz to 80 MHz 6 V in the ISM bands between 0.15 MHz and 80 MHz 80 % AM at 1 kHz
Voltage dips, short interruptions and voltage fluctuations acc. to IEC 61000-4-11	0 % U_T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % U_T; 1 cycle and 70 % U_T; 25/30 cycles Single phase at 0° 0 % U_T; 250/300 cycles	0 % U_T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0 % U_T; 1 cycle and 70 % U_T; 25/30 cycles Single phase at 0° 0 % U_T; 250/300 cycles

Mobile HF communications equipment

Mobile HF communications equipment						
Test frequency in MHz	**Frequency band in MHz [a)]**	**Radio service [a)]**	**Modulation [a)]**	**Maximum power output in W**	**Distance in m**	**Interference immunity test level in V/m**
385	380 to 390	TETRA 400	Pulse modulation [b)] 18 Hz	1.8	0.3	27
450	430 to 470	GMRS 460 FRS460	FM [c)] ± 5 kHz deviation 1 kHz sine	2	0.3	28
810 870 930	800 to 960	GSM 800/900 TETRA 800 iDEN 820 CDMA 850 LTE Band 5	Pulse modulation [b)] 18 Hz	2	0.3	28
1720 1845 1970	1700 to 1900	GSM 1800 CDMA 1900 GSM 1900 DECT LTE Band 1, 3, 4, 25 UMTS	Pulse modulation [b)] 217 Hz	2	0.3	28

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Mobile HF communications equipment						
Test frequency in MHz	**Frequency band in MHz [a)]**	**Radio service [a)]**	**Modulation [a)]**	**Maximum power output in W**	**Distance in m**	**Interference immunity test level in V/m**
2450	2400 to 2570	Bluetooth® WiFi 802.11 b/g/n RFID 2450 LTE Band 7	Pulse modulation [b)] 217 Hz	2	0.3	28
5240	5100 to 5800	WiFi 802.11 a/n	Pulse modulation [b)] 217 Hz	0.2	0.3	9
5500						
5785						
Note: If necessary, the distance between the transmitting antenna and MEDUCORE Standard^2 can be reduced to 1 meter to achieve the interference immunity test level. The 1 meter test distance is permitted according to IEC 67000-4-3.						
[a)] For some radio services, only the frequencies for the uplink have been included in the table. [b)] The HF carrier must be modulated with a square wave with a 50 % signal ratio. [c)] As an alternative to frequency modulation (FM), pulse-width modulation with a 50 % signal ratio at 18 Hz can be used, as this would represent the worst-case scenario even if it is not the actual modulation.						

Further technical data can be obtained from the manufacturer WEINMANN Emergency on request.

18.18 The CARDIObiphasic shock pulse

A characteristic of the CARDIObiphasic shock pulse is that it limits the maximum current. This greatly reduces the risk of myocardial damage, which is mainly caused by excessively high electric currents, especially where patient impedance is low.

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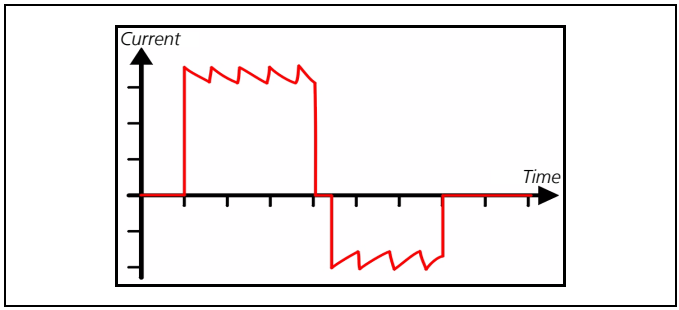
18.18.1 Functional principle

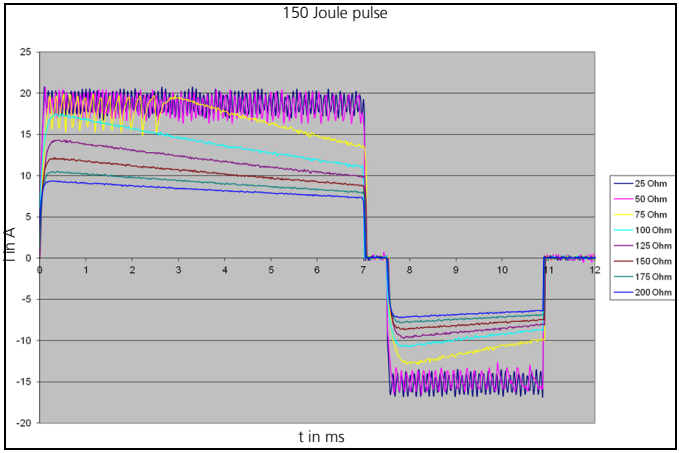
A setpoint controls the delivered current, producing a sawtooth-shaped pulse.



18-1 Basic shape of the CARDIObiphasic shock pulse

The mean ratio of electric charge delivered between the second (negative) and the first (positive) phase is 0.38.

For safety reasons, voltages of no higher than 2000 V are used. The resulting currents as a function of patient impedance are shown in the following graph by way of example.



18-2 Currents as a function of patient impedance

18.18.2 Accuracy of the delivered energies

The shock pulse is generated on a current-controlled basis (I = const.) and for a fixed duration (t = const.). Patient impedance is the only variable. The shock pulse energy is the result of current, pulse duration and patient impedance. Since current and pulse duration are specified, the shock pulse can be individually adapted for each patient.

The current control of the shock pulse ensures that patients with low impedance receive the same current as patients with high impedance since it is not energy but current which is key for defibrillation. Furthermore, current control prevents patients with a low patient impedance from being shocked with an overly high current.

Due to current control and the dependency on patient impedance of the energy delivered, it is possible that the energy delivered will deviate from the selected energy (see table below):

Selected energy in J	**Energy delivered as a function of patient impedance***								**Accuracy of energy delivered**
	Patient impedance in Ω								
	25	**50**	**75**	**100**	**125**	**150**	**175**	**200**	
1	0.4	1	2.5	2.4	2	1.8	1.7	1.6	±3 J
5	2.6	5.4	7.8	6.8	6	5.4	4.9	4.4	±3 J
10	5.2	10.8	13.2	11.6	10.2	9.3	8.4	7.6	±3 J
15	7.8	15.7	20.4	18.4	16.5	15.3	13.6	12.4	±3 J
20	10.2	19.9	25.6	23.4	21	19.2	17.5	16	±15 %
30	15.4	30.2	42.1	40.2	36.7	33.9	31.1	28.8	±15 %
40	19.8	39	51.4	49.8	46	42.3	38.8	36.4	±15 %
50	26	50.2	72.1	72	65.7	60.3	55.6	51.6	±15 %
75	38.4	73.8	106.6	107.7	100.7	92.9	86	79.9	±15 %
100	53	102	135.6	134.1	123.2	113.3	104.9	96.3	±15 %
120	63.6	122.3	153.7	148.3	137.2	127.1	116.8	107.9	±15 %
150	79.6	152	181.7	170.9	157.7	146.3	134.7	126.7	±15 %
200	128.9	201.2	211.6	208.3	205.6	196	187.5	179.5	±15 %

*Selected energy differs from delivered energy due to the laws of physics. Delivered energy depends on patient impedance (see also IEC 60601-2-4:2010 Chapter 201.12.1 and Annex AA).

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19 Labeling

Symbol	Description
	Article no.
 SN	Serial number
	Production batch number
	Unique Device Identifier (UDI): Allows individual products to be uniquely identified in the market
	Medical device
	Manufacturer
	Date of manufacture
	Follow instructions for use
	Follow instructions for use
	Attention
  CE 0197	CE mark (confirms that the product complies with the applicable European directives)
	FCC mark (confirms that the product has a market license in the USA for devices with wireless technologies)
	KC mark (confirms that the product complies with applicable South Korean directives)

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Symbol	Description
	China RoHS label (confirms that the product does not emit toxic substances for the number of years indicated)
	
	Safety check label (STK, only applies to Germany): Indicates when the next Technical Safety Check ("Sicherheitstechnische Kontrolle" in accordance with § 11 of the German regulation MPBetreibV) is required.
	Metrological check label (only applies to Germany): Indicates when the next metrological check in accordance with § 14 of the MPBetreibV is required.
	Disposable item, do not reuse
	Storage temperature range limits
	Storage humidity range limits
	Air pressure range limits
	Keep dry
	Fragile
	Expiry date
	Latex-free
	Non-sterile
	Do not dispose of in household waste
	Defibrillation-proof Type BF applied part
	Defibrillation-proof Type CF applied part

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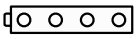
Symbol	Description
	Direct voltage
	Type of protection against electric shock: Protection class II device
IP55	Degree of protection against • Ingress of solid objects • Ingress of dust • Ingress of water with harmful effect
IPX1	
IPX7	Degree of protection against temporary immersion in water
IPX2	Degree of protection against water dripping at an angle, 15° relative to the normal operating position
	Input voltage
	Output voltage
	Input (12 V - 15.1 V, 30 W)
	Input voltage (12 V - 15.1 V)
	Line power indicator: The LED comes on when the charging station is connected to line power.
	Battery fault, if red fault indicator on
	Battery status
	Audibly engage battery
Pad	Connection for master cable
SpO2	Connection for pulse oximetry sensor connecting cable
ECG	Connection for ECG cable
NIBP	Connection for NIBP cuff connector tube
E_{max} = 200 J	Maximum energy delivered

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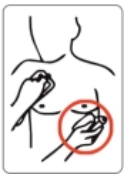
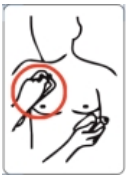
Symbol	Description
	Marks the button which can be used to charge the shock capacitor.
	Marks the two buttons which have to be pressed simultaneously for shock delivery.
APEX 	Marks the paddle which has to be held at the apex position.
STERNUM 	Marks the paddle which has to be held at the sternum position.
	On/Off button
For other labeling, see the following instructions for use: • Defibrillation electrodes • ECG electrodes • NIBP cuffs	

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20 Warranty

Starting from the date of purchase, WEINMANN Emergency offers the customer a limited manufacturer's warranty on a new original WEINMANN Emergency product or spare part installed by WEINMANN Emergency in accordance with applicable warranty terms and conditions for the particular product and the warranty periods listed below. The warranty terms and conditions are available on the Internet at www.weinmann-emergency.com. On request, we will also send you the warranty terms and conditions.

If you wish to make a warranty claim, consult your authorized dealer.

Product	**Warranty periods**
WEINMANN Emergency devices, including accessories (excluding masks) for oxygen therapy and emergency medicine	2 years
Masks including accessories, batteries (unless otherwise stated in the technical documentation), sensors, breathing circuits	6 months
Disposable products	None

21 EC Declaration of Conformity on Medical Devices

WEINMANN Emergency Medical Technology GmbH + Co. KG hereby declares that the product complies fully with the respective regulations of the Medical Device Directive 93/42/EEC. The unabridged text of the EC Declaration of Conformity on Medical Devices can be found on our website at www.weinmann-emergency.com.

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