MEDUCORE Standard^2

Monitor/Defibrillator

Instructions for Use for Devices from Software Version 1.1

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1 Introduction

1.1 Intended use

MEDUCORE Standard^2 is a mobile external defibrillator with monitoring functions. It is used to measure and monitor vital parameters and for defibrillation of emergency patients.

The following monitoring and diagnostic functions are available:

- 6-lead monitoring ECG
- Pulse oximetry
- Non-invasive blood pressure measurement

The following therapy functions are available:

- Manual defibrillation
- Semi-automatic defibrillation (from age 1)

1.2 Function

The device offers the following monitoring and diagnostic functions:

- 6-lead monitoring ECG: The electrical activity of the heart is derived and shown on the display. This allows the user to interpret cardiac rhythms and the heart rate. The 6-lead monitoring ECG does this by deriving the standard (Einthoven) limb leads (I, II, III) and augmented (Goldberger) limb leads (aVR, aVL, aVF) and displaying them in the curve view.

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- Pulse oximetry: Pulse oximetry monitoring allows continuous, non-invasive measurement of the arterial oxygen saturation with the aid of different pulse oximetry sensors for different application sites. At the same time, a photo sensor 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 the pulse rate. The values for SpO_2 and pulse rate are shown on the display numerically, the plethysmogram in the form of a curve.
- Non-invasive blood pressure (NIBP) monitoring: NIBP monitoring allows measurement of blood pressure on a limb in adults, children, and infants. Safety and effectiveness have not been proven in pregnant women. Effectiveness in neonates (up to 28 days) has not been proven for arrhythmias. Measurement is based on oscillometric blood pressure measurement technology. Following performance of the measurement, the systolic and diastolic blood pressures in mmHg are shown numerically on the display.

The device offers the following therapy functions:

- Manual defibrillation: Based on the information of the displayed ECG, the user decides whether it is necessary to administer a shock. If a shock is necessary, the user can select the shock energy, charge the device for shock delivery, and deliver the shock manually.
- Semi-automatic defibrillation (for patients aged 1 and upwards): In the 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 performs an ECG analysis and, if necessary, charges for electric shock delivery. The shock is administered manually by the user.

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1.3 Operator/user qualification

MEDUCORE Standard^2 must only be used by persons who can verify that they have the following qualifications:

- Medical qualification, including training in cardiac life support
- Training in advanced methods of treating emergency patients using the manual mode (see "5.5.2 Manual defibrillation (only with Manual defibrillation option)", page 86).

As the operator or user, you must be fully familiar with the operation of this medical device. Follow the statutory requirements for operation and use (in Germany, particularly the German regulations governing owners/operators of medical devices (Medizinprodukte-Betreiberverordnung)). General recommendation: You should seek instruction on the correct handling, use and operation of this medical device from a person authorized by WEINMANN Emergency.

1.4 Contraindications for defibrillation

Defibrillation must only be performed in cases of:

- Ventricular fibrillation (VF)
- Pulseless ventricular tachycardia (VT)

Contraindications include:

- The patient is responsive
- The patient is breathing normally
- ECG is showing asystole

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1.5 Side effects

Possible side-effects of defibrillation are:

- Burns
- Arrhythmias triggered by defibrillation
- Ventricular fibrillation
- Failure of active implants
- Skin irritations
- Failure of external diagnostic or therapy devices

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2 Safety

2.1 Safety information

Read these Instructions for Use carefully. They form part of the devices described, and must be available at all times.

Only use the device for the intended use (see "1.1 Intended use", page 6).

For your own safety and that of your patients, and in accordance with the requirements of Directive 93/42/EEC, please observe the following safety instructions.

2.1.1 Qualification

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

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

⇒ Only use the device if the user has a medical qualification and is familiar with defibrillation and the operation of the device.

⇒ Follow the defibrillation guidelines.

⇒ Observe national and regional provisions and organizational defibrillation guidelines.

2.1.2 How to use the device

Warning **Risk of injury if the device is used in damp or electrically conductive surroundings!**

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

⇒ Only use the device in a dry place.

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

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

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Risk of injury due to device or component malfunction!
A damaged device or damaged components may result in injury to the patient, user or bystanders.
⇒ Only operate the device and components if they are externally undamaged.
⇒ Only operate the device and components if the function check has been successfully completed.
⇒ Do not leave device and patient unsupervised.
⇒ In the event of device failure during resuscitation: Perform cardiopulmonary resuscitation in line with the applicable resuscitation guidelines and obtain a replacement device.
⇒ In the event of device failure during monitoring: Monitor patient by monitoring breathing and taking pulse and obtain a replacement device if required.

Risk of injury due to concealed alarm!
A concealed alarm light, loudspeaker and/or display will prevent the user from noticing any alarms and reacting to dangerous situations. This may result in injury to the patient.
⇒ Always keep the alarm (alarm light, loudspeaker and display) free.
⇒ Do not operate the device in a closed bag if the alarms are then concealed.

Risk of injury due to inaccessible device!
During use, the device requires the intervention of the user. An inaccessible device may delay treatment and result in injury to the patient.
⇒ Keep the device accessible at all times.
⇒ Position the device so that display and alarms are clearly visible during use.

Risk of injury due to alarm limits which are too high or too low!
Alarm limits which are either too high or too low can prevent the device from emitting 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 can result in incorrect settings in the user menu or too limited/too comprehensive device functions. This can cause critical operating situations and injure the patient.

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⇒ The operator menu should only be used by operators who are familiar with the settings in the operator menu and their impacts 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 password.

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

Use of the device, accessories and components outside of the prescribed ambient conditions may mean that tolerances are not adhered to and result in device failure and injury to the patient.

⇒ Only operate the device within the prescribed ambient conditions (see "15 Technical data", page 175).
⇒ Allow the device, components and accessories to acclimatize to the operating temperature.

Risk of injury due to reuse of disposable items!

Disposable items are intended for single use. Disposable items which are reused may be contaminated and/or impaired in their function and therefore cause injury to the patient.

⇒ Do not reuse disposable items.

Risk of injury from using third-party accessories!

Accessories which have not been approved by WEINMANN Emergency can result in electric shocks, incorrect monitoring, negative impact on interference immunity and emission or lead to damage to the device and injure the patient.

⇒ Only use accessories which have been approved by WEINMANN Emergency.

Delay in treatment due to overly loud audio outputs!

When the defibrillator is used in conjunction with devices with audio outputs (e.g. audible alarms, voice prompts), overly loud audio outputs from one device can drown out the audio outputs from the other device, and thus delay treatment.

⇒ When using multiple devices with audio outputs 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 can result in treatment delays and thus to injury to the patient.

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

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⇒ Do not stack devices.

Notice **Damage to the device caused by ingress of liquids!**
The device is only protected from water jets as per IP55 when the battery is inserted and the water jet protection of the SD card slot is closed. Ingress of liquids and dust may damage the device, components, and accessories.
⇒ Do not immerse the device, components, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.

2.1.3 Power supply

Warning **Risk of injury due to electric shock when the device is opened!**
The device has a capacitor for shock energy. Opening the device may result in electric shock and injure people.
⇒ Do not open the device.
⇒ The device should only be opened by WEINMANN Emergency or persons 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 the latter.

Risk of injury due to electric shock when connecting an incorrect power supply unit and charger to the 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 ECG filter not being correctly adapted to the regional supply system!
An ECG filter which is not correctly adapted to the regional power supply network can impair the ECG display and cause the device to recommend a shock at the wrong point in time. This may result in serious injury to the patient.
⇒ Adapt the ECG filter to the regional power supply network.

Risk of injury due to missing, discharged, or defective battery!
A missing, discharged or defective battery prevents treatment functions.
⇒ Perform a function check before each use in order to check the battery.

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⇒ Always have a charged, ready-to-use spare battery on hand.

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 can injure the user or the patient.

⇒ Do not touch the contacts in the battery compartment and the patient at the same time.

Risk of injury due to trailing power cord!

A trailing power cord is a trip hazard, which may cause injury and hinder operation of the device being used.

⇒ During line operation, 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 due to inaccessible power plug!

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

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

Notice

Damage to the device caused by removal of the battery during shock delivery!

Removal of the battery during shock delivery can cause damage to the device.

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

Material damage due to prolonged storage of the battery without recharging!

Storing the battery for a prolonged period of time without recharging can 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 "13.3 Storing the battery", page 173).

⇒ If the battery is not stored in the device: Charge battery every 5 months (see "13.3 Storing the battery", page 173).

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2.1.4 Defibrillation

Warning **Risk of injury due to sparks during defibrillation in the presence of oxygen and combustible materials!**

During defibrillation in an oxygen-enriched atmosphere and in the presence of combustible materials (e.g. textiles), sparks generated by defibrillation may cause explosion and fire, which may result in injury to 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 m away from the patient during defibrillation, and ensure that the oxygen/air mixture flows away from the torso.

⇒ When treating patients with a resuscitator: Leave the resuscitator securely in place on the patient tube or place it at least 1 m away from the patient, and ensure that the oxygen/air mixture flows away from the torso.

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

⇒ When performing defibrillation in tight spaces with an oxygen-enriched atmosphere, ensure that there is adequate ventilation.

Risk of injury due to missing battery in the AED mode and in manual mode!

Without a battery, the capacitor for shock energy in the device cannot charge. This prevents defibrillation and delays treatment.

⇒ Insert a battery when using the AED mode or manual mode.

⇒ When using the AED mode or manual mode: Do not remove the battery.

Risk of injury due to sparks during defibrillation in the presence of flammable gases!

During defibrillation in the presence of flammable gases, sparks may cause explosion, which may result in injury to the patient, user or bystanders.

⇒ Do not use the device in the presence of flammable gases.

Risk of injury due to incorrect operation of the device!

Performing defibrillation on patients who are responding normally, breathing normally or have a non-defibrillatable cardiac rhythm will result in injury to the patient.

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⇒ Only perform defibrillation on patients who are not responding normally, are not breathing normally and have a defibrillatable cardiac rhythm.

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 the AED mode on children below one year of age.

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

Incorrect settings in the operator menu can result in undesirable effects during resuscitation as well as injury to 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 distort the ECG. They may result in the user or the device incorrectly interpreting the ECG, and delay treatment.

During cardiac rhythm analysis:

⇒ Place the patient in a resting position.

⇒ Stand clear of the patient.

⇒ Do not resuscitate the patient.

⇒ Do not ventilate the patient.

⇒ Do not transport the patient.

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

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

⇒ Select the correct size of defibrillation electrodes pursuant to the resuscitation guidelines and not based on the weight specifications given on the packaging.

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

Incorrectly placed defibrillation electrodes may distort the ECG and result in the user delivering an unnecessary shock, not delivering a necessary shock or unsuccessful defibrillation on the basis of the interpretation of an incorrect ECG.

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⇒ Place the defibrillation electrodes correctly as per the Instructions for Use.
⇒ Always place defibrillation electrodes together on only one person.
⇒ Prevent the defibrillation electrodes from being touched.
⇒ 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 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.
⇒ Remove hair in hirsute patients.
⇒ Rub the patient's skin dry.
⇒ Firmly press on the defibrillation electrodes.

Risk of injury due to non-functional defibrillation electrodes!

Non-functional defibrillation electrodes may result in injury and unsuccessful defibrillation.
⇒ Only use defibrillation electrodes with undamaged packaging.
⇒ Do not use defibrillation electrodes with a dry gel layer, 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 and delay in treatment due to implanted cardiac pacemakers!

Impulses from implanted cardiac pacemakers may affect the detection of defibrillatable cardiac rhythms, and delay treatment. Performing defibrillation on patients with implanted cardiac pacemakers may irreversibly damage the myocardium.
⇒ Position defibrillation electrodes at least 8 cm away from cardiac pacemakers.
⇒ Choose alternative positions (e.g. anterior-lateral, anterior-posterior) for the defibrillation electrodes.

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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. The ECG curve is designed to detect shockable cardiac rhythms and is not suitable for differential diagnostics. This can result in ECG misinterpretation, and thus in injury to the patient.

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

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 cardiopulmonary resuscitation by means of voice prompts, the simultaneous voice prompts from 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 and treatment delay from connecting the device to several patients!

Connection of the device to several patients may result in the ECG being misinterpreted and thus to unsuccessful defibrillation. This can injure the patient.

⇒ Only connect the device, components and accessories to one patient.

Notice **Damage to the device caused by the delivery of defibrillation energy!**

The charging and delivery of defibrillation energy may interfere with the functioning of other electrical devices or damage devices connected to the patient or in the vicinity of the defibrillator.

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

⇒ After using the defibrillator, check the function of the electrical devices in its vicinity.

⇒ Maintain separation distances between the defibrillator and portable and mobile radio-frequency communications devices.

Damage to the device caused by removal of the defibrillation electrodes during shock delivery!

Removal of the defibrillation electrodes during shock delivery can cause damage to the device.

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⇒ Always leave defibrillation electrodes connected to the device during shock delivery.

2.1.5 ECG monitoring

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 measurements. This can injure the patient.

⇒ Use ECG electrodes WM 45201 which have been approved by WEINMANN Emergency. If this is not possible: Only use ECG electrodes which satisfy all the of the following points.
⇒ Only use ECG electrodes as per AAMI EC 12.
⇒ Only use high-quality ECG electrodes.
⇒ Observe the expiry date of the ECG electrodes and, if necessary, replace the ECG electrodes.
⇒ Only use ECG electrodes with undamaged packaging.
⇒ Do not use ECG electrodes with a dry gel layer, damage or detached protective film.
⇒ Do not remove ECG electrodes from the packaging until directly before use.
⇒ Replace damaged ECG electrodes during use.
⇒ Do not use ECG electrodes for defibrillation.
⇒ Dispose of ECG electrodes after use, and do not reuse them.

Risk of injury from using the 6-lead ECG for more in-depth diagnostics!

The ECG curve of the 6-lead ECG is not suitable for differential diagnostics (e.g. infarction diagnostics). This can result in ECG misinterpretation, and thus in injury to the patient.

⇒ Do not use the 6-lead ECG for differential diagnostics.
⇒ Additionally, use a 12-lead diagnostics ECG device for differential diagnostics.

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 impulses and suppresses the heart rate display and heart rate alarms. This may result in injury to the patient.

⇒ Monitor patients with pacemakers very closely.

Caution **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.
Risk of injury from burns during defibrillation!
ECG cables without defibrillation protection may result in injury to the patient.
⇒ Only use approved ECG cables.

2.1.6 Pulse oximetry monitoring

Caution **Risk of injury due to overly high pulse oximetry sensor contact pressure!**
High pulse oximetry sensor contact pressure over an extended period of time can cause poor circulation or changes to the skin and injury to the patient.
⇒ Do not attach the pulse oximetry sensor too tightly.
⇒ Check the pulse oximetry sensor every 4 hours and, if necessary, reposition it.
⇒ Reposition the pulse oximetry sensor in the case of skin changes.
Risk of injury from using the pulse oximetry sensor at high temperatures!
At temperatures of > 41°C, the skin can be damaged from high contact pressures causing injury to the patient.
⇒ Do not apply excessive pressure when attaching the pulse oximetry sensor.
⇒ If necessary: Shorten the application time of the pulse oximetry sensor.
Risk of injury due to incorrect use of the pulse oximetry sensor!
The incorrect use of the pulse oximetry sensor may produce false readings, and result in injury to the patient.
⇒ Keep the pulse oximetry sensor away from strong electromagnetic sources (e.g. electrosurgical devices).
⇒ Do not use the pulse oximetry sensor in radiological areas (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.

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⇒ 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 sleeve or catheter port.
⇒ Keep the pulse oximetry sensor away from nail polish and artificial fingernails.
⇒ Keep the pulse oximetry sensor away from intravascular dyes.
⇒ Beware inaccurate readings in the case of elevated levels of dysfunctional hemoglobins.
⇒ Note deviations from the measurement result in the case of serious anemia, venous pulsation and high total bilirubin values.
⇒ Note deviations from the 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.
⇒ Note deviations from the measurement result during defibrillation.
⇒ Only use undamaged pulse oximetry sensors.
⇒ Only use the pulse oximetry sensors and pulse oximetry sensor connecting cables contained in the scope of supply and mentioned in the accessories.

2.1.7 Non-invasive blood pressure (NIBP) monitoring

Warning **Risk of injury due to incorrect NIBP cuff!**
An incorrectly selected or used NIBP cuff can lead to patient injuries.
⇒ Attach the NIBP cuff so that the blood supply is not stopped.
⇒ Do not attach the NIBP cuff to a limb with an intravenous infusion.
⇒ 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.
⇒ Do not attach the NIBP cuff to a limb with poor circulation.

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Caution **Risk of injury from falsified measurement results during non-invasive blood pressure monitoring!**

An incorrectly selected or used NIBP cuff can falsify the results and lead to patient injuries.

⇒ Always use the NIBP cuff which is best suited to the patient's limb. Selecting the right NIBP cuff is vital to ensuring good-quality results.

⇒ Attach the NIBP cuff level with the heart.

⇒ Avoid moving the NIBP cuff during NIBP measurements.

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

⇒ Repeat the NIBP measurement if the results appear questionable. If the results of the repeated measurement are still questionable, select an alternative method.

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

⇒ Only use undamaged NIBP cuffs.

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

⇒ Follow the Instructions for Use for the NIBP cuff

Risk of injury from overly frequent measurements

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

⇒ Select the measurement intervals so that sufficient perfusion is guaranteed.

⇒ With long-lasting NIBP measurements, check the position of the NIBP cuff regularly and, if necessary, reposition it

2.1.8 Electromagnetic 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 each other can 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: Approved combinations of devices for MEDUCORE Standard^2 on the portable systems from WEINMANN Emergency).

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⇒ 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 increased interference emissions or reduced interference immunity!

Electronic accessories such as cables, sensors and power supply units and chargers influence electromagnetic interference emissions and immunity and can lead to malfunctioning of the device or other medical electrical devices. This can injure the patient.

⇒ Only use the articles defined by WEINMANN Emergency in the scope of supply and accessories.

Risk of injury from portable radio-frequency communication devices in the immediate vicinity of the device!

Portable radio-frequency communication devices (e.g. mobile radios, antennae and antenna cables) in the direct vicinity of the device can influence the functioning of the device and injure the patient.

⇒ With portable radio-frequency communication devices, maintain a minimum distance of 30 cm to the device, components and accessories.

Caution **Delay in treatment due to interference caused by electromagnetic fields!**

Electromagnetic fields can impair the functioning of the device. This can lead to incorrect analysis results, false measurements and false alarms and thus delay treatment.

⇒ Maintain separation distances (see "15 Technical data", page 175).

Delay in treatment due to power supply network faults!

Transient or pulsed conducted interferences may cause the device to malfunction. This can lead to false measurements and false alarms and thus delay treatment.

⇒ If there is major interference in the power supply network, only operate the device with a battery.

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2.2 General instructions

- If third-party items are used, malfunctions may occur and fitness for use may be restricted. 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 the radiation output or reduce the interference immunity.
- Repairs, servicing and maintenance should only be carried out by the manufacturer WEINMANN Emergency or by a technician expressly authorized by the latter.
- The manufacturer, WEINMANN Emergency, guarantees the compatibility of the device and all components or accessories connected to the patient prior to use. Only have modifications to the device (exception: software update) carried out by the manufacturer, WEINMANN Emergency, or by a technician expressly authorized by the latter. Do not use any articles from third parties.
- Any constructive changes made to the device may put the patient and the user at risk and are not permitted.
- The power supply unit and charger is not intended for use in vehicles or outdoors. Only use the power supply unit and charger in closed rooms and observe the technical data (see "15 Technical data", page 175).
- Please observe the section on hygienic reprocessing in order to avoid infection or bacterial contamination (see "9 Hygienic reprocessing", page 144).
- Also follow the respective Instructions for Use for the components and the accessories.
- Always carry out a function check before using the device (see "10 Function check", page 148).
- Risks due to software errors have been minimized by means of extensive qualification measures.

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- This device's software contains code which is subject to the General Public License (GPL). You will receive the source code and the GPL upon request.

2.3 Warnings in this document

Warnings are used to flag up safety-relevant information.

You will find a warning preceding any action that entails a hazard for persons or equipment.

Warnings consist of

- the warning symbol (pictogram),
- a signal word designating the hazard level,
- information about the hazard, and
- instructions for avoiding the hazard.

The warnings appear in three hazard levels depending on the degree of danger:

⚠ **DANGER**	**Danger!** Designates an extremely dangerous situation. Failure to observe this warning may lead to serious, irreversible injury or death.
⚠ **WARNING**	**Warning!** Designates an extremely dangerous situation. Failure to observe this warning may lead to serious, irreversible or fatal injury.
⚠ **CAUTION**	**Caution!** Designates a dangerous situation. Failure to observe this warning may lead to minor or moderately serious injury.
NOTICE	**Note!** Indicates a harmful situation. Failure to observe this warning may lead to damage to equipment.
i	Designates useful information relating to a particular action.

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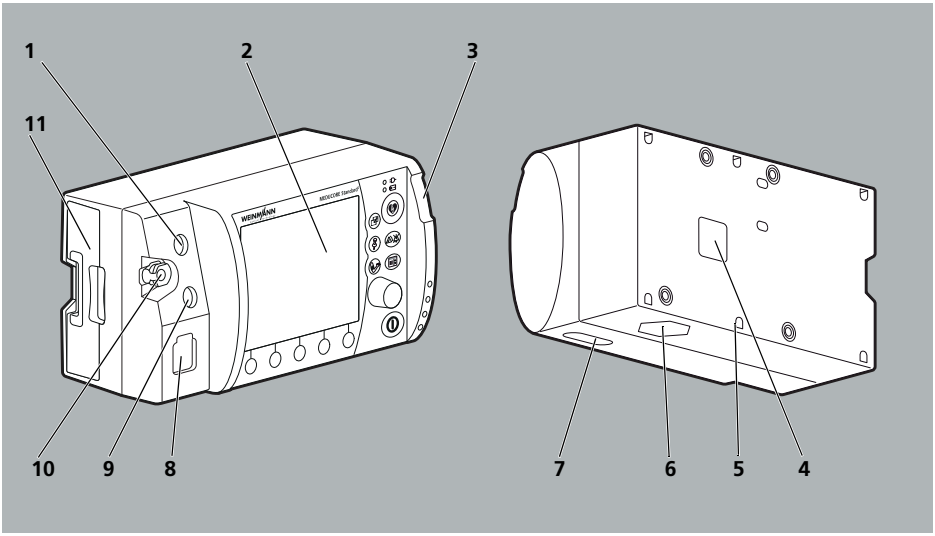
3 Description

3.1 Overview



3-1 Device

No.	Designation	Description
1	ECG connection for ECG cable	Connects the device to the ECG cable.
2	Display	Displays settings and current values (see "3.4 Symbols on the display", page 37).
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	For inserting an SD card.
8	Pad connection for trunk cable	Connects the device via the trunk cable to the defibrillation electrodes and the function test resistor.
9	SpO_2 port for pulse oximetry sensor connecting cable	Connects the device to the pulse oximetry sensor via the pulse oximetry sensor connecting cable.

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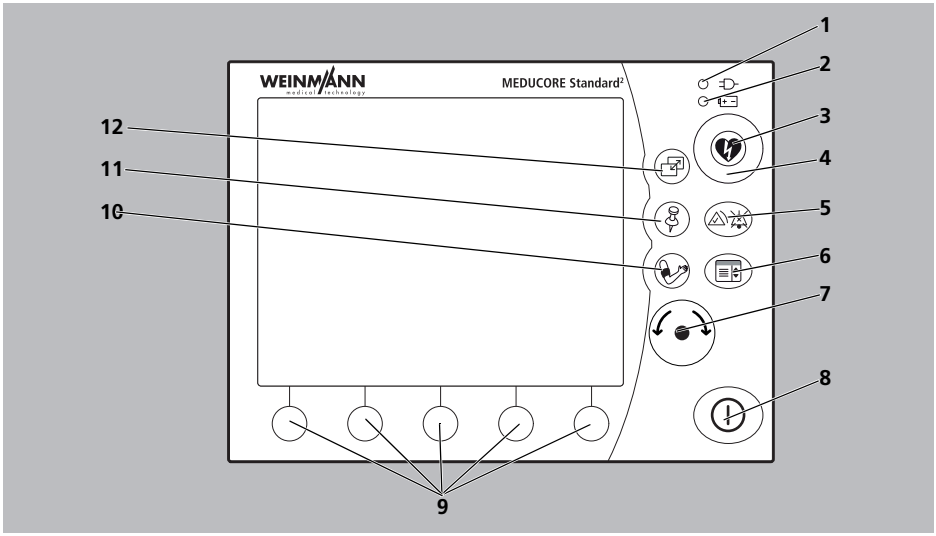
No.	Designation	Description
10	Connection for NIBP connecting tube	Connects the device to an NIBP cuff via the NIBP connecting tube.
11	Battery compartment with battery	Houses the battery.

3.2 Control panel



3-2 Controls

No.	Designation	Description
1	Line power indicator	Indicates that the device is connected to line power.
2	Battery status indicator	• Steady green light: The battery is full or is not being charged because it is outside the charging temperature range. • Flashing green light: The battery is being charged. • Steady red light: The battery is defective or not in the device. • No light: The device is not connected to line power.
3	Shock button	Delivers an electric shock for defibrillation.
4	Shock standby indicator	Flashing red light when the device is ready to deliver a shock.

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No.	Designation	Description
5	Alarm button	• Pauses the audio alarm output for a certain length of time. • Mutes the audio alarm output. • Cancels audio alarm outputs. • Deactivates muting of the 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.
7	Navigation knob	• Allows values to be selected (by turning). • Confirms selected values (by pressing). • In a mode: Provides access to the application menu (by pressing).
8	On/Off button	Switches the device on or off.
9	Function buttons	• Provide access to the mode shown on the display. • Activate/deactivate the functions shown on the display.
10	NIBP button	• Activates the NIBP function mode (press NIBP button < 2 s) • Starts an NIBP measurement (press NIBP button for > 2 s)
11	Event button	Manually saves an event in the data set.
12	View button	Switches between the following views: • Parameter view • Curve view

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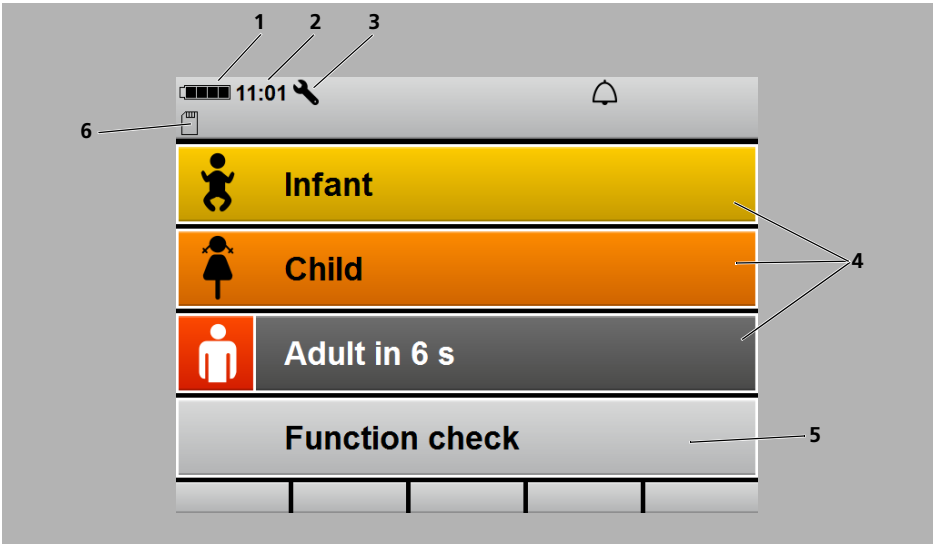
3.3 Display

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.
4	Patient groups	Starts the device with the presets specific to the patient groups.
5	Function check	Provides access to the function check.
6	SD card indicator	Indicates the status of the SD card.

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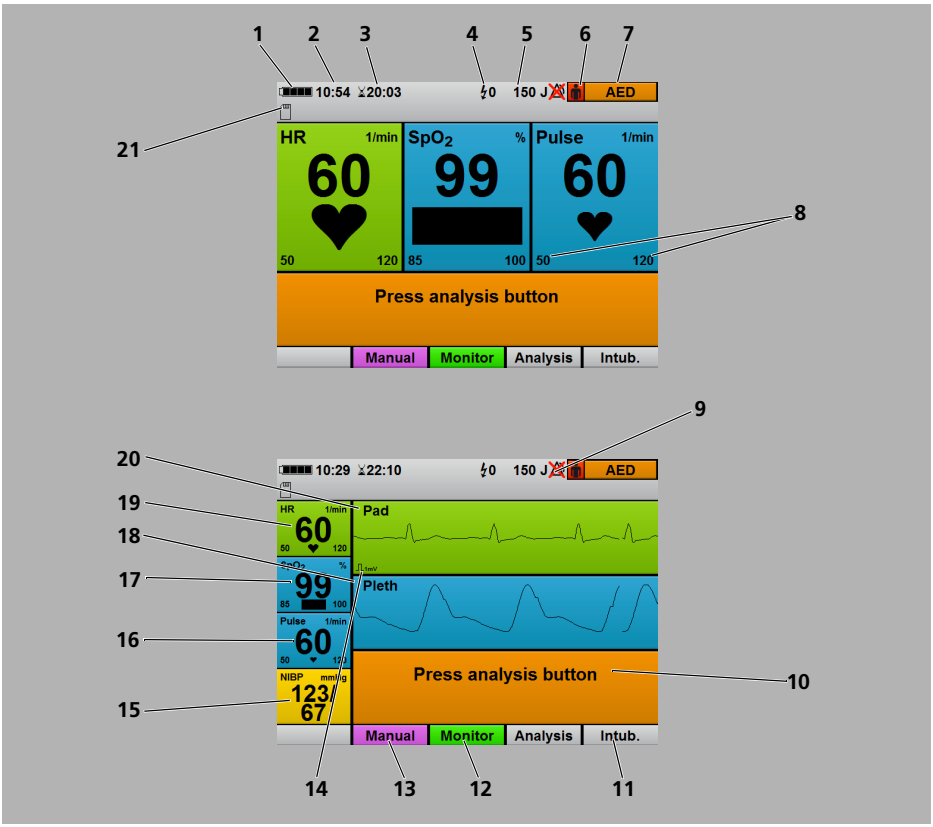
3.3.2 AED mode



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	Shows the selected shock energy for the next shock.

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No.	Designation	Description
6	Patient group	Shows the selected patient group: • for adults • Child
7	Mode indicator	Indicates the currently selected mode.
8	Alarm limits	Displays the set alarm limits.
9	Alarm off indicator	Shows whether the alarm output is deactivated in AED mode.
10	AED instructions	Give instructions on performing cardiopulmonary resuscitation.
11	Metronome switch	Switches the metronome algorithm between two settings: • 15:2 /30:2: 15/30 chest compressions with 2 mechanical breaths • Intub.: Continuous chest compression
12	Monitor mode	Provides access to the monitor mode.
13	Manual mode (only with Manual defibrillation option)	Provides access to the manual mode.
14	ECG calibration mark	Shows the curve corresponding to 1 mV of the ECG signal.
15	NIBP	Shows blood pressure.
16	Pulse	Shows the pulse rate.
17	SpO_2	Shows the oxygen saturation.
18	Middle curve field	Shows the plethysmogram.
19	HR	Shows the heart rate.
20	Top curve field	Displays the ECG lead (pad, II).
21	SD card indicator	Indicates the status of the SD card.

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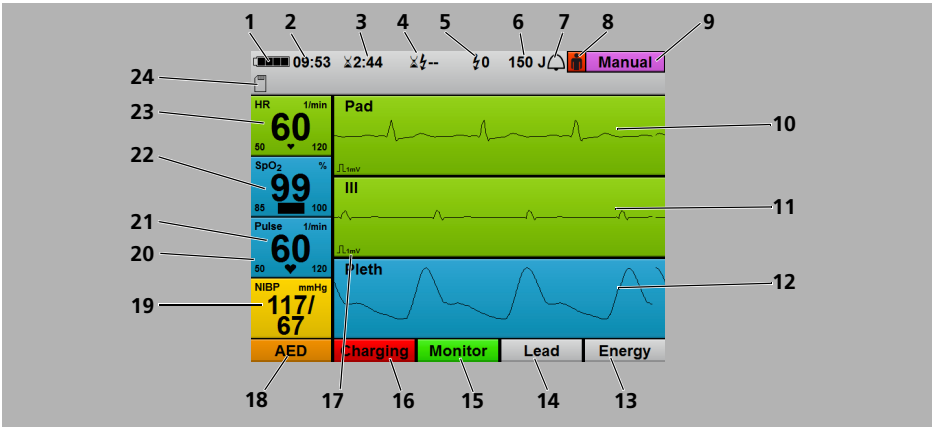
3.3.3 Manual mode



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	Elapsed time since last defibrillation	Displays the elapsed device time since the last defibrillation.
5	Number of shocks delivered	Displays the number of shocks delivered during the current session.
6	Shock energy	Shows the selected shock energy for the next shock.
7	Alarm indicator	Indicates the status of the audio alarm output: • Audio alarm output active • Audio alarm output muted/paused • Audio alarm output canceled
8	Patient group	Shows the selected patient group: • for adults • Child • Infant
9	Mode indicator	Indicates the currently selected mode.
10	Top curve field	Shows the ECG lead (Pad, II).
11	Middle curve field	Displays selected ECG lead (I, II, III, aVR, aVL or aVF).
12	Bottom curve field	Shows the plethysmogram.
13	Energy	Allows the shock energy to be set.

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No.	Designation	Description
14	ECG lead selection	Enables the user to select the type of ECG lead displayed in the middle curve field (I, II, III, aVR, aVL or aVF).
15	Monitor mode	Provides access to the monitor mode.
16	Charging	Charges the defibrillation capacitor.
17	ECG calibration mark	Shows the curve corresponding to 1 mV of the ECG signal.
18	AED mode	Provides access to the AED mode.
19	NIBP	Shows blood pressure.
20	Alarm limits	Displays the set alarm limits.
21	Pulse	Shows the pulse rate.
22	SpO_2	Shows the oxygen saturation.
23	HR	Shows the heart rate.
24	SD card indicator	Indicates the status of the SD card.

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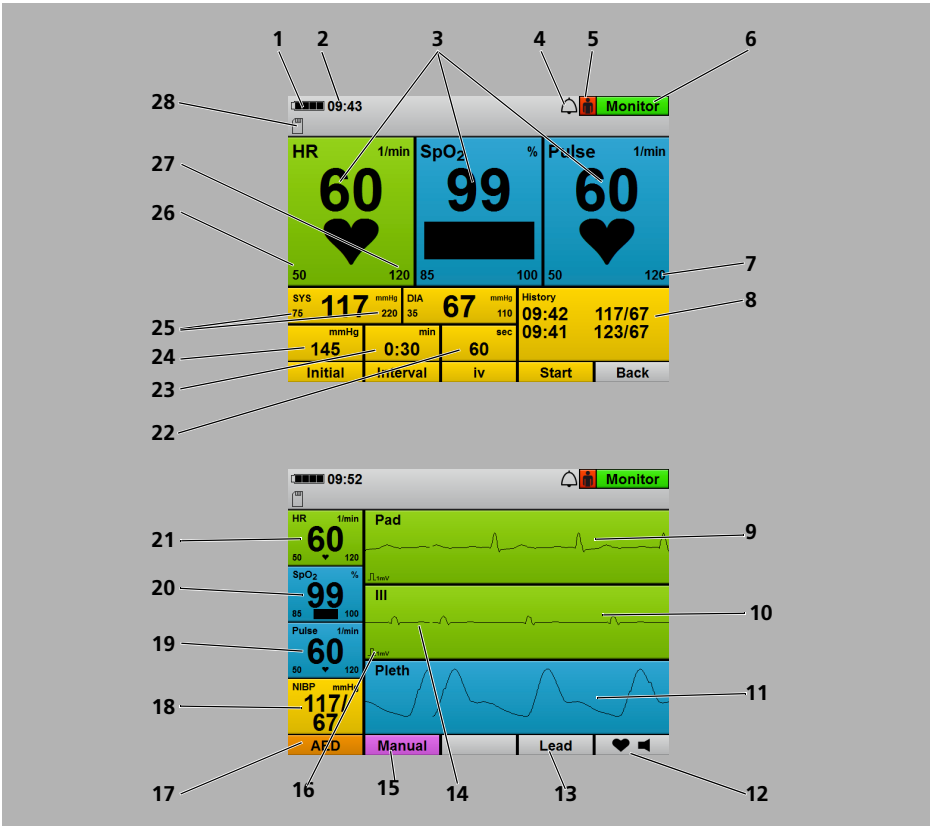
3.3.4 Monitor mode



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.
4	Alarm indicator	Indicates the status of the audio alarm output: • Audio alarm output active • Audio alarm output muted/paused • Audio alarm output canceled

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No.	Designation	Description
5	Patient group	Shows the selected patient group: • for adults • Child • Infant
6	Mode indicator	Indicates the currently selected mode.
7	Alarm limits	Displays the set alarm limits.
8	History	Shows the time and values of the last NIBP measurements.
9	Top curve field	Shows the ECG lead (Pad, II).
10	Middle curve field	Displays selected ECG lead (I, II, III, aVR, aVL or aVF).
11	Bottom curve field	Shows the plethysmogram.
12	Heart rate tone/pulse tone	Switches the heart rate tone/pulse tone on and off.
13	ECG lead selection	Enables the user to select the type of ECG lead displayed in the middle curve field (I, II, III, aVR, aVL or aVF).
14	ECG lead	Displays selected ECG lead (I, II, III, aVR, aVL or aVF).
15	Manual mode (only with Manual defibrillation option)	Provides access to the manual mode.
16	ECG calibration mark	Shows the curve corresponding to 1 mV of the ECG signal.
17	AED mode	Provides access to the AED mode.
18	NIBP	Shows blood pressure.
19	Pulse	Shows the pulse rate.
20	SpO_2	Displays the SpO_2 curve (plethysmogram).
21	HR	Shows the heart rate.
22	Duration of venous stasis	Shows the time during which the NIBP cuff maintains a venous stasis.
23	Interval duration	Shows the time between two consecutive NIBP measurements when measurements are taken at intervals.
24	Initial NIBP cuff pressure	Shows the pressure to which the device initially inflates the NIBP cuff.
25	Alarm limits	Shows the alarm limits for the systolic and diastolic measured values.
26	SYS	Shows the systolic value following an NIBP measurement.
27	DIA	Shows the diastolic value following an NIBP measurement.
28	SD card indicator	Indicates the status of the SD card.

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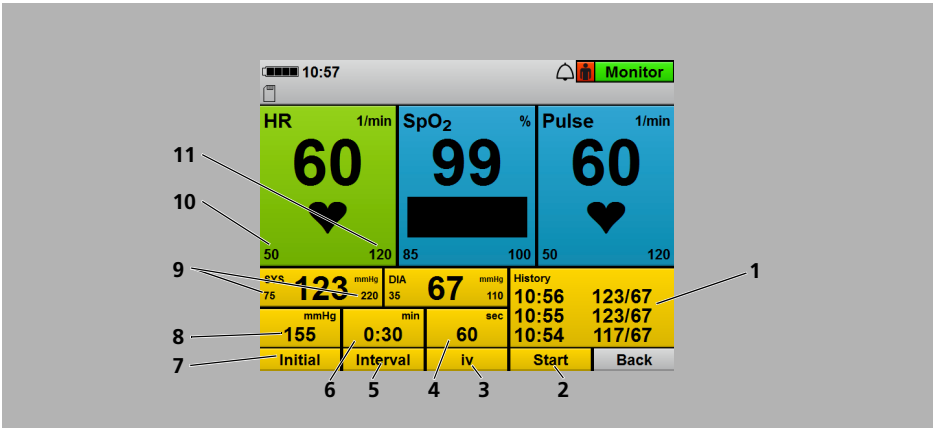
3.3.5 NIBP function mode



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

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	Shows the time during which the NIBP cuff maintains a 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 when measurements are taken at intervals.
6	Interval duration	Shows the time between two consecutive NIBP measurements when measurements are taken at intervals.
7	Initial	Allows the initial NIBP cuff pressure to be changed.
8	Initial NIBP cuff pressure	Shows the pressure to which the device will inflate the NIBP cuff at the next NIBP measurement.

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No.	Designation	Description
9	Alarm limits	Shows the alarm limits for the systolic and diastolic measured values.
10	SYS	Shows the systolic value with an NIBP measurement.
11	DIA	Shows the diastolic value with an NIBP measurement.

3.4 Symbols on the display

Symbol	Designation	Description
	Battery status symbol	Battery status
	SD card symbol	SD card in SD card slot
		• No SD card in SD card slot • SD card defective/not formated • SD card full
		Saving data to SD card
	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

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Symbol	Designation	Description
	Heart rate tone/pulse tone function button	Heart rate tone/pulse tone on
		Heart rate tone/pulse tone off
	Function check symbols	Requirements for function check met
		Requirements for function check not met
		Fault found during function check
		Follow Instructions for Use
		Service interval exceeded
	Cardiac symbol	• In the HR parameter field: Flashes at the measured heart rate. • In the SpO_2 parameter field: Flashes at the measured pulse rate.
	Signal bar	Shows the signal quality of the SpO_2 measurement.

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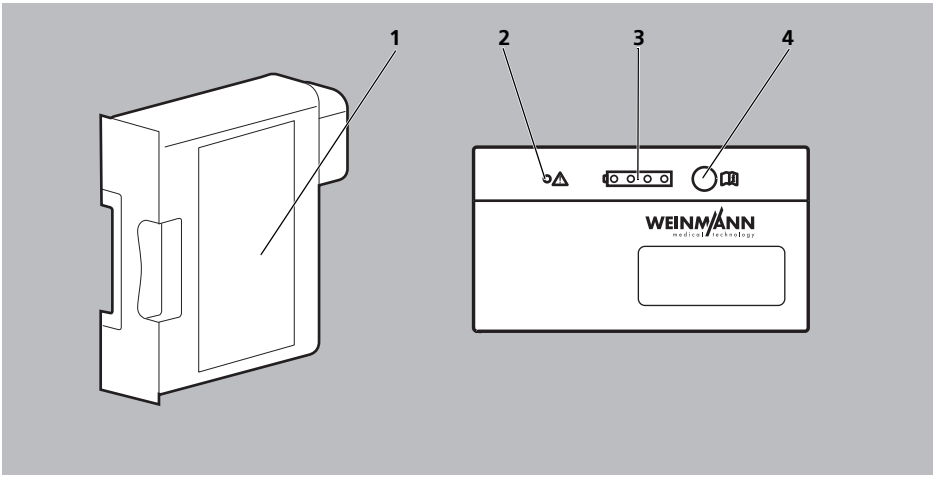
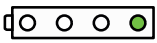
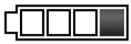
3.5 Battery and battery status indicator



3-8 Battery and battery status indicator

No.	Designation	Description
1	Battery	Supplies power to the device.
2	Fault indicator (red)	Lights up if the battery is defective.
3	Status LEDs (green)	Show the 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 %
		Battery status approx. 10%-40%

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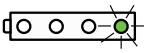
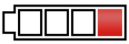
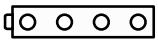
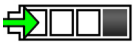
Status indicator on the battery	Status indicator on the device display	Meaning
		Battery status < 10% On the display: • The last remaining segment in the battery status symbol is red. • The message **Battery weak** appears in the display. • The device outputs in AED mode: *Battery weak*.
		Battery is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

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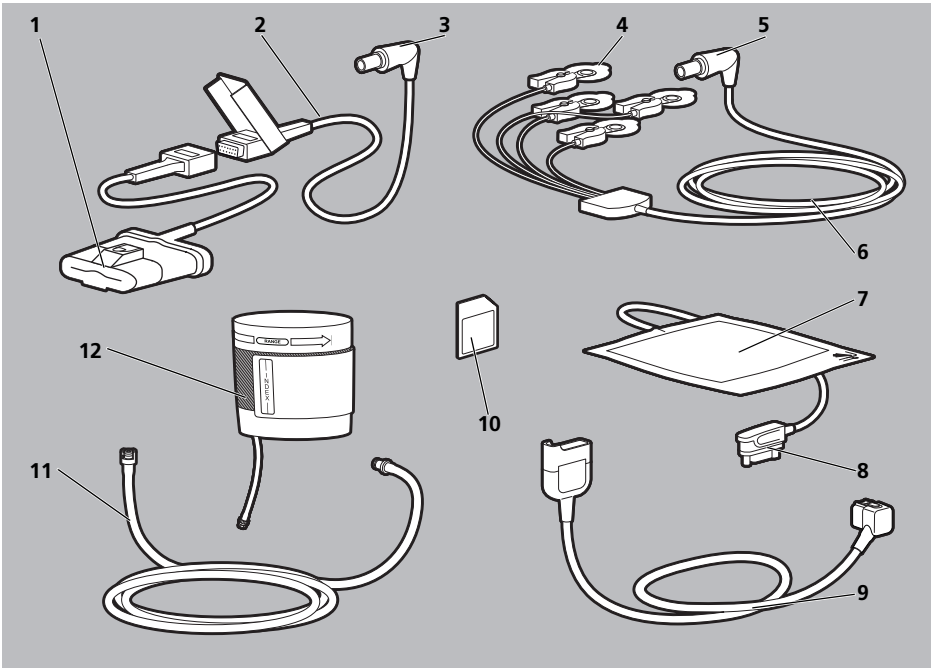
3.6 Components



3-9 Components

No.	Designation	Description
1	SoftTip® pulse oximetry sensor, size M, reusable	Measures oxygen saturation.
2	Pulse oximetry sensor connecting cable	Connects the pulse oximetry sensor to the device.
3	SpO_2 connector	Connects the pulse oximetry sensor to the device via the pulse oximetry connecting cable.
4	ECG electrodes for adults and children	Derive the electrocardiograms.
5	ECG connector	Connects the ECG electrodes to the device via the ECG cable.
6	ECG cable	Conducts the electrocardiograms to the device.
7	Defibrillation electrodes for adults	Conduct the electrocardiograms to the device and the defibrillation energy to the patient.
8	Pad connector	Connects the defibrillation electrodes to the trunk cable.

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No.	Designation	Description
9	Trunk cable	Connects the defibrillation electrodes and the function test resistor to the device.
10	SD card	Records session data.
11	NIBP connecting tube	Connects the NIBP cuff to the device.
12	NIBP cuff, adult, for 23-33 cm upper arm circumference, reusable	For measuring patient's blood pressure.

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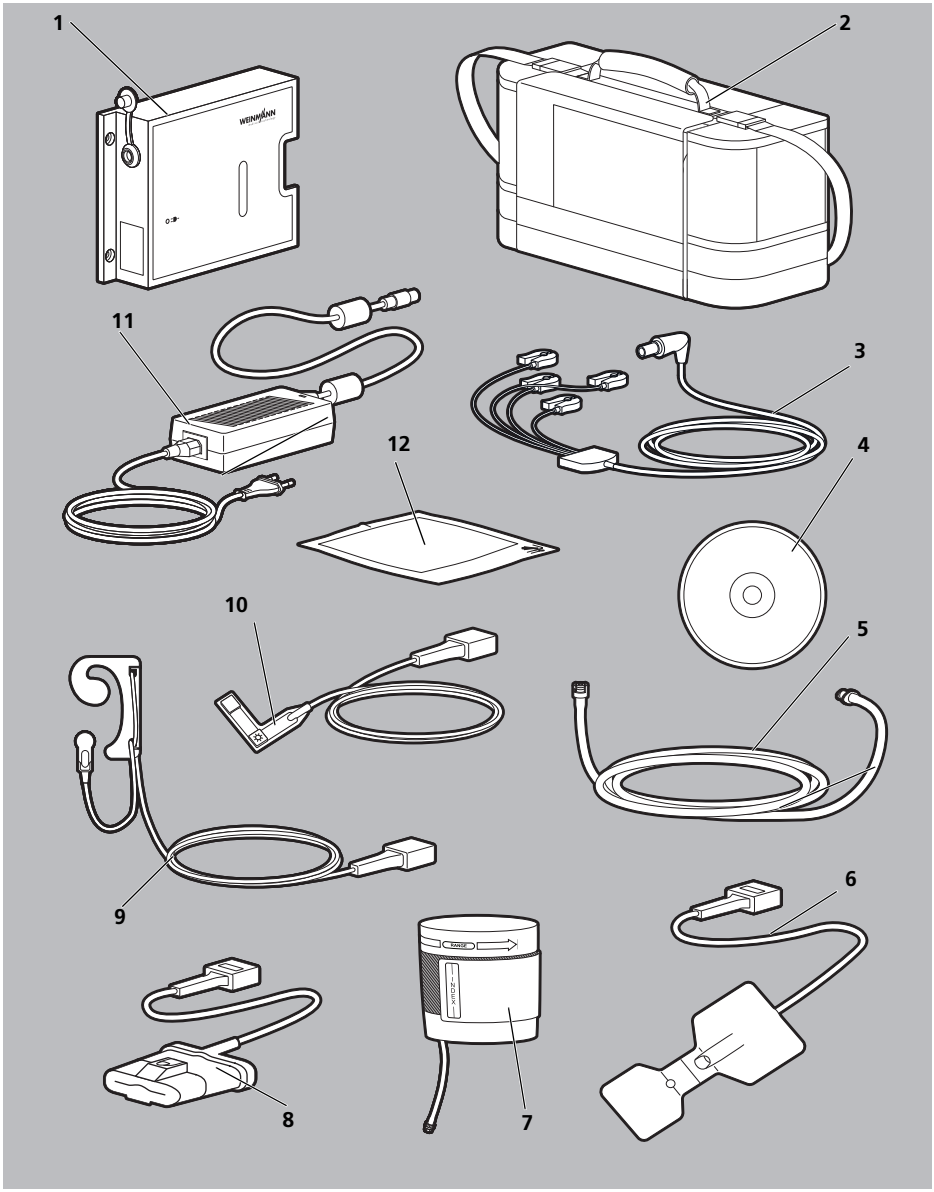
3.7 Accessories



3-10 Accessories

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No.	Designation	Description
1	Charging station for battery WM 45045	Allows external battery charging.
2	Protective transport bag	Protects the device against damage and facilitates transportation.
3	ECG cable	Conducts the electrocardiograms to the device. Available in various designs (see "16.3 Accessories", page 191).
4	DEFIview PC software	Facilitates the read-out and analysis of session data.
5	Adapter tube for connection of NIBP disposable cuffs for neonates	Connects the NIBP cuffs for neonates (disposable).
6	Disposable pulse oximetry sensor	Measures oxygen saturation. Available in various sizes (see "16.3 Accessories", page 191)
7	NIBP cuff	Measures blood pressure. Available in various versions and sizes (see "16.3 Accessories", page 191)
8	SoftTip® pulse oximetry sensor, reusable	Measures oxygen saturation. Available in various sizes (see "16.3 Accessories", page 191)
9	Ear-clip pulse oximetry sensor, reusable	Measures oxygen saturation.
10	Wrap pulse oximetry sensor, reusable	Measures oxygen saturation.
11	Power supply unit and charger	Supplies the device or the charging station with power.
12	Defibrillation electrodes for children	Allow the defibrillation of children.

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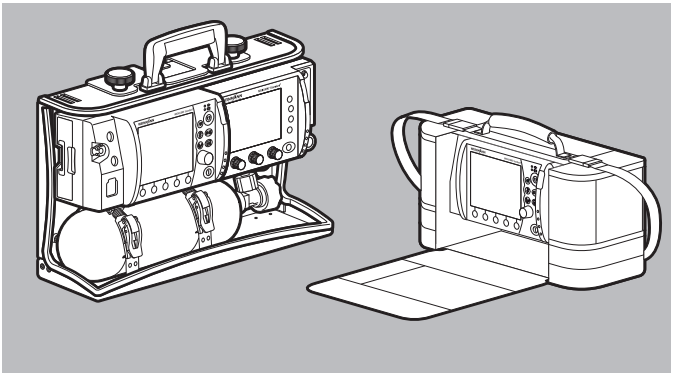
3.8 Transport options



3-11 Transport options (examples)

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

- LIFE-BASE 3 NG
- LIFE BASE 1 NG XL
- LIFE BASE 1 NG XS
- Protective transport bag (cannot be attached to the wall mounting)

3.9 Options

You can tailor the range of functions on the device to your needs with the optional functions. You need a release code to enable the optional functions. This device-specific code can be used to enable the options (see "5.14 Enable options", page 101).

Available options:

- Manual defibrillation

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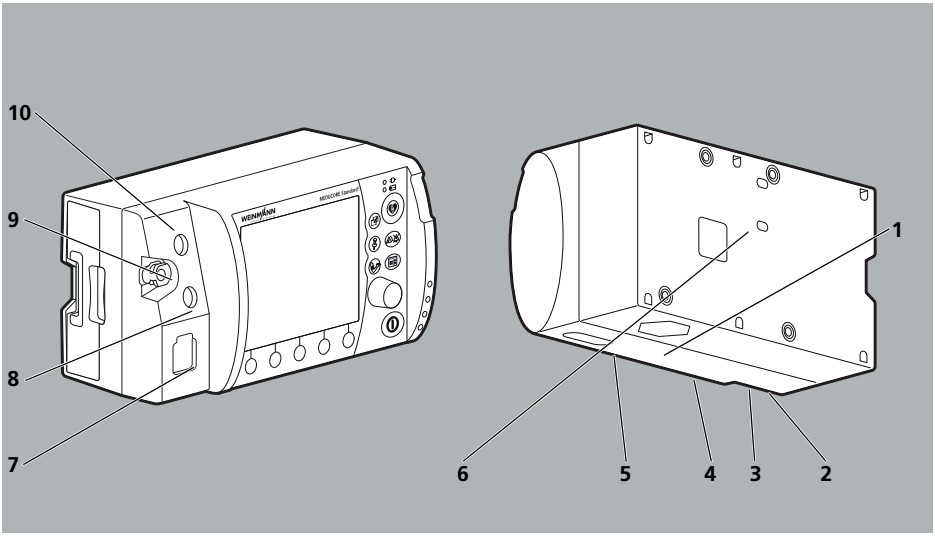
3.10 Markings and symbols

3.10.1 Markings on the device



3-12 Markings on the product

No.	Symbol	Description
Device information label		
1	SN	Serial number
		Input (12 V-15 V, 30 W)
		Direct voltage
	E_{max} = 200 J	Maximum energy generated
		Do not dispose of device in household waste
		Type of protection against electric shock: Protection class II device

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No.	Symbol	Description
1		Date of manufacture
	IP55	Degree of protection against • Ingress of solid objects • Ingress of dust • Ingress of water with harmful effect
		Follow Instructions for Use
	CE 0197	CE mark (confirms that the product complies with the applicable European directives)
Other labels and symbols		
2		Safety check label (only in the Federal Republic of Germany): Indicates when the next safety check in accordance with §11 of the Medizinprodukte-Betreiberverordnung [German regulations governing owners/operators of medical devices] is required.
3		Metrological check label (only in the Federal Republic of Germany): Indicates when the next metrological check in accordance with §14 of the Medizinprodukte-Betreiberverordnung [German regulations governing owners/operators of medical devices] is required.
4		Follow Instructions for Use
5		Follow Instructions for Use
6		Input voltage (12 V-15 V)
7	**Pad**	Connection for trunk cable
		Defibrillation-proof Type BF applied part
8	**SpO_2**	Connection for pulse oximetry sensor
		Defibrillation-proof Type BF applied part
9		Defibrillation-proof Type BF applied part
10	**ECG**	Connection for ECG cable
		Defibrillation-proof Type CF applied part

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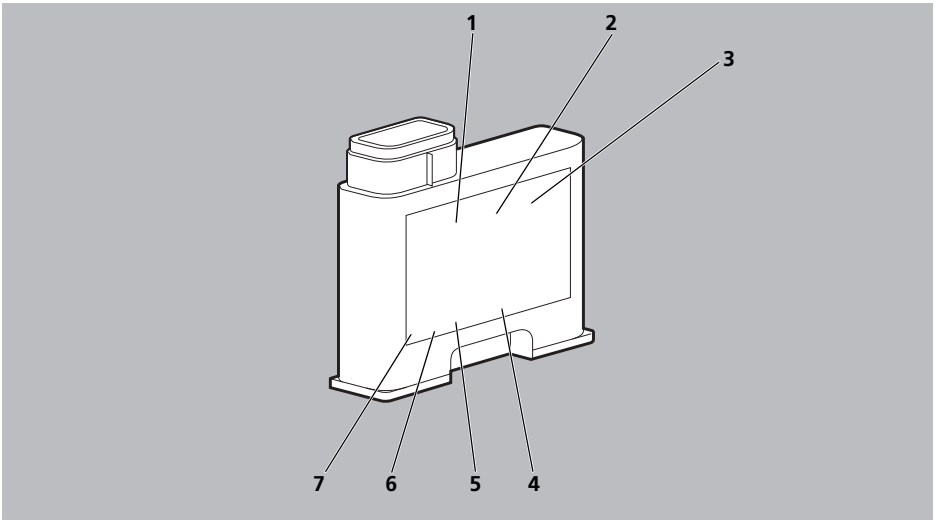
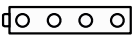
3.10.2 Markings on the battery



3-13 Markings on the battery

No.	Symbol	Description
1		Battery fault, if fault indicator light is red
2		Battery status
3 7		Follow Instructions for Use
4		Manufacturer
5		Do not dispose of in household waste.
6		China RoHS label (confirms that the product does not emit toxic substances for the number of years indicated)

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3.10.3 Markings on the pulse oximetry sensors

Symbol	Description
	Follow Instructions for Use
	Do not dispose of in household waste.
	Manufacturer

3.10.4 Markings on the ECG cable

Symbol	Description
	Follow Instructions for Use
	Do not dispose of in household waste.

3.10.5 Markings on the defibrillation electrodes

Follow the Instructions for Use for the defibrillation electrodes.

3.10.6 Markings on the NIBP cuffs

Follow the Instructions for Use for the NIBP cuffs.

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3.10.7 Markings on the packaging

Symbol	Description
Device packaging	
	Article number
	Permissible storage temperature: -40 °C to +70 °C
	Permissible storage humidity: 15 % to 95 % relative humidity
	Keep dry
	Fragile
	Follow Instructions for Use
	Serial number
	CE mark (confirms that the product complies with the applicable European directives)
	Manufacturer
Battery packaging	
	Article number
	Permissible storage temperature: -30 °C to +70 °C
	Keep dry
	Permissible storage humidity: Max. 95 % relative humidity
	Serial number
	Manufacturer

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Symbol	Description
SpO_2 sensor packaging	
	Do not dispose of in household waste.
	Non-sterile
	Latex-free
	Permissible storage humidity: Max. 95 % relative humidity
	Permissible storage temperature: -40 °C to +70 °C
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
	Serial number
	Article number
	CE mark (confirms that the product complies with the applicable European directives)
	Date of manufacture
	Manufacturer
	Disposable item, do not reuse
	Follow Instructions for Use
	Expiration date
	Production batch number

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Symbol	Description
ECG cable packaging	
	Permissible storage temperature: -40 °C to +70 °C
	Permissible storage humidity: Max. 95 % relative humidity
	Do not dispose of in household waste
	Article number
	Serial number
	Follow Instructions for Use
	Manufacturer
	Date of manufacture
NIBP cuff packaging	
Follow the Instructions for Use for the NIBP cuffs.	
Defibrillation electrode packaging	
Follow the Instructions for Use for the defibrillation electrodes.	
ECG electrode packaging	
Follow the Instructions for Use for the ECG electrodes.	

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4 Preparation

4.1 Mounting the device

The device is mounted on a portable system as standard and is ready for use. Follow the Instructions for Use for the portable systems.

4.2 Connecting to a power supply

⚠ WARNING

Risk of injury due to missing battery!
During line operation, defibrillation is not possible without the battery. Line operation without the battery impairs the operational readiness of the device.
⇒ Only operate the device with the battery inserted.

NOTICE

Damage to the device caused by ingress of liquids!
The device is only protected from water jets as per IP55 when the battery is inserted, the water jet protection for the SD card slot is closed and the lines for the ECG, SpO_2, trunk cable and 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, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.
⇒ Always leave the lines for ECG, SpO_2, trunk cable and NIBP connecting tube including NIBP cuff connected.

1. Check battery status (see "3.5 Battery and battery status indicator", page 39).
2. If necessary: Charge battery (see "4.3.2 Charging the battery in the device", page 55).

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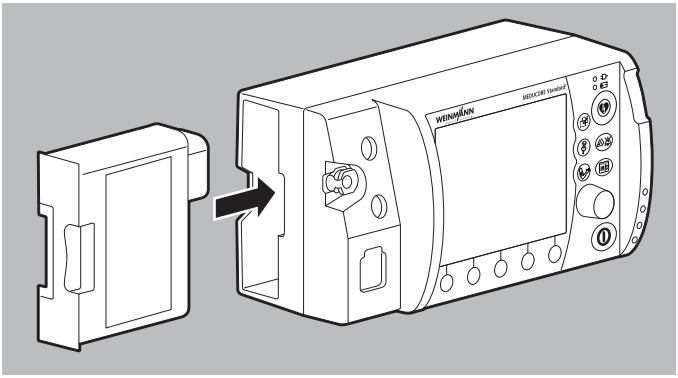

3. Slide the fully charged battery into the battery compartment until it clicks into place.

4. If necessary:
   If operating on the portable system, mount the portable system on a wall mounting with charging interface

   or

   Connect the device with its power supply unit and charger to the line power.

   or

   Connect the device to a vehicle electrical system with a 12 V cable.

Result The power supply is connected.

The power supply unit and charger is not intended for use in vehicles or outdoors. Only use the power supply unit and charger in closed rooms and observe the technical data (see "15 Technical data", page 175).

4.3 Using the rechargeable battery

4.3.1 General instructions

- Always operate the device with the rechargeable battery WM 45045.

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- Note the methods of storing the battery and the charging intervals for prolonged storage (see "13.3 Storing the battery", page 173).
- The expected life of the battery is 2 years. Recommendation: Replace the battery after 2 years. If battery life has substantially dropped before then, replace the battery earlier.
- If you receive a replacement battery, you need to fully charge it before the first use.

4.3.2 Charging the battery in the device

Requirement

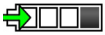
- The portable system is mounted on a wall mounting with charging interface.

  or

- The device is connected to the line power via the power supply unit and charger or via the 12 V network.

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	At least 11 V
Battery status	< 95 % charged
Battery temperature	Between 0 °C and 45 °C

   - If the device is switched on, the green arrow appears in the battery status symbol on 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 will light up red for a short period of time. It goes out again when the battery status progresses.

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

Result The battery is fully charged.

4.3.3 Charging the battery with the charging station

You can also charge the battery with the charging station WM 45190. Follow the Instructions for Use for the charging station.

4.3.4 Changing the battery

Requirement The replacement battery is fully charged.

1. If the device is not connected to the line power: Switch off the device (see "5.2 Switching the device off", page 77).
2. Take battery out of the battery compartment.
3. Slide the replacement battery into the battery compartment until it audibly clicks into place.
4. If necessary: Switch on the device (see "5.1 Switching the device on", page 76).
   The symbol  appears on the display.

Result The battery is changed.

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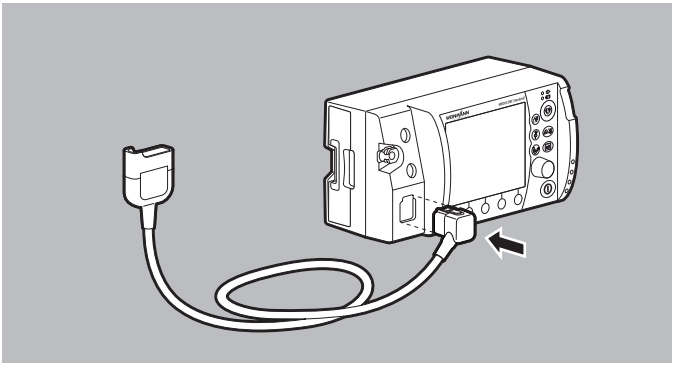
4.4 Connecting the trunk cable and defibrillation electrodes

NOTICE

Damage to the device caused by ingress of liquids!
The device is only protected from water jets as per IP55 when the battery is inserted, the water jet protection for the SD card slot is closed and the lines for the ECG, SpO_2, trunk cable and 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, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.
⇒ Always leave the lines for ECG, SpO_2, trunk cable and NIBP connecting tube including NIBP cuff connected.

The following section describes how to attach the defibrillation electrodes to the device and 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 decisive for the use of the defibrillation electrodes. Observe these Instructions for Use and packaging information.



1. Plug the connector of the trunk cable into the **pad** connection on the device.

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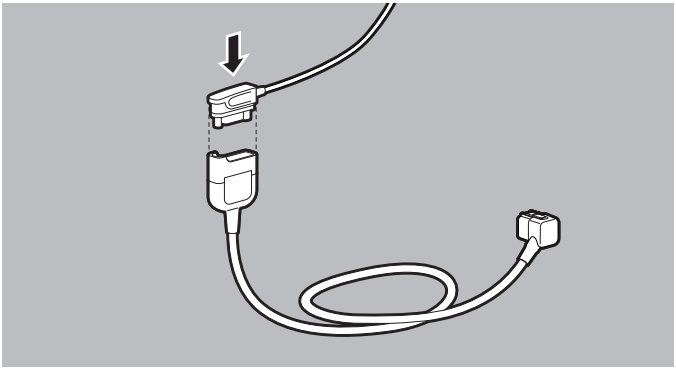
⚠ CAUTION

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

If the wrong size of defibrillation electrodes is selected, this can result in sub-optimal defibrillation results and patient burns.

⇒ Select the correct size of defibrillation electrodes pursuant to the resuscitation guidelines and not based on the weight specifications given on the packaging.

2. Select suitable adult (Adult) or child (Pediatric) defibrillation electrodes.



3. Attach the pad connector of the defibrillation electrodes to the trunk cable.
   When doing so, please note: The pad connector must be fully inserted.

4. Bare the patient's torso.

⚠ CAUTION

Risk of injury from incorrect positioning of the defibrillation electrodes!

Incorrect positioning of the defibrillation electrodes leads to a sub-optimal defibrillation result.

⇒ Select the electrode position according to the illustration.

⇒ Maintain distance from ECG electrodes.

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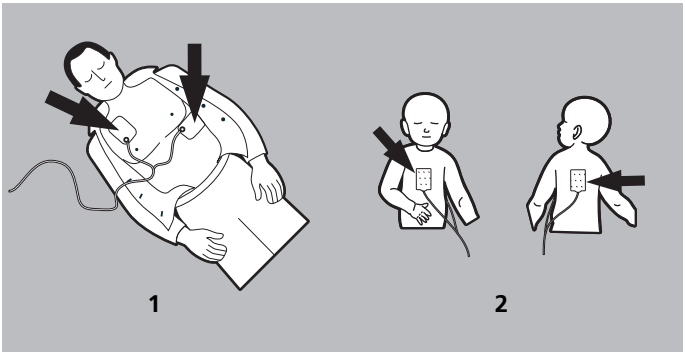

5. Select the required electrode position on the patient's torso:
   - Position **1**: Sternum-apex
   - Position **2**: Anterior-posterior (can also be used for adults)

⚠ CAUTION

Risk of injury due to air/moisture between defibrillation electrodes and the patient's skin!
Air (e.g. in 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.
⇒ Remove hair in hirsute patients.
⇒ Rub the patient's skin dry.
⇒ Firmly press on the defibrillation electrodes.
⇒ Wipe down oily skin with an alcohol pad.

6. If necessary: Remove hair from the torso.
7. If necessary: Rub damp spots on the torso dry.
8. If necessary: Wipe down oily skin with an alcohol pad.
9. Tear open the defibrillation electrode packaging and take out the defibrillation electrodes.
10. Remove the protective backing from the defibrillation electrodes.
11. Stick on defibrillation electrodes and press firmly in place.
12. If necessary: Stroke out any trapped air from under the defibrillation electrodes.

Result The trunk cable and defibrillation electrodes are connected.

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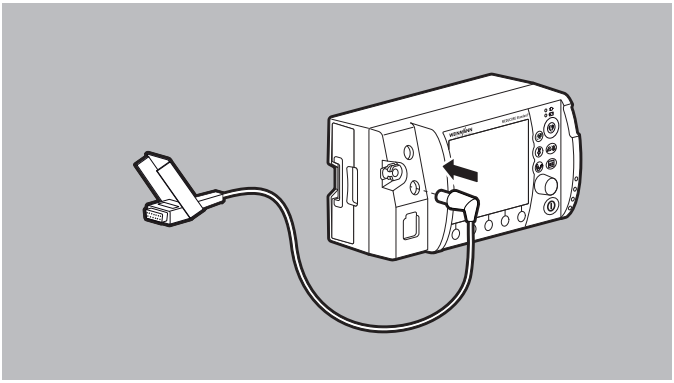
4.5 Connecting the pulse oximetry sensor

NOTICE

Damage to the device caused by ingress of liquids!
The device is only protected from water jets as per IP55 when the battery is inserted, the water jet protection for the SD card slot is closed and the lines for the ECG, SpO_2, trunk cable and 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, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.
⇒ Always leave the lines for ECG, SpO_2, trunk cable and NIBP connecting tube including NIBP cuff connected.



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

Pulse oximetry sensor	Patient group	Application site
SoftTip® sensor size S	Ø 7.5 mm-12.5 mm finger diameter	Finger/large toe
SoftTip® sensor size M	Ø 10 mm -19 mm finger diameter	
SoftTip® sensor size L	Ø 12.5 mm-25.5 mm finger diameter	
Wrap sensor	> 10 kg body weight	Finger/hand
Ear-clip sensor	> 30 kg body weight	Ear

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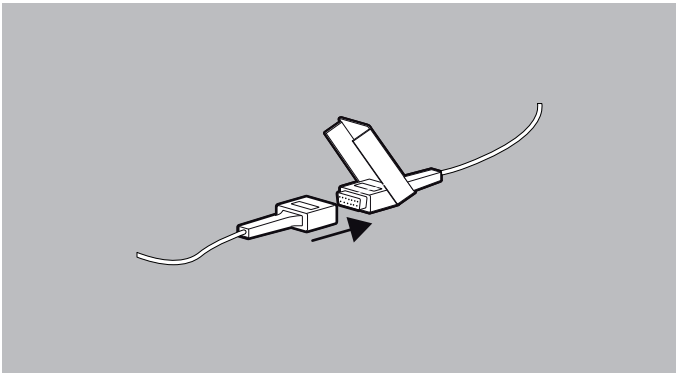
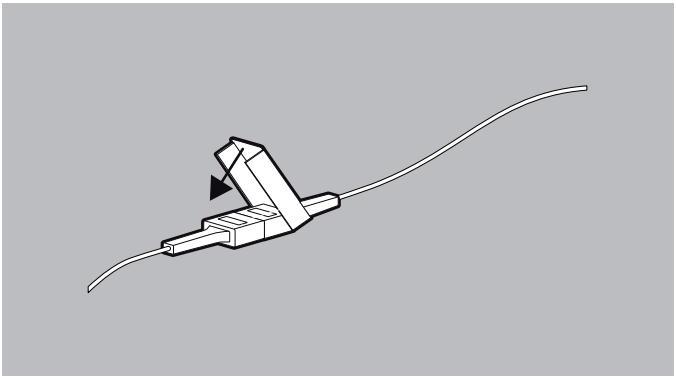
Pulse oximetry sensor	Patient group	Application site
Disposable sensor for adults (Adult)	> 30 kg body weight	Finger/large toe
Disposable sensor for children (Pediatric)	10 kg-50 kg body weight	
Disposable sensor for infants (Infant)	10 kg-20 kg body weight	

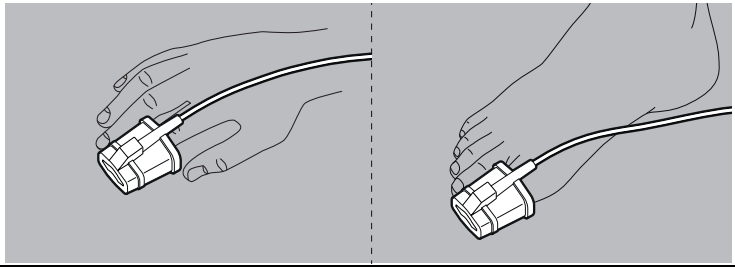
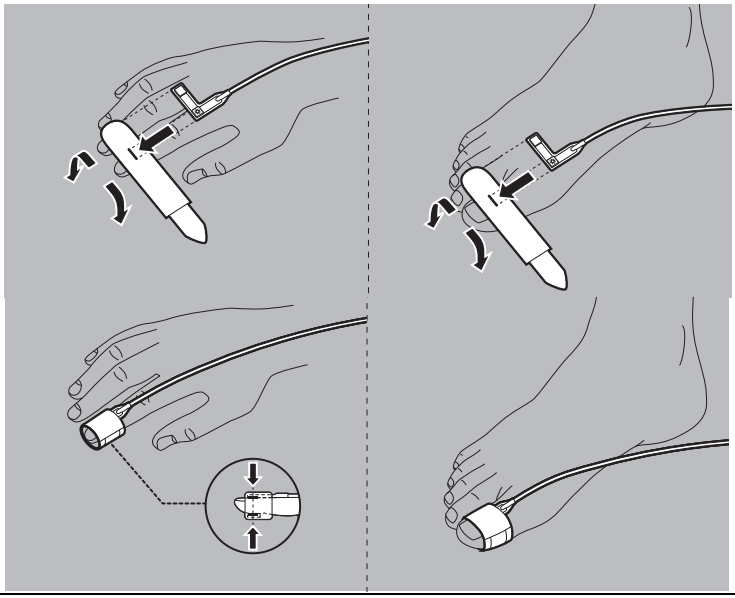
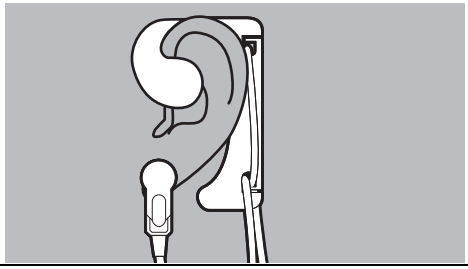


3. Connect the selected pulse oximetry sensor to the pulse oximetry sensor connecting cable.



4. Press the lock until it clicks into place.
5. Switch on the device (see "5.1 Switching the device on", page 76).
6. Select the patient group in the start menu.

7. Attach the pulse oximetry sensor:

Pulse oximetry sensor	Attachment
SoftTip® sensor Special feature: The finger mark must point upwards	
Wrap sensor Special feature: The sensor's transmitter and receiver must be aligned to face each other on one axis.	
Ear-clip sensor	

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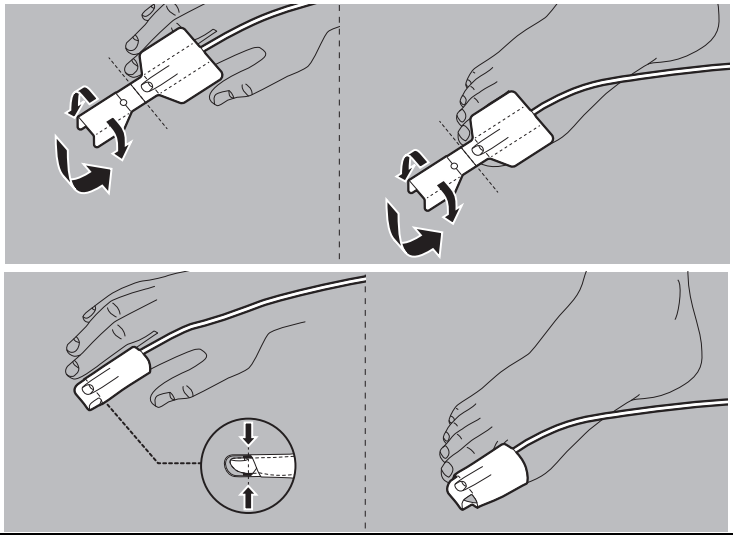
Pulse oximetry sensor	Attachment
Disposable sensor Special feature: The sensor's transmitter and receiver must be aligned to face each other on one axis.	

When doing so, please note:

- The site must have a good blood supply.
- When attaching to the finger: If possible, use the ring or middle finger of the non-dominant hand.

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

Result A pulse oximetry sensor is connected.

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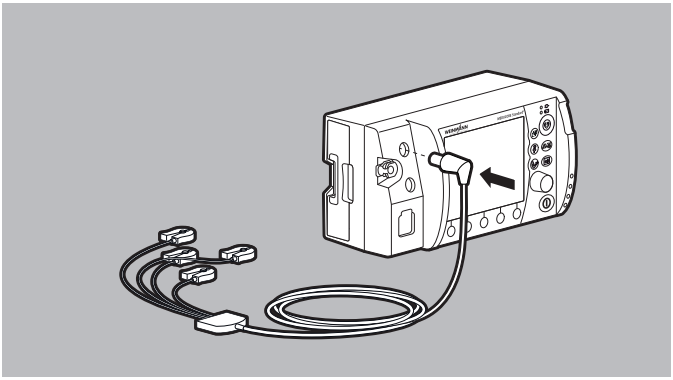
4.6 Connecting the ECG cable and ECG electrodes

NOTICE

Damage to the device caused by ingress of liquids!
The device is only protected from water jets as per IP55 when the battery is inserted, the water jet protection for the SD card slot is closed and the lines for the ECG, SpO_2, trunk cable and 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, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.
⇒ Always leave the lines for ECG, SpO_2, trunk cable and NIBP connecting tube including NIBP cuff connected.



1. Connect the ECG connector of the ECG cable to the **ECG** connection for the ECG cable on the device.
2. Bare the patient's torso.

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⚠ CAUTION

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 the measurement results. This can injure the patient.

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

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

⚠ CAUTION

Risk of injury from incorrect positioning of the ECG electrodes!

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

⇒ Select the electrode position according to the illustration.
⇒ Position the ECG electrodes so that defibrillation is possible.
⇒ Maintain distance from the defibrillation electrodes.
⇒ Do not position ECG electrodes on tendons or muscle groups.

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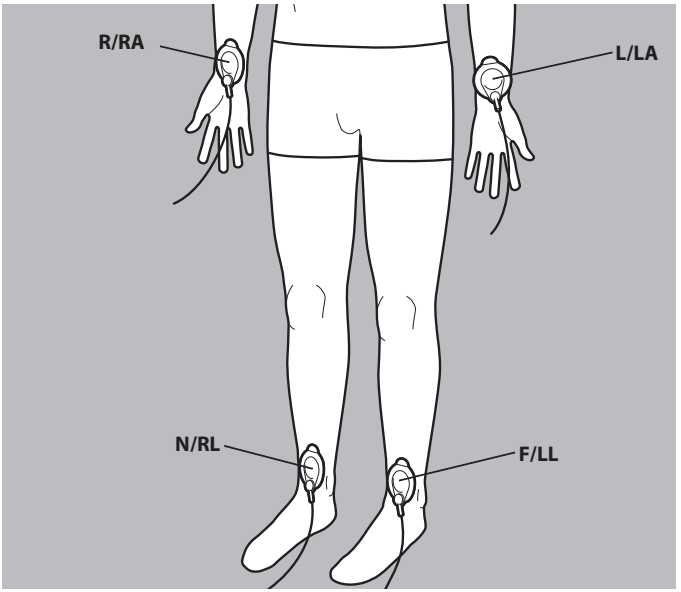
7. Stick and firmly press on the ECG electrodes as follows:

Code 1 (Europe)		Code 2 (America)		
Electrode marking	**Color coding**	**Electrode marking**	**Color coding**	**Application site**
R	Red	RA	White	Right arm; shortened: under right collarbone
L	Yellow	LA	Black	Left arm; shortened: under 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



4-1 Regular position for ECG electrodes

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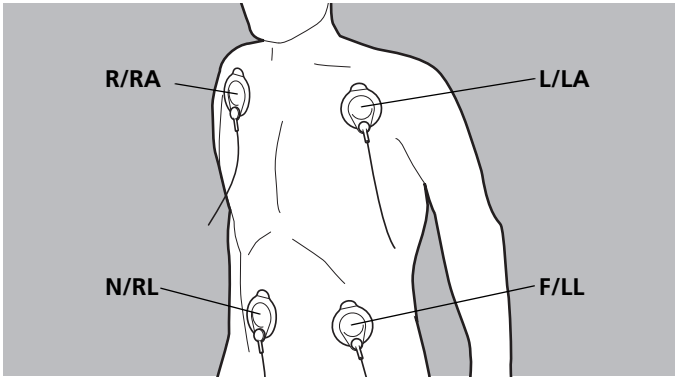


4-2 Shortened position for ECG electrodes

8. If the ECG electrodes are used at the same time as the defibrillation electrodes: Do not allow ECG electrodes and defibrillation electrodes to overlap.
9. If necessary: Stroke out any trapped air from under the ECG electrodes.
10. Clip the ECG cable to the individual ECG electrodes.
11. Switch on the device (see "5.1 Switching the device on", page 76).
12. Select the patient group in the start menu.
13. Check whether the ECG curves for ECG measurement displayed on the device are plausible.

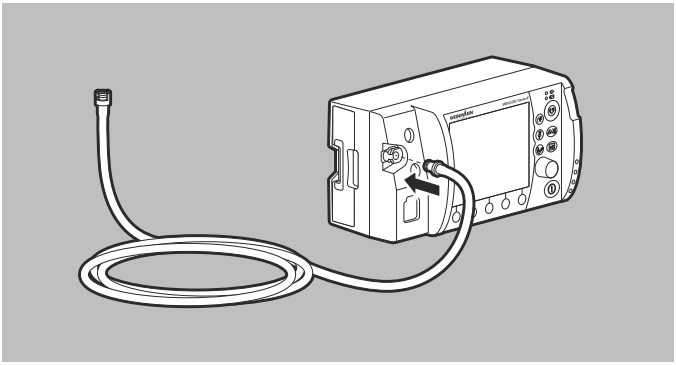
Result The ECG cable and the ECG electrodes are connected.

4.7 Attaching the NIBP cuff

NOTICE

Damage to the device caused by ingress of liquids!
The device is only protected from water jets as per IP55 when the battery is inserted, the water jet protection for the SD card slot is closed and the lines for the ECG, SpO_2, trunk cable and 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, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.
⇒ Always leave the lines for ECG, SpO_2, trunk cable and NIBP connecting tube including NIBP cuff connected.

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.



1. Connect the NIBP connecting tube to the **NIBP** connection on the device.

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⚠ WARNING

Risk of injury due to incorrect NIBP cuff!
An incorrectly selected or used NIBP cuff can lead to patient injuries.
⇒ Attach the NIBP cuff so that the blood supply is not stopped.
⇒ Do not attach the NIBP cuff to a limb with an intravenous infusion.
⇒ 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.
⇒ Do not attach the NIBP cuff to a limb with poor circulation.

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

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

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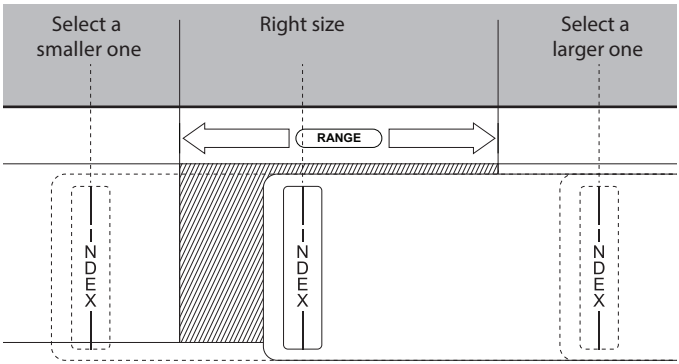
When doing so, please note:



- The index printed on the NIBP cuff must be within the printed range.
- If the index marking does not extend into the printed range: Select a larger NIBP cuff.
- If the index marking extends beyond the printed range: Select a smaller NIBP cuff.
- In the case of disposable cuffs for neonates, use adapter tube (WM 45467).

3. Switch on the device (see "5.1 Switching the device on", page 76).

⚠ WARNING

Risk of injury due to incorrectly selected patient group!
If the incorrect patient group is selected, the contact pressure of the NIPB cuff may be too high and injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If necessary: Change the patient group in the application menu.

4. Select the patient group in the start menu.

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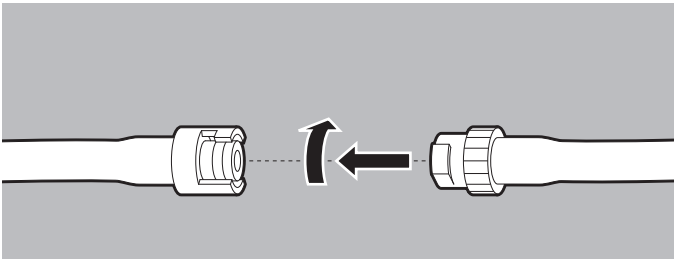

5. Connect the NIBP connecting tube to the tube of the NIBP cuff.
6. Turn the two tubes towards each other until they lock into place.

⚠ WARNING

Risk of injury due to incorrectly attached NIBP cuff!
An incorrectly attached NIBP cuff can result in excessive contact pressure. This can stop the blood supply and injure the patient.
⇒ Attach the NIBP cuff so that the blood supply is not stopped.
⇒ Do not attach the NIBP cuff to a limb with an intravenous infusion.
⇒ Do not attach the NIBP cuff to a limb to which an SpO_2 sensor is already attached.
⇒ Do not attach the NIBP cuff to a limb with open wounds or burns.
⇒ With long-term NIBP monitoring, check the position of the NIBP cuff regularly and, if necessary, reposition.
⇒ Do not attach the NIBP cuff to a limb with poor circulation.
⇒ Do not bend or crush the NIBP cuff tube or the NIBP connecting tube.

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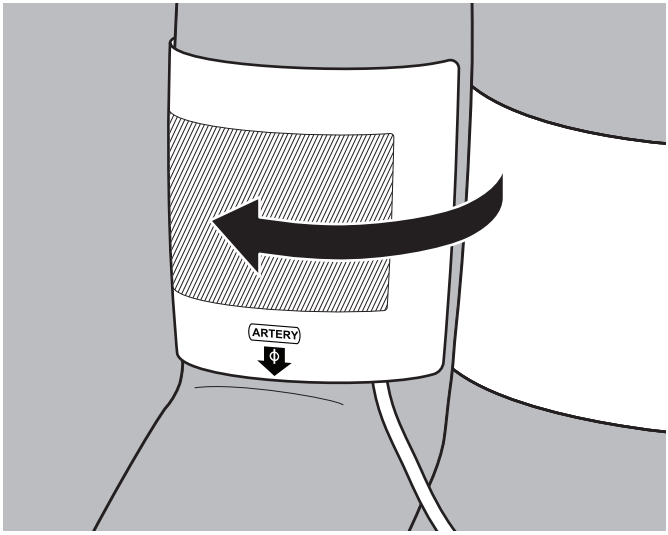

7. Attach the empty NIBP cuff to fit closely around the patient's limb.

When doing so, please note:

- The skin below the NIBP cuff must be undamaged.
- The NIBP cuff must fit tightly around the limb.
- The artery ("Artery") marking of the NIBP cuff must be positioned above the artery and point toward the hand/ foot.
- If the NIBP cuff is attached to the arm: The NIBP cuff must be positioned level with the heart.

8. Once the NIBP measurement is complete: Remove the NIBP cuff.

Result An NIBP cuff which is suitable for the patient is attached.

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4.8 Using the SD card

NOTICE

Loss of data due to incorrect SD card!
SD cards not purchased from WEINMANN Emergency may have reduced functionality or result in the loss of data.
⇒ Only use SD cards from WEINMANN Emergency.
⇒ Do not use the SD card for third-party files.

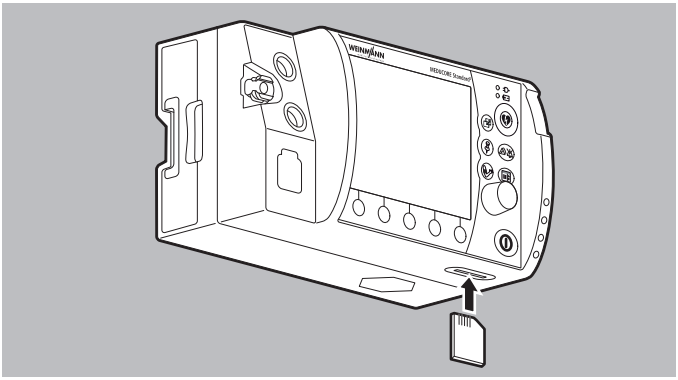
NOTICE

Damage to the device caused by ingress of liquids!
The device is only protected from water jets as per IP55 when the battery is inserted, the water jet protection for the SD card slot is closed and the lines for the ECG, SpO_2, trunk cable and 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, or accessories in liquids.
⇒ Only operate the device with the battery inserted.
⇒ Always close the water jet protection of the SD card slot.
⇒ Always leave the lines for ECG, SpO_2, trunk cable and NIBP connecting tube including NIBP cuff connected.

4.8.1 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.



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2. Push the SD card into the SD card slot until it clicks into place. 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 the ingress of dust and water.

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

After the device is switched on, the symbol appears on the display.

4.8.2 Removing the SD card

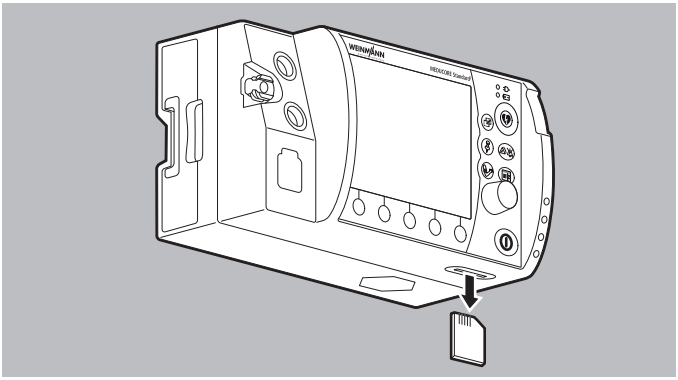
Requirement An SD card is in the SD card slot.

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

NOTICE

Incorrect use may result in loss of data!
If you remove the SD card while the symbol is displayed or during an ongoing session, data may be lost or the SD card damaged.
⇒ Only remove the SD card if the device is switched off or the following symbols or are displayed.

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



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

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Result The SD card is removed.

The symbol  appears on the device display.

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5 Operation

5.1 Switching the device on

Requirement

- The ECG cable and the defibrillation electrodes 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 sequence:

   - Alarm light flashes and test tone sounds
   - The start screen appears
   - Shock standby indicator is illuminated

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

   - If the device was switched off for ≥ 30 s: The start menu appears. The device starts with the presets in the operator menu.
   - If the device was switched off for < 30 s and, if whilst switched on previously, patient measurements were taken or an event was saved manually: The device skips the start menu and starts in the preset start mode and with the preset start view. The settings in the user menu from the last session are retained and the device assigns the session data to the last session.
   - If the ECG cable and the defibrillation electrodes were 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.
3. Perform a function check (see "10.2 Performing a function check", page 148).

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Result The device is switched on.

5.2 Switching the device off

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

Result The device is completely switched off.

5.3 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 the menu item	Confirm the set value	Select the menu item	Activate the application menu
Press the menu button	Close the menu	Close the menu	Activate the operator menu	Activate the user menu
Press the view button	-	-	-	Switch view: • Parameter view • Curve view

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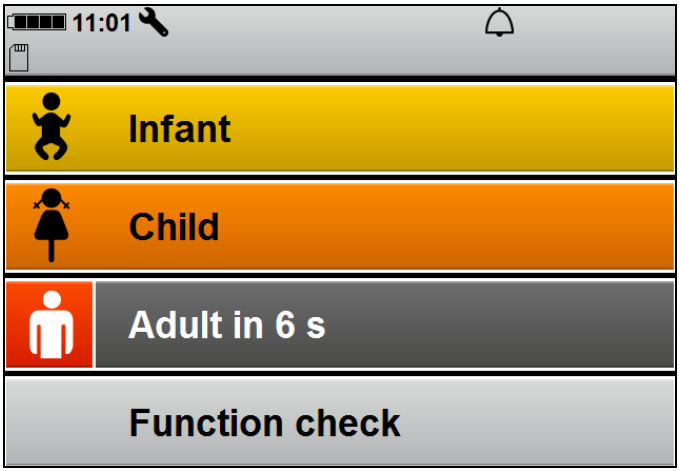
Action	Result			
	In a menu	Within a menu item	In the start menu	In a mode
Press event button	-	-	-	Manually saves an event in the data set.
Press the NIBP button	-	-	-	• Activate the NIBP function mode (press for < 2 s) • Start NIBP measurement (press for > 2 s)

5.4 Selecting the 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 "5.1 Switching the device on", page 76).



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

   or

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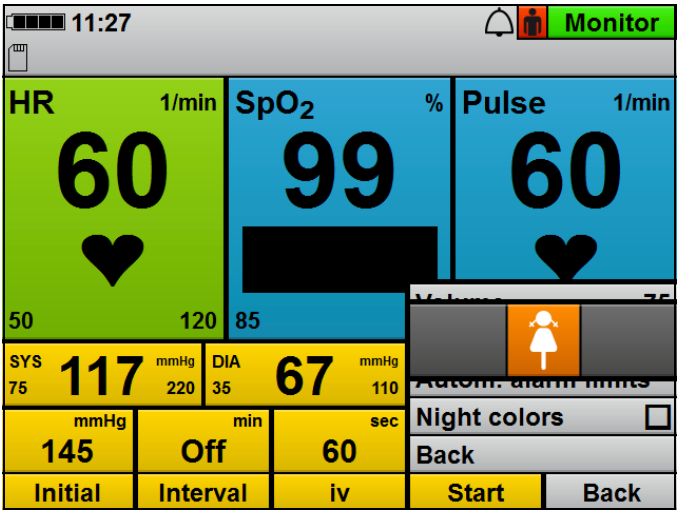
If the timer has expired: The device automatically selects the **Adult** patient group.



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 the mode display.

5.5 Performing defibrillation

5.5.1 Semi-automatic defibrillation in AED mode

The defibrillation sequence in the 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 the latter during resuscitation measures whilst taking the regional features into account.

Requirement

- The trunk cable and defibrillation electrodes are connected (see "4.4 Connecting the trunk cable and defibrillation electrodes", page 57).
- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is selected (see "5.4 Selecting the patient group", page 78).

⚠ WARNING

Risk of injury due to missing battery in the AED mode and in manual mode!
Without a battery, the capacitor for shock energy in the device cannot charge. This prevents defibrillation and delays treatment.
⇒ Insert a battery before using the AED mode or the manual mode.

⚠ 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 the AED mode on children below one year of age.

⚠ 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 which also guides the user through cardiopulmonary resuscitation by means of voice prompts (e.g. MEDUMAT Easy CPR), the simultaneous voice prompts from 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.

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1. Select AED mode with 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.
   - Upon connection of the defibrillation electrodes for children, the 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.

⚠ WARNING

Risk of injury due to incorrectly selected patient group!
With an incorrectly selected patient group in AED mode, the shock energy, the number of shocks in series, the energy curve and/or the metronome frequency, the ventilation pause and the compression/ventilation ratio may not be suitable for the patient and could result in patient injury.
⇒ Adapt the patient group to the patient.
⇒ If necessary: Change the patient group in the application menu.

2. If necessary: 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.
3. If necessary: Open the application menu with the navigation knob and change the device volume.
4. Follow the voice prompts and AED instructions.

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

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

- Shock required (see " Shock required", page 82)

  or

- Shock not required (see " Shock not required", page 84)

Shock required

The device performs 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 audio alarm sounds.

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⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may result in injury to the patient, 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.

NOTICE

Damage to the device caused by removal of the defibrillation electrodes during shock delivery!
Removal of the defibrillation electrodes during shock delivery can cause damage to the device.
⇒ Always leave defibrillation electrodes connected to the device and the patient during shock delivery.

1. Deliver a shock with the shock button .
   When doing so, please note: If the shock button is not pressed, the capacitor for the shock energy discharges automatically after 15 seconds.

Result The patient receives an electric shock. The shock energy corresponds to the settings in the operator menu. Upon delivery, the device settings are as follows:

Patient group	Setting
Child	First shock 75 J, subsequent shocks 75 J
for adults	First shock 150 J, subsequent shocks 200 J

The device guides you through cardiopulmonary resuscitation by means of voice prompts, AED instructions and the metronome (see " Performing cardiopulmonary resuscitation", page 84). It warns you again to stand clear of the patient after the preset time has elapsed (120 seconds when delivered), in order to perform another cardiac rhythm analysis.

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Shock not required

The device performs 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. Perform cardiopulmonary resuscitation (see " Performing cardiopulmonary resuscitation", page 84).

Result The patient does not have a defibrillatable cardiac rhythm. The device guides you through cardiopulmonary resuscitation 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 seconds when delivered), in order to perform another cardiac rhythm analysis.

Performing cardiopulmonary resuscitation

This section describes cardiopulmonary resuscitation in the AED mode. Upon delivery, the device performs cardiopulmonary resuscitation with the following parameters; these, however, can be adapted by the operator:

Setting	Patient group	
	for adults	Child
Duration of CPR phase	120 s	120 s
Ventilation pause	5 s	5 s
Compression/ventilation ratio	30:2	15:2
Start in intubation mode?	No	No
CPR voice prompts	No	No
Metronome frequency	100/min	100/min
Start analysis automatically	Yes	Yes

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

Voice prompt (optional)	AED instruction
Carry out cardiopulmonary resuscitation	Cardiopulmonary resuscitation

1. Perform chest compressions:
   - 30 chest compressions for the adult patient group
   - 15 chest compressions for the child patient group
   - Continuous chest compression with intubated patients

   When doing so, please note: The metronome sets the ideal frequency.

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	Cardiopulmonary resuscitation

3. Repeat the cardiopulmonary resuscitation sequence.
4. If the patient is intubated: Press the **Intub.** function button. The metronome sets a continuous frequency.
5. If the patients shows vital signs (breathing, response): Take basic patient care steps.
6. After each cardiopulmonary resuscitation cycle: Check that the defibrillation electrodes are positioned correctly.

Result Cardiopulmonary resuscitation has been performed.

5.5.2 Manual defibrillation (only with Manual defibrillation option)

This function is only available if it has been enabled and activated by the operator: Operator menu | System settings | Enable options | Manual mode (see "8.8 System settings", page 137).

If you are the operator of the device and have access to the operator menu, you can disable the manual mode: Operator menu | System settings | Disable functions | Manual mode (see "8.8 System settings", page 137).

Requirement

- The trunk cable and defibrillation electrodes are connected (see "4.4 Connecting the trunk cable and defibrillation electrodes", page 57).
- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is selected (see "5.4 Selecting the patient group", page 78).

⚠ WARNING

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

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

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

⇒ Follow the defibrillation guidelines.

⇒ Observe national and regional provisions on defibrillation.

⇒ Observe organizational guidelines on defibrillation.

⚠ WARNING

Risk of injury due to missing battery in the AED mode and in manual mode!

Without a battery, the capacitor for shock energy in the device cannot charge. This prevents defibrillation and delays treatment.

⇒ Insert a battery before using the AED mode or the manual mode.

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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 can injure the patient.
⇒ Adapt the patient group to the patient.
⇒ If necessary: Change the patient group in the application menu.

1. If necessary: 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 the parameter view in manual mode. If you activate the manual mode from the parameter view, there is an automatic switchover to curve view since, for manual shock delivery, the ECG evaluation on the display is required.
   - Audio alarm output is deactivated in manual mode. To activate the audio alarm output, press the alarm button briefly.
3. Evaluate the ECG lead.
4. If necessary: Select another ECG lead by pressing the **Lead** function button.
5. If shock is required: Select shock energy by pressing the **Energy** function button. When doing so, please note: Upon connection of the defibrillation electrodes for children (Pediatric), the defibrillation energy is automatically restricted to 100 J. It is not possible to set a higher energy in manual mode.
6. Press the **Charging** function button.
   The charge progress bar appears. A rising charge tone sounds until the device is ready to deliver the shock. When the device is charged, a sequence of tones sounds which signalizes shock standby and the shock button flashes.
7. Check ECG derivations to ascertain whether a shock is still required.

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⚠ WARNING

Risk of injury from electric shock!
The electric shock administered to the patient may result in injury to the patient, 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.

NOTICE

Damage to the device caused by removal of the defibrillation electrodes during shock delivery!
Removal of the defibrillation electrodes during shock delivery can cause damage to the device.
⇒ Always leave defibrillation electrodes connected to the device and the patient during shock delivery.

8. Deliver a shock with the shock button .
   When doing so, please note: If the shock button is not pressed, the capacitor for the shock energy discharges automatically after 30 seconds.

9. If necessary: Cancel shock charging by pressing the **Cancel** function button or by switching to another mode.

Result The patient receives an electric shock.

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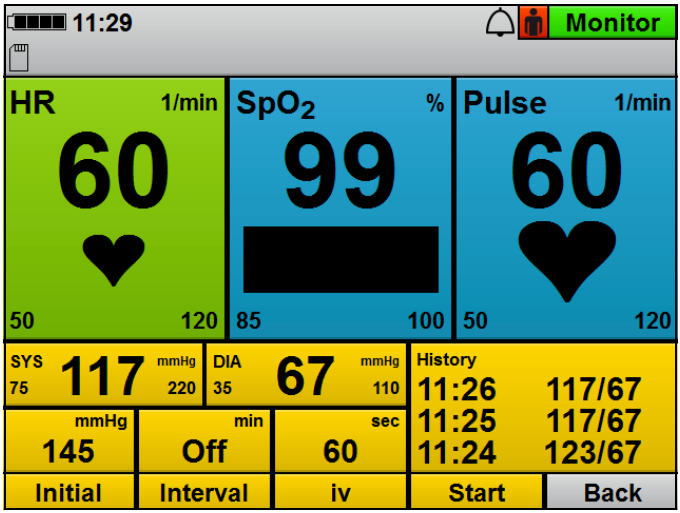
5.6 Performing pulse oximetry monitoring

Requirement

- The device is switched on (see "5.1 Switching the device on", page 76).
- A patient group is selected (see "5.4 Selecting the patient group", page 78).
- A pulse oximetry sensor is connected (see "4.5 Connecting the pulse oximetry sensor", page 60).

1. If necessary: Select another patient group (see "5.4 Selecting the patient group", page 78).
2. If necessary: Select the monitor mode by pressing the **Monitor** function button.
3. If necessary: Switch between parameter view and curve view with the view button .



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

   or

In the 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 "7.3.3 SpO_2 settings", page 114):
   - Adapt the feed speed of the plethysmogram
   - Give the pulse tone output priority over the heart rate tone output so that the tone pitch is output depending on oxygen saturation, even when the ECG cable or pad electrodes are connected to the patient.
6. If necessary: Set alarm limits in the user menu (see "7.3.1 Alarm settings", page 111).

   or

   Set automatic alarm limits in the application menu (see "6 Application menu", page 106).
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 the signal quality is not sufficient (bar in the **SpO_2** parameter field): Reposition the pulse oximetry sensor on the patient's limb.

Result Pulse oximetry monitoring is performed.

5.7 Performing ECG monitoring

Requirement
- The device is switched on (see "5.1 Switching the device on", page 76).
- A patient group is selected (see "5.4 Selecting the patient group", page 78).
- An ECG cable and the ECG electrodes are connected (see "4.6 Connecting the ECG cable and ECG electrodes", page 64).

1. If necessary: Select another patient group (see "5.4 Selecting the patient group", page 78).
2. If necessary: Select the monitor mode by pressing the **Monitor** function button.

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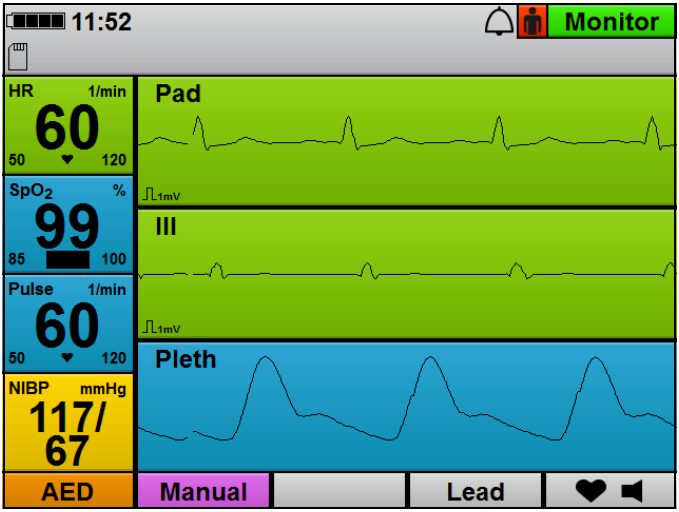
3. If necessary: Open the application menu with the navigation knob and change the device volume.
4. If necessary: Switch between parameter view and curve view with the view button .



5. Evaluate the ECG leads and heart rate.
6. If necessary: Select another ECG lead by pressing the **Lead** function button.
7. If necessary: Make the following ECG settings in the user menu (see "7.3.2 ECG settings", page 113):
   - Adapt amplitude scaling in order to adapt the displayed height of the ECG curve to the ECG measuring signal.
   - Activate autoscaling in order to have the height of the ECG curve automatically displayed adapted to the ECG measuring signal.
   - Adapt the feed speed of the ECG curve.
   - Activate the filter to filter disturbances caused by the line supply network out of the ECG display.

   If necessary: Set alarm limits in the user menu (see "7.3.1 Alarm settings", page 111).

   or

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Set automatic alarm limits in the application menu (see "6 Application menu", page 106).

8. If necessary: Switch off the heart rate tone/pulse tone with the function button ♥ 🔈.
   The symbol ♥ 🔇 appears.
9. If necessary: Open the application menu with the navigation knob and change the device volume.

Result ECG monitoring is performed.

5.8 Performing non-invasive blood pressure measurement (NIBP)

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

Furthermore, arteriosclerosis, reduced circulation, diabetes, old age, pregnancy, preeclampsia, kidney disease, trembling, shivers and the use of a cardiac pacemaker can impair the ability of the non-invasive blood pressure measurement module to record correct measured values.

5.8.1 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 the 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

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- Patient position (ideal position: Sitting comfortably, legs not crossed, feet flat on the floor, back and arm supported, middle 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.

Performing the NIBP measurement

Requirement

- An NIBP cuff is connected to the NIBP connecting tube (see "4.7 Attaching the NIBP cuff", page 68).
- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is set (see "5.4 Selecting the patient group", page 78).

⚠ CAUTION

Risk of injury due to incorrectly selected patient group
The device only provides correct measured values if the appropriate patient group is selected. An incorrect patient group can lead to incorrect measurements and patient injuries.
⇒ Select the suitable patient group for the patient (see "5.4 Selecting the patient group", page 78).

⚠ CAUTION

Risk of injury due to incorrectly selected NIBP cuff
The device only provides correct measured values if the appropriate NIBP cuff is selected. An unsuitable NIBP cuff can lead to incorrect measurements and patient injuries.
⇒ Select the suitable NIBP cuff for the patient (see "4.7 Attaching the NIBP cuff", page 68).

1. Press the NIBP button for < 2 s.
   The device switches to NIBP function mode.
2. If necessary: Select another patient group (see "5.4 Selecting the patient group", page 78).
   The NIBP module is configured in the device accordingly with the selected patient group.

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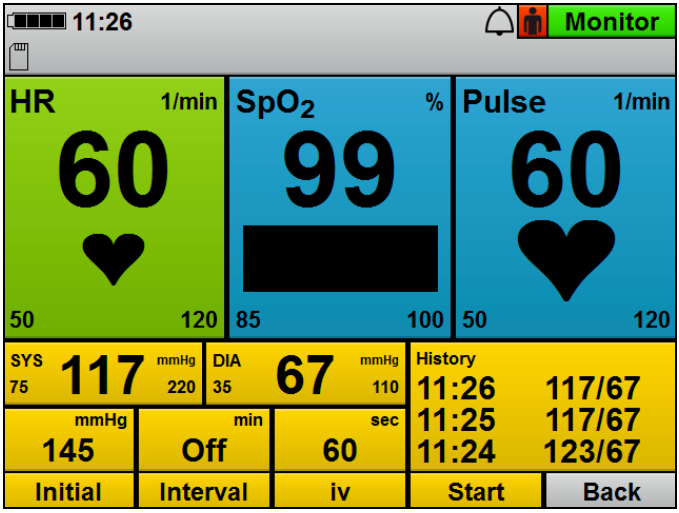

3. If necessary: Adapt the initial NIBP cuff pressure to the patient with the **Initial** function button and navigation knob.
   When doing so, please note: Following successful NIBP measurement, the initial NIBP cuff pressure adapts to the patient (approx. 30 mmHg above the systolic measured value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

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

   or

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

5. Evaluate the NIBP measurement.

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 "7.3.1 Alarm settings", page 111).

   or

   Set automatic alarm limits in the application menu (see "6 Application menu", page 106).

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

   or

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

Result Non-invasive blood pressure measurement has been performed.

5.8.2 Interval measurement

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

Performing the interval measurement

Requirement

- An NIBP cuff is connected to the NIBP connecting tube (see "4.7 Attaching the NIBP cuff", page 68).
- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is set (see "5.4 Selecting the patient group", page 78).

1. Press the NIBP button for < 2 s.
   The device switches to NIBP function mode.
2. If necessary: Select another patient group (see "5.4 Selecting the patient group", page 78).
   The NIBP module is configured in the device accordingly with the selected patient group.
3. Press the **Interval** function button.
4. Set the interval duration using the navigation knob.

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5. Press the **Start** function button.

   or

   Press the NIBP button for < 2 s.
   An NIBP measurement starts. At the end of the measurement, the device shows the systolic and diastolic arterial pressure, the timer expires and the next measurement starts automatically.

6. Evaluate the NIBP measurement.

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 "7.3.1 Alarm settings", page 111).

   or

   Set automatic alarm limits in the application menu (see "6 Application menu", page 106).

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

   or

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

Result The interval measurement has been performed.

5.8.3 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. The venous blood return flow is impeded and the user can puncture one of the patient's veins. The venous stasis function is only available to 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 "8.8 System settings", page 137).

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Performing venous stasis

Requirement

- An NIBP cuff is connected to the NIBP connecting tube (see "4.7 Attaching the NIBP cuff", page 68).
- The device is switched on (see "5.1 Switching the device on", page 76).
- The **Adult** patient group is set.
- A mode is set.

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 expires. During the venous stasis time, the pressure of the NIBP cuff is maintained.

⚠ CAUTION

Risk of injury from deflating the pressure in the NIBP cuff too soon.
On expiry of the timer, the venous stasis ends automatically. If the intravenous access is not created during this time, this can injure the patient.
⇒ Create the access before the timer expires.
⇒ If the access cannot be created before the timer expires: Abort and provide medical treatment to the puncture site.

3. Create the intravenous access.
4. Once the access has been created: Release the pressure from the NIBP cuff with the **Stop** function button.

Result A venous stasis is created.

5.9 Using the audio alarm output

5.9.1 Canceling the audio alarm output

Requirement An alarm is active and is audible.

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

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

5.9.2 Pausing/muting the audio alarm output

Requirement An alarm is active and is audible.

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

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

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

5.9.3 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 .

   or

   Switch modes.

Result Muting or pausing of audio alarm output is canceled.

5.10 Saving the event manually in the session data set

Measured values and the user actions performed 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, medication administration, etc.) can be saved in the data set in order to subsequently assign them chronologically during evaluation.

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Requirement

- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is set (see "5.4 Selecting the patient group", page 78).

1. Press event button .

Result The device saves an event with the designation **Manual event** in the session data set and an acknowledgment tone is heard.

5.11 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 neonates
2. Remove the short-term NIBP cuffs from the patient and check the duration of use.
3. If necessary: Include new short-term NIBP cuffs with the device.
4. Include new disposable articles and, if necessary, a short-term NIBP cuff with the device.
5. Hygienically reprocess the device, components and accessories (see "9 Hygienic reprocessing", page 144).
6. If necessary: Place components and accessories on the portable system or in the protective transport bag.
7. If necessary: Store the device, components and accessories (see "13 Storage", page 172).

Result The device is reprocessed following use.

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5.12 Saving session data/status log

The device always saves the session data and status log to its internal memory. The status log is required in order to be able to analyze the data should servicing be necessary.

If an SD card is inserted in the SD card slot, the device automatically saves the data to the SD card in addition. The symbol appears on the display. In the first minute after a new session is started, the device only saves the session data temporarily to the device memory, but not yet to the SD card. If you switch off the device during this time, the session data is lost. After the first minute, the device permanently saves the data to the internal device memory and to the SD card (provided that the SD card was inserted in the SD card slot before the start of the session). If the SD card is full, the symbol appears.

If you switch off the device and then switch it on again after < 30 s, the device continues saving the data.

If you switch off the device and then switch it on again after > 30 s, the device creates a new session data set.

Saving session data/status log to SD card

Requirement An SD card is in the SD card slot.

1. Switch on the device (see "5.1 Switching the device on", page 76).
   The start menu appears.
2. Press the menu button to call up the operator menu.
3. Enable the operator menu with the access code.
4. Select **System settings | SD card**.
5. Select the menu item **Export internal memory to SD card**.

   or

   Select the menu item **Export status log to SD card**.
   The message **Start export?** appears.
6. Press the function button **OK** to start copying.
   The session data/status log are saved to the SD card. During the copying process, the symbol appears

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Result The session data/status log are located on the SD card.

5.13 Analyzing sessions

You can analyze and archive device session data using the DEFIview WM 45120 PC software.

1. Remove the SD card (see "4.8.2 Removing the SD card", page 74).
2. Insert the SD card into a PC's SD card slot.
3. To import, analyze or archive session data: Follow the Instructions for Use for the PC software.

5.14 Enable options

Requirement

- The device is switched off.
- There is an enable code for a new option.

1. Switch on the device (see "5.1 Switching the device on", page 76).
   The start menu appears.
2. Call up the operator menu with the menu key and enable (see "8.1 Navigating the operator menu", page 117).
3. Select **System settings | Enable options | Enter enable code**.
4. Enter the enable code for the new option.
   The new option appears as a selection under **System settings | Enable options.**
5. Activate/deactivate a new option with a checkmark.

Result A new option is enabled for use and activated/deactivated.

5.15 Transferring the device configuration to another device

Using the device's SD card, you can transfer 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 can confuse the user and result in injury to the patient.
⇒ Select the same alarm presets in the same or similar devices.

1. Switch on the device (see "5.1 Switching the device on", page 76).
   The start menu appears.
2. Call up the operator menu with the menu key and enable (see "8.1 Navigating the operator menu", page 117).
3. Select **System settings | SD card | Export device configuration to SD card**.
4. Confirm with **OK**.
5. Remove the SD card (see "4.8.2 Removing the SD card", page 74).
6. Insert the SD card into another device (see "4.8.1 Inserting an SD card", page 73).
7. Switch on the device (see "5.1 Switching the device on", page 76).
   The start menu appears.
8. Call up the operator menu with the menu key and enable (see "8.1 Navigating the operator menu", page 117).
9. Select **System settings | SD card | Import device configuration from SD card**.
10. Confirm by pressing **OK** to start importing.

Result The device settings have been transferred to another device.

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5.16 Updating the software

Requirement

- A charged battery is inserted in the device.
- The device is connected to the line power.
- The device is off and an SD card with new software is in the SD card slot.

NOTICE

Damage to the device due to battery failure or lack of line power!
If the power supply to the device is cut during the software update due to a battery failure or lack of line power, the device may be damaged to such an extent that it needs to be repaired.
⇒ Always connect the device to the line power with a charged battery for software updates.

1. If necessary: Download the current software from the Login area of the WEINMANN Emergency website to the SD card.
2. If the software is available as a ZIP file: Unzip the software.
3. Place the file in the SD card's root directory. When doing so, please note: The file must not be in a sub-folder.
4. Switch on the device (see "5.1 Switching the device on", page 76).
   The start menu appears.
5. Call up the operator menu with the menu key  and enable (see "8.1 Navigating the operator menu", page 117).
6. Select **System settings | Software**.

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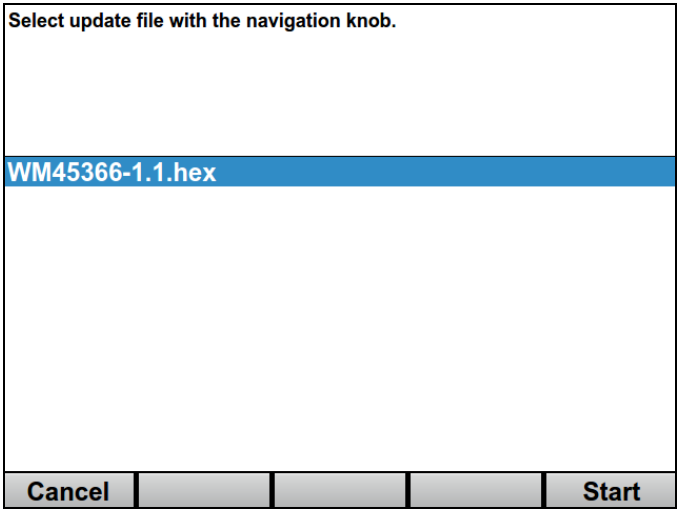

7. Select new software with the navigation knob.

NOTICE

Damage to the device caused by moving the device and/or pressing buttons during the update!
Moving the device and/or pressing buttons during the update may cancel the update and damage the device.
⇒ Do not move the device.
⇒ Do not press any buttons on the device.

8. Update the device software with the **Start** function button.
9. Wait until the software has been updated.
   After the end of the update, the device displays the message **SUCCESS**.
10. Restart the device with the **Restart** function button.
    The device restarts and the start menu appears on the display.
11. Call up the operator menu with the menu key and enable (see "8.1 Navigating the operator menu", page 117).
12. Select **Device information | Device information**.
    The device displays the installed software.

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Device information	
Serial numbers	
Serial number	1000
Device ID	12345678
Counter	
Passed function check	2017-09-06 16:50
Days until service	0
Next service	due
Software versions	
Device software	1.1
	Back

13. Press and hold the On/Off button ⏻ for at least 2 seconds to switch off the device and save the settings.
14. Perform a function check (see "10.2 Performing a function check", page 148).
15. If necessary: Set the date and time (see "8.8 System settings", page 137).

Result The software has been updated.

6 Application menu

The application menu contains functions and settings which can be accessed quickly and easily during use.

6.1 Navigating the application menu

Requirement

- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is set (see "5.4 Selecting the patient group", page 78).
- A mode is set.

1. To call up the application menu: Press the navigation knob.
2. Select the entry.
3. To change the volume and patient group: Select setting with the navigation knob and confirm.
4. To activate/deactivate automatic alarm limits and night colors: Press the navigation knob.
5. To exit the menu without making any entries:
   Select the **Back** function button.

   or

   Wait 3 seconds.

Result Functions are performed or settings are made.

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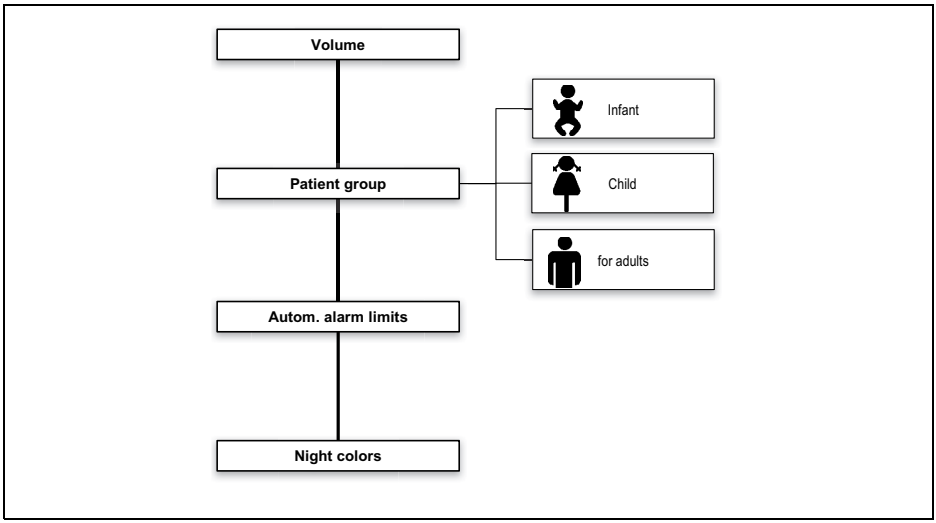
6.2 Menu structure



6-1 Application menu

6.3 Settings

Parameter	Possible values	Description	Factory setting
Volume	25 % 50 % 75 % 100 %	Here you can set the volume of the device for the current session.	75 %
Patient group	for adults  Child  Infant 	Here you can select the patient group.	For adults 
Autom. alarm limits		The device sets the alarm limits for the physiological alarms automatically. 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 "7 User menu", page 109).	20 %
Night colors	Activated  Deactivated 	Here you can set whether the device is to display night colors.	Deactivated

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7 User menu

The user menu contains functions and settings which influence the current session and which are not saved permanently as device presets.

If the device was switched off for < 30 s and, if whilst switched on previously, patient measurements were taken or a manual event was saved, the settings made previously in the user menu are retained.

7.1 Navigating the user menu

Requirement

- The device is switched on (see "5.1 Switching the device on", page 76).
- The patient group is set (see "5.4 Selecting the patient group", page 78).
- A mode is set.

1. Press the menu button .
2. Select setting with the navigation knob and confirm.
3. Change the setting with the navigation knob and confirm.
4. To exit the menu:
   Select the **Back** function button.
   Or
   Press the menu button .

Result Settings are made and apply to the current session.

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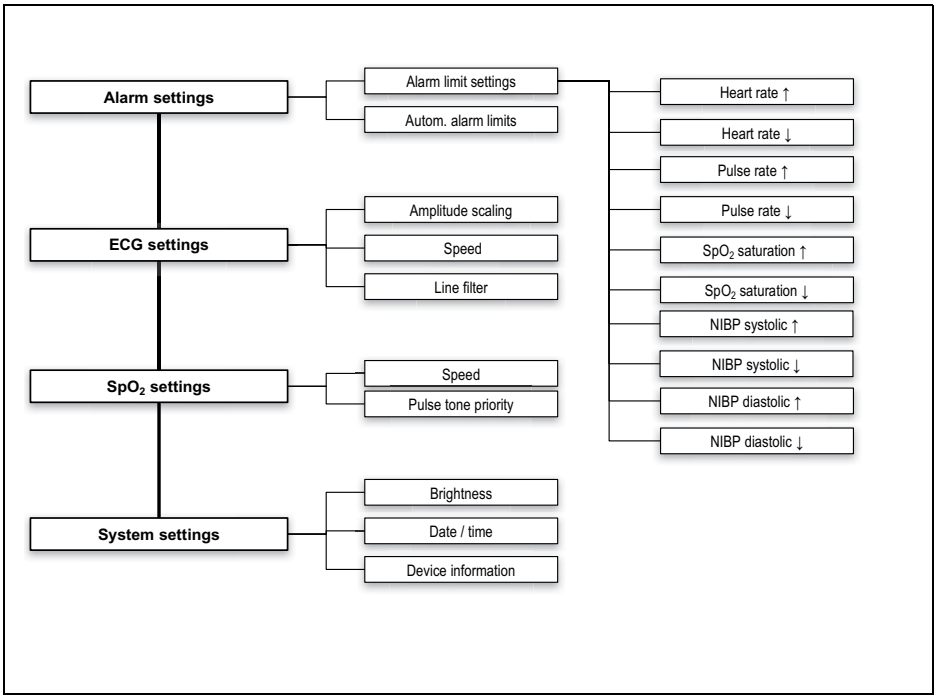
7.2 Menu structure



7-1 User menu

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7.3 Settings

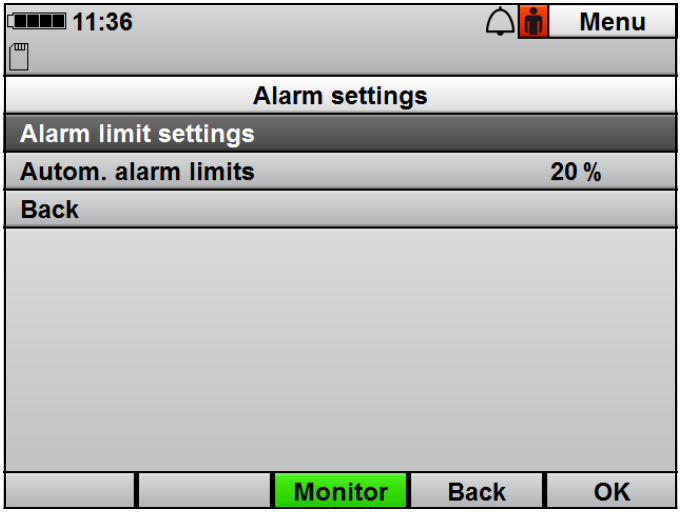
7.3.1 Alarm settings

⚠ 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 can prevent the device from emitting an alarm, thereby putting the patient at risk.

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



7-2 Alarm settings sub-menu

Parameter		Possible values	Description	Factory setting for patient group		
				Adult	Child	Infant
Alarm limit settings	Heart rate ↑	35/min-250/min, in increments of 5	Here you can set the upper (↑) and lower (↓) limits as of which the device must emit an alarm. According to the values set, the setting ranges of the upper and lower limits 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	150/min	200/min
	Heart rate ↓	30/min-245/min, in increments of 5		50/min	50/min	100/min
	Pulse rate ↑	35/min-250/min, in increments of 5		120/min	150/min	200/min
	Pulse rate ↓	30/min-245/min, in increments of 5		50/min	50/min	100/min
	SpO_2 saturation ↑	66 %-100 %		100 %	100 %	95 %
	SpO_2 saturation ↓	65 %-99 %		85 %	85 %	85 %
	NIBP systolic ↑	45 mmHg-260 mmHg, in increments of 5		220 mmHg	145 mmHg	100 mmHg
	NIBP systolic ↓	40 mmHg-255 mmHg, in increments of 5		75 mmHg	75 mmHg	50 mmHg
	NIBP diastolic ↑	25 mmHg-200 mmHg, in increments of 5		110 mmHg	100 mmHg	70 mmHg
	NIBP diastolic ↓	20 mmHg-195 mmHg, in increments of 5		35 mmHg	35 mmHg	30 mmHg
Autom. alarm limits		10 % 20 % 30 %	Here you can set the automatic alarm limits. The device sets the alarm limits for the physiological alarms automatically. The deviation is 10 %, 20 % or 30 % from the values measured at the time of activation.	20 %		

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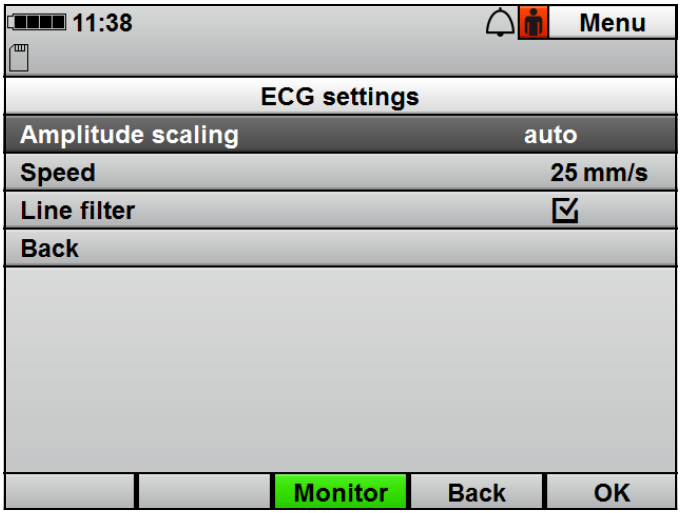
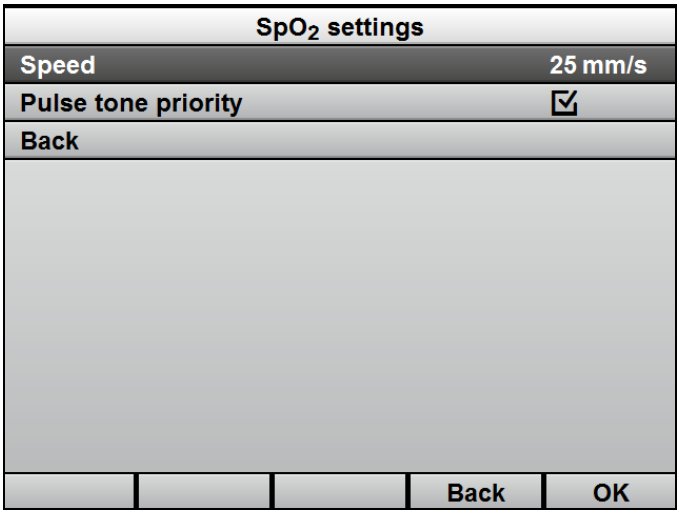
7.3.2 ECG settings



7-3 ECG settings sub-menu

Parameter	Possible values	Description	Factory setting
Amplitude scaling	auto 2 mm/mV 5 mm/mV 10 mm/mV 20 mm/mV	Here you can set the strength of the ECG signal and thus the height of the ECG curve. If the **auto** setting has been selected, the strength of the ECG signal and thus the height of the ECG curve are adapted automatically so that a maximum height is displayed.	auto
Speed	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the speed of the ECG curve display and thus change the temporal resolution.	25 mm/s
Line filter	Activated ☑ Deactivated ☐	By activating the line filter, you can reduce ECG disturbances caused by the power supply network.	Activated

7.3.3 SpO_2 settings



7-4 SpO_2 settings sub-menu

Parameter	Possible values	Description	Factory setting
Speed	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the speed of the SpO_2 curve display and thus change the temporal resolution.	25 mm/s
Pulse tone priority	Activated ☑ Deactivated ☐	Here you can set whether the pulse tone should take priority over the heart rate tone. The tone pitch of the pulse tone is adapted to the measured oxygen saturation.	Activated

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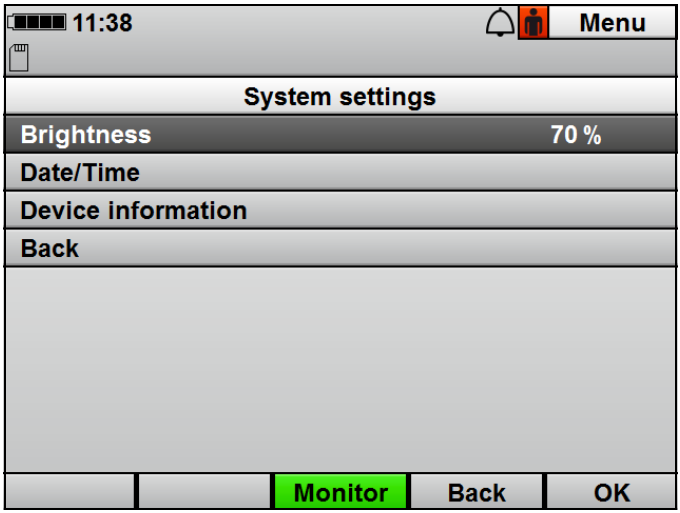
7.3.4 System settings



7-5 System settings sub-menu

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 the new time only if it remained switched on for at least 1 min before being switched off. The new time does not take effect until the device is switched on again.	-
	Month			-
	Day			-
	Hour			-
	Minute			-
Device information	Serial numbers	No settings	Here you can view information on the device data	-
	Counter			-
	Software versions			-

8 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 can result in incorrect settings in the user menu or too limited/too comprehensive device functions. This can cause critical operating situations and injure the patient.
⇒ The operator menu should only be used by operators who are familiar with the settings in the operator menu and their impacts on the user menu and device functions.
⇒ Adapt the device functions to the user's know-how.
⇒ Protect the operator menu with a password.

The operator menu contains the device presets which are permanently stored. If the device was switched off for longer than 30 s and is switched on again, these operator menu device presets are loaded. If the device was switched off for less than 30 s and a patient was previously connected, the user menu settings are restored.

Moreover, the operator menu contains functions which are only relevant to the operator and not the user, e.g. the performance of software updates, the enabling of optional functions and the disabling of functions.

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8.1 Navigating the operator menu

Requirement

- The device is switched on (see "5.1 Switching the device on", page 76).
- The start screen is displayed.

1. Press the menu button  .
2. Select access code with the navigation knob and confirm.

The operator menu is protected by an access code. Upon delivery this code is 0000. WEINMANN Emergency recommends changing this code as soon as the device is put into operation.

3. Select setting with the navigation knob and confirm.
4. Change the setting with the navigation knob and confirm.
5. To exit the menu:
   Select the **Back** function button.

   or

   Press the menu button  .

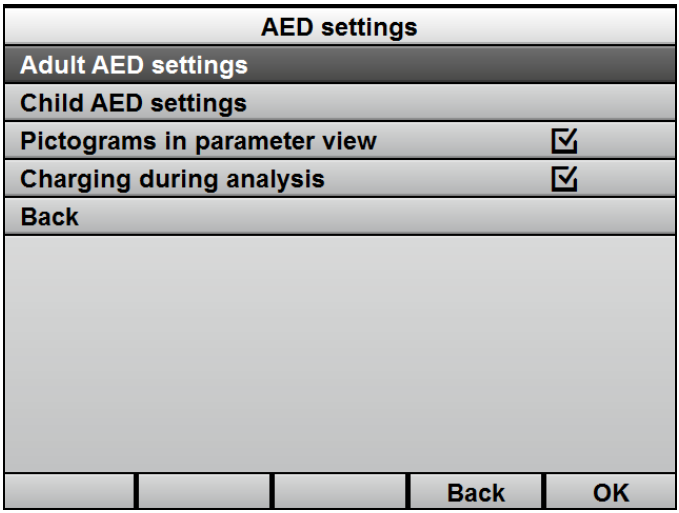
Result Settings are made and apply to the current session.

8.2 AED settings

You can make presets for the AED mode in the AED setup menu.

The factory settings are such that the ERC guidelines for resuscitation are met. Adjustments to the AED settings can result in users no longer being supported in compliance with these guidelines.

The AED settings enable you to adapt the device to the users' qualification level and to provide optimal support to the latter during resuscitation measures whilst taking the regional features into account.



8-1 AED settings sub-menu

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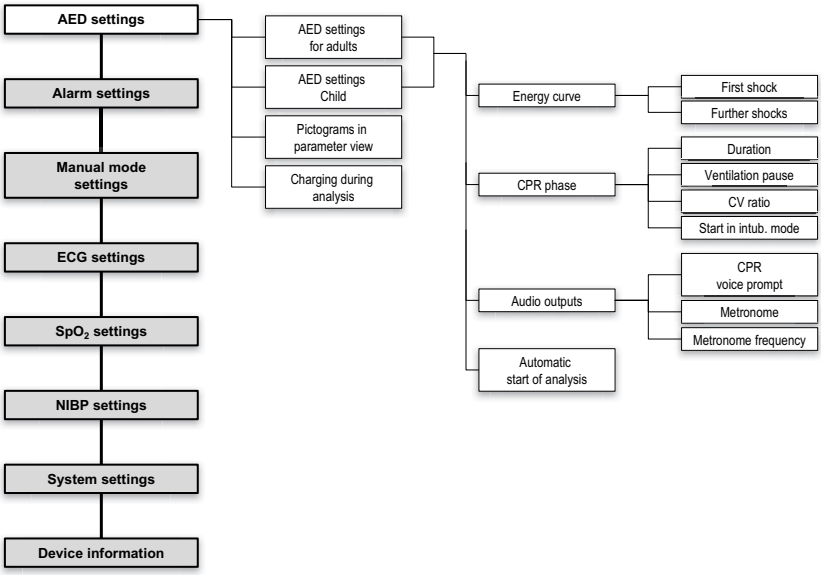
8.2.1 Menu structure



8.2.2 Possible values

Parameter		Possible values	Description	Factory setting
Adult AED settings/child AED settings				
Energy curve	First shock	1 J to 200 J	Here you can set the shock energy of the first shock in the AED mode.	• AED mode adult: 150 J • AED mode child: 75 J
	Further shocks		Here you can set the shock energy of subsequent shocks in the 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 interval between the cardiac rhythm analyses.	120 s

Parameter		Possible values	Description	Factory setting
Adult AED settings/child AED settings				
CPR phase	Ventilation pause	3 s to 8 s	Here you can set the time interval for ventilation between the chest compressions. When choosing a setting, consider whether the voice prompt is deactivated: • When the voice prompt is activated, the pause begins after the last metronome sound and ends when the voice prompt begins. • When the voice prompt is deactivated, the pause begins after the last metronome sound and ends when the first metronome sound begins.	5 s
	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
	Start in intub. mode	Activated ☑ Deactivated ☐	Here you can set whether the device is to start up with the continuous metronome rhythm for intubated patients.	Deactivated

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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 compression (*Ventilate twice* and *Carry out cardiopulmonary resuscitation*) should be output.	Deactivated
	Metronome	Activated ☑ Deactivated ☐	Here you can activate or deactivate the metronome output.	Activated
	Metronome frequency	100/min to 120/min	Here you can set the frequency of the metronome.	100/min
Start analysis automatically		Activated ☑ Deactivated ☐	Here you can set whether the cardiac rhythm analysis starts automatically, or manually at the touch of a button.	Activated
Pictograms in parameter view		Activated ☑ Deactivated ☐	Here you can set in the AED mode whether, instead of parameters, pictograms are shown in the parameter view.	Deactivated
Charging during analysis		Activated ☑ Deactivated ☐	Here you can set whether the defibrillation capacitor is to be charged at the same time as the cardiac rhythm analysis and thus independently of the analysis result. If this setting is deactivated, the service life of the defibrillation capacitor is extended.	Activated

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8.3 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 can prevent the device from emitting 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 can confuse the user and result in injury to the patient.

⇒ Select the same alarm presets in the same or similar devices.

You can make presets for the alarm system in the alarm setup menu.

The factory settings are selected so that the guidelines required by the standards are met and a high level of safety is achieved. Changes to the alarm settings can 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.

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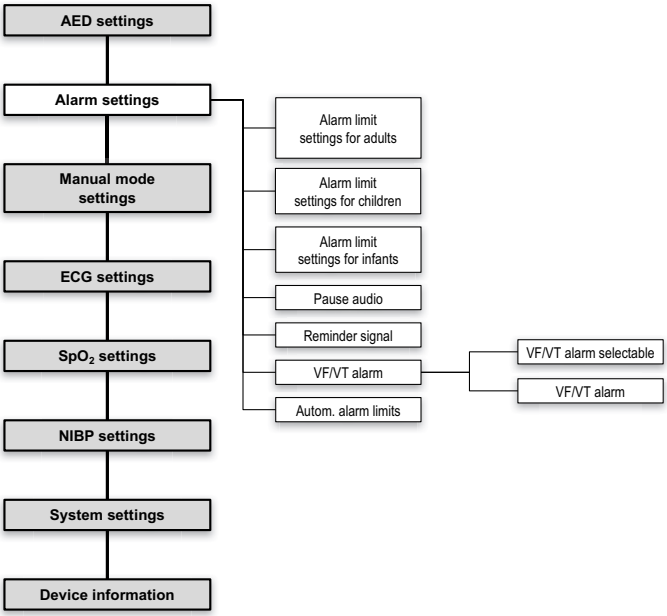
Alarm settings	
Adult alarm limit settings	
Child alarm limit settings	
Infant alarm limit settings	
Pause audio	**2 min**
Audible alarm emitted in manual mode	☐
Reminder signal	**2 min**
VF/VT alarm	
Autom. alarm limits	**20 %**
Back	

			Back	OK

8-2 Alarm settings sub-menu

8.3.1 Menu structure



8.3.2 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 (↓) limits for the patient group as of which the device must emit an alarm. According to the values set, the setting ranges of the upper and lower limits 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 (↓) limits for the patient group as of which the device must emit an alarm. According to the values set, the setting ranges of the upper and lower limits 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-260 mmHg, in increments of 5		145 mmHg
	NIBP systolic ↓	40 mmHg-255 mmHg, in increments of 5		75 mmHg
	NIBP diastolic ↑	25 mmHg-200 mmHg, in increments of 5		100 mmHg
	NIBP diastolic ↓	20 mmHg-195 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 (↓) limits for the patient group as of which the device must emit an alarm. According to the values set, the setting ranges of the upper and lower limits 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-260 mmHg, in increments of 5		100 mmHg
	NIBP systolic ↓	40 mmHg-255 mmHg, in increments of 5		50 mmHg
	NIBP diastolic ↑	25 mmHg-200 mmHg, in increments of 5		70 mmHg
	NIBP diastolic ↓	20 mmHg-195 mmHg, in increments of 5		30 mmHg
Pause audio		Infinite 1 min 2 min 5 min 10 min	Here you can set the length of time for which the audio alarm output is paused. If you select **Infinite**, the audio alarm output is permanently paused (the audio alarm output is muted).	2 min
Alarm tone output in manual mode		Activated ☑ Deactivated ☐	Here you can set whether the audio alarm output is active or inactive when the user calls up the 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 interval at which a reminder signal reminds you that the 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 should be active when the device is started.	Activated
Autom. alarm limits		10 % 20 % 30 %	Here you can set the automatic alarm limits. The device sets the alarm limits for the physiological alarms automatically. The deviation is 10 %, 20 % or 30 % from the values measured at the time of activation.	20 %

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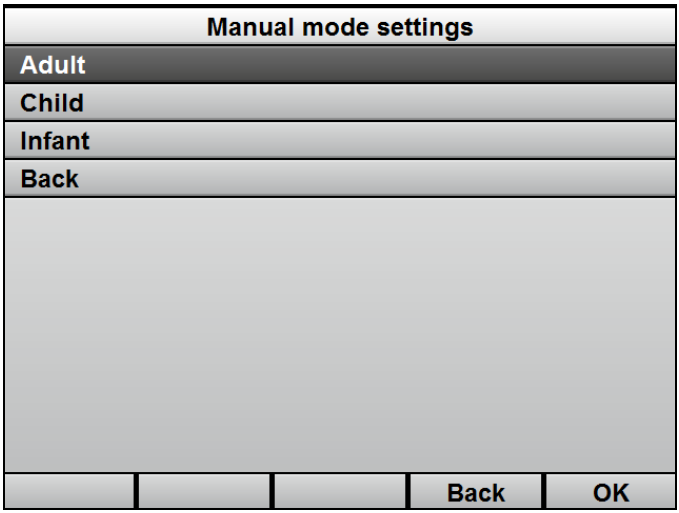
8.4 Manual mode settings (only with Manual mode option)

You can make the presets for the defibrillation energies in the manual mode setup menu.

The factory settings are such that the ERC guidelines for resuscitation are met. Adjustments to the settings for the manual mode can result in users no longer being supported in compliance with these guidelines.

You can adapt the device to the patient group using the specific settings for the manual mode.



8-3 Manual mode settings sub-menu

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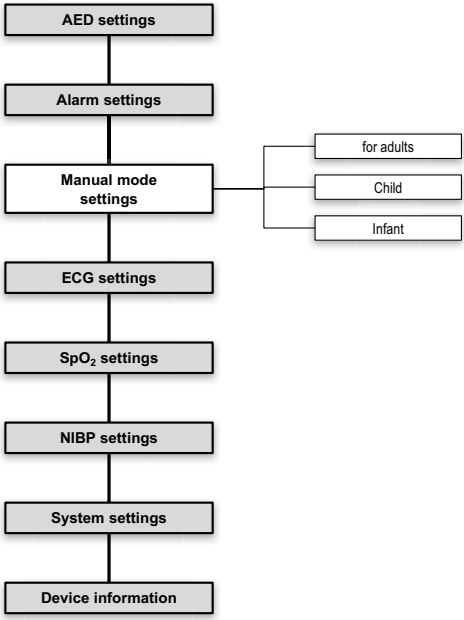
8.4.1 Menu structure

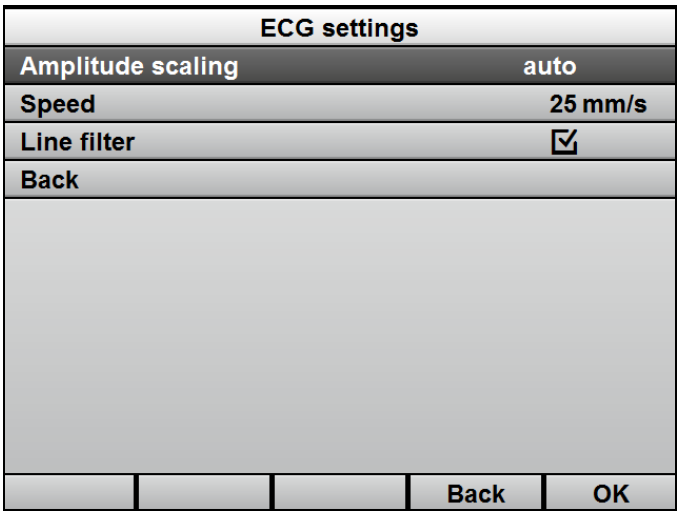


8.4.2 Possible values

Parameter		Possible values	Description	Factory setting
for adults	Shock energy	1 J to 200 J	Here you can set which defibrillation energy should be preset in manual mode.	150 J
Child				75 J
Infant				

8.5 ECG settings

In the ECG setup menu, you can make the presets for displaying the ECG curves.



8-4 ECG settings sub-menu

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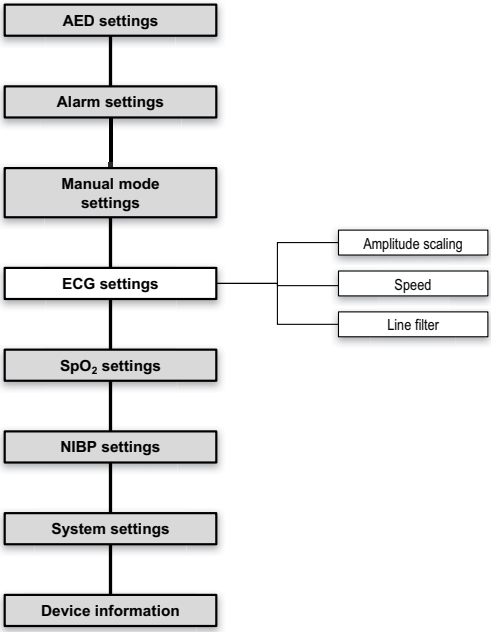
8.5.1 Menu structure

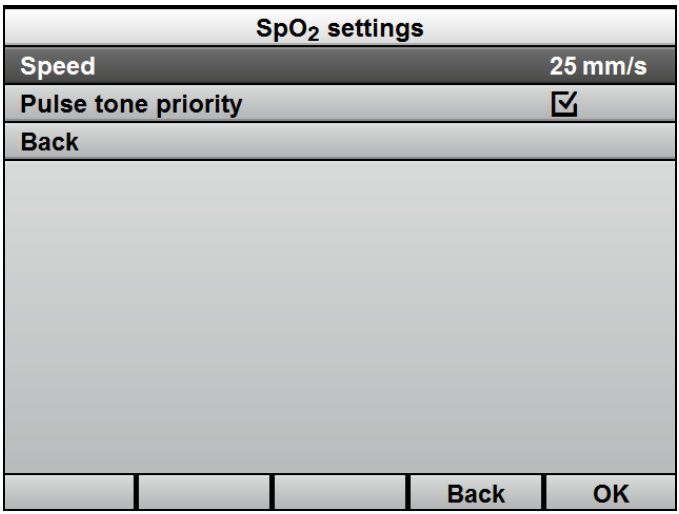


8.5.2 Possible values

Parameter	Possible values	Description	Factory setting
Amplitude scaling	auto 2 mm/mV 5 mm/mV 10 mm/mV 20 mm/mV	Here you can set the strength of the ECG signal and thus the height of the ECG curve.	auto
Speed	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the speed of the ECG curve display and thus change the temporal resolution.	25 mm/s
Line filter	Activated ☑ Deactivated ☐	By activating the line filter, you can reduce ECG disturbances caused by the power supply network.	Activated

8.6 SpO_2 settings

In the SpO_2 setup menu you can make the presets for displaying the plethysmogram and for outputting the pulse tone.



8-5 SpO_2 settings sub-menu

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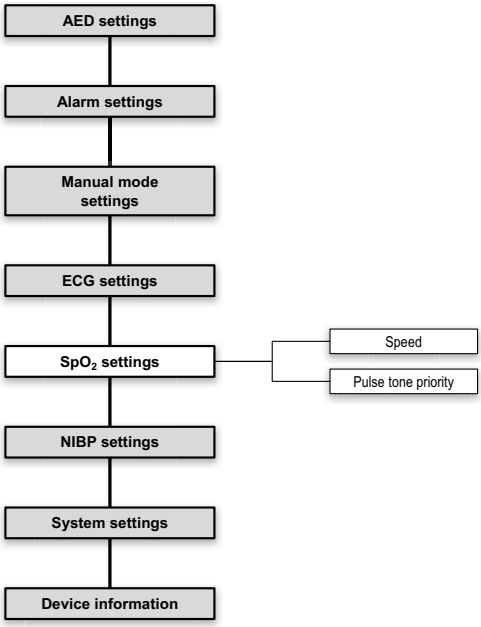
8.6.1 Menu structure



8.6.2 Possible values

Parameter	Possible values	Description	Factory setting
Speed	12.5 mm/s 25 mm/s 50 mm/s	Here you can set the speed of the SpO_2 curve display and thus change the temporal resolution.	25 mm/s
Pulse tone priority	Activated ☑ Deactivated ☐	Here you can set whether the pulse tone should take priority over the heart rate tone. The tone pitch of the pulse tone is adapted to the measured oxygen saturation.	Activated

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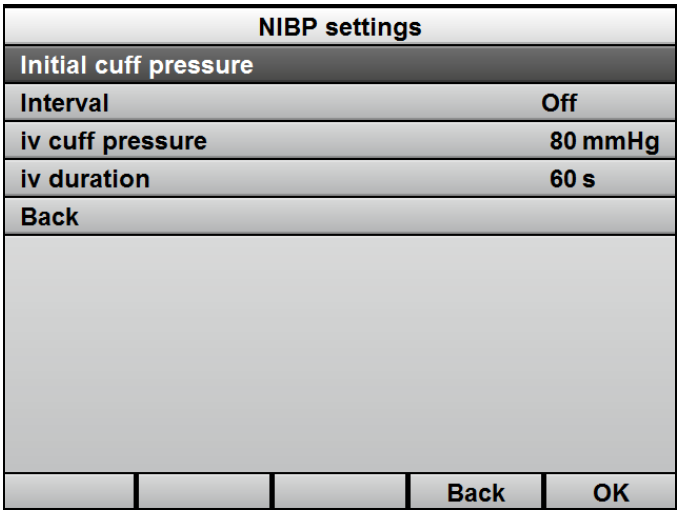
8.7 NIBP settings

In the NIBP setup menu you can make the presets for blood pressure measurement and the venous stasis function.

You can adapt the device to the patient group using the specific NIBP settings.



8-6 NIBP settings sub-menu

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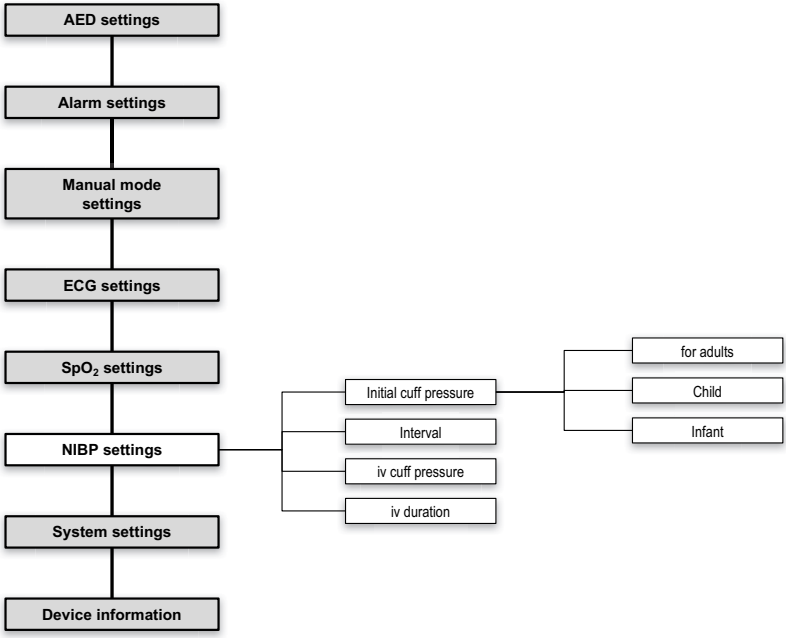
8.7.1 Menu structure



8.7.2 Possible values

Parameter		Possible values	Description	Factory setting
Initial cuff pressure	for adults	120 mmHg-280 mmHg, in increments of 5	Here you can set for the patient group the NIBP cuff pressure to which the device must inflate the NIBP cuff.	180 mmHg
	Child	80 mmHg-170 mmHg, in increments of 5		120 mmHg
	Infant	60 mmHg-140 mmHg, in increments of 5		90 mmHg

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Parameter		Possible values	Description	Factory setting
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
iv cuff pressure		60 mmHg- 140 mmHg, in increments of 5	Here you can set the pressure to which the NIBP cuff is inflated on initiation of the iv function.	80 mmHg
iv duration		10 s-120 s	Here you can set the duration for which the pressure must be maintained on the NIBP cuff when the iv function has been initiated.	60 s

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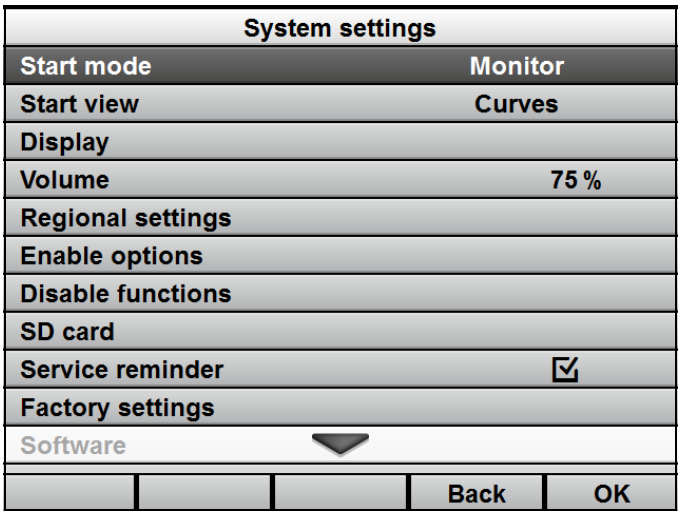
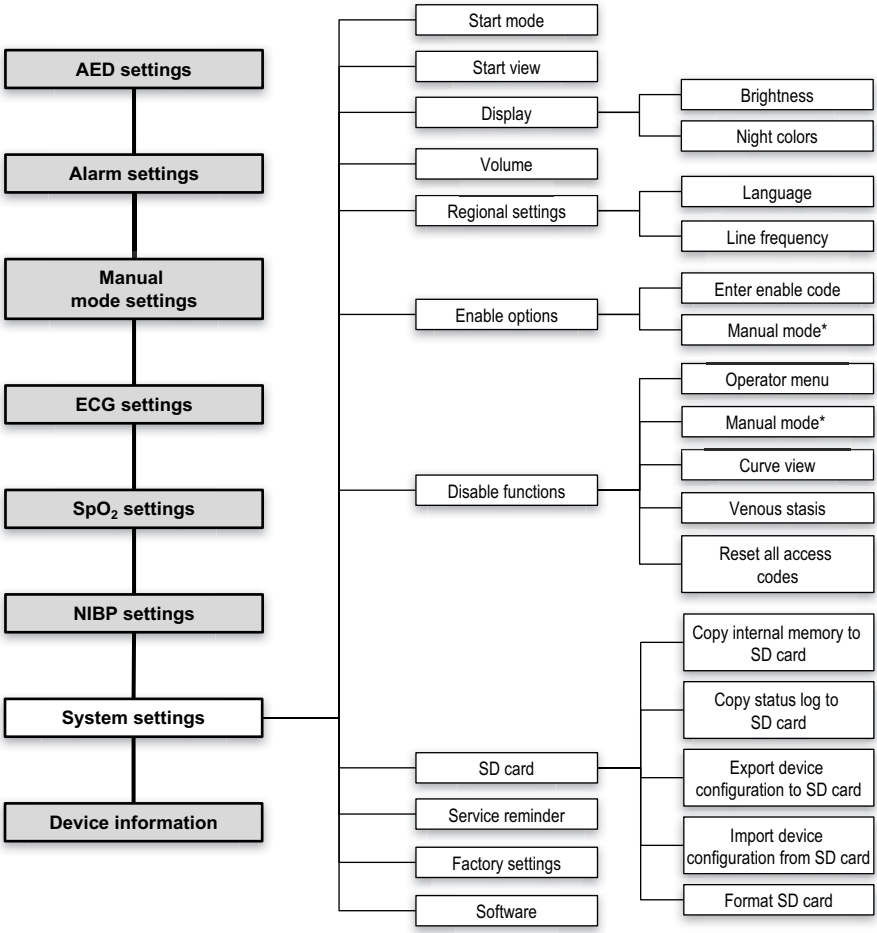
8.8 System settings

In the System setup menu, you can make the presets for the system and also perform functions which are conceived exclusively for the device operator.



8-7 System settings sub-menu

8.8.1 Menu structure



* Only available if optional function is enabled

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8.8.2 Possible values

Parameter		Possible values	Description	Factory setting
Start mode		Monitor AED Manual	Here you can set in which mode the device is to start.	Monitor
Start view		Curves Parameter	Here you can set in which view the device is to start.	Curves
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
Volume		25 %-100 %, in increments of 25	Here you can set the volume of the device.	75 %
Regional settings	Language	Arabic (ar SA) German (de DE) English (en US) Farsi (fa IR) French (fr FR) Hindi (hi HI) Dutch (nl NL) Indonesian (id ID) Italian (it IT) Croatian (hr HR) Portuguese (pt PT) Russian (ru RU) Spanish (es ES) Thai (th TH) Korean (ko KR)	Here you can set the language of the 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)).	Deutsch (de DE)
	Line frequency	50 Hz 60 Hz	Here you can select the ECG filter in order to suppress disturbance caused by your regional supply system.	50 Hz
Enable options			Here you can enable the optional functions and then activate and deactivate them.	

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Parameter		Possible values	Description	Factory setting
Disable functions			Here you can disable certain functions and protect against unauthorized access with a code prompt: • Manual mode • Curve view* • Venous stasis Each function can be protected individually and also assigned an individual code. Upon delivery from the factory, the code is 0000 and the functions are not protected.	
SD card	Export status log to SD card		Here you can export the status log to the SD card.	
	Export device configuration to SD card		Here you can export the currently set values 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 import the settings which have been copied to an SD card from the operator menu of another device	
	Format SD card		Here you can format the inserted SD card. This deletes all the data from the SD card	
Service reminder		Activated ☑ Deactivated ☐	Here you can set whether the device should output a reminder when there are less than 30 days until the next service interval.	Activated
Factory settings			Here you can reset the device to the factory settings.	-
Software			Here you can update the device software.	-

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*If you disable curve view but this is set as start view, the device switches on without requesting a code. The request for a code only appears when you switch to parameter view and back to curve view.

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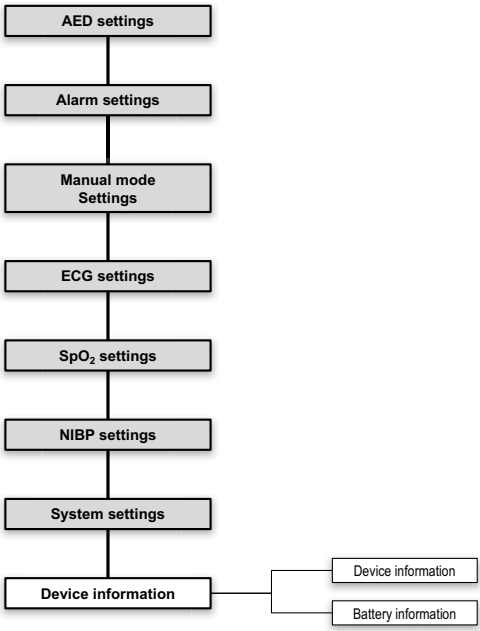
8.9 Device information

You will find information on the device and the battery in the device information menu.

8.9.1 Menu structure



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8.9.2 Information displayed

Parameter	Description
Device information	Serial number: Here you can find out the device serial number. This is located on the device information label.
	Device ID: Here you can find out the device ID. This is required to procure optional functions
	Passed function check: Here you can find out when the last successful function check was performed.
	Days until 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.
Battery information	Here you can find out information on the battery and the line voltage. This information can be of use for remote diagnoses.

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9 Hygienic reprocessing

9.1 General instructions

- **This product may contain disposable items. Disposable items are intended to be used only once.** So use these items only once and do **not** reprocess them. Reprocessing disposable items may impair the functionality and safety of the product and lead to unforeseeable reactions as a result of ageing, embrittlement, wear, thermal load, the effects of chemical processes, etc.
- This product may contain short-term NIBP cuffs. Short-term NIBP cuffs are only intended for short-term use. They should thus only be used in the short term and be reprocessed a maximum of 20 times. With typical use (3 applications per day followed by disinfection), this results in a recommended total usage period of 1 week. When reprocessing, note the information given in the Instructions for Use for the short-term NIBP cuffs. Reprocessing short-term NIBP cuffs too often may impair the functionality and safety of the product and lead to unforeseeable reactions as a result of ageing, embrittlement, wear, thermal load, the effects of chemical processes, etc.
- Wear suitable protective equipment for hygienic reprocessing work.
- Wear suitable gloves for disinfection work.
- Please follow the Instructions for Use supplied with the disinfectant used.
- Also follow the respective Instructions for Use for the components and the accessories.
- Always carry out a function check after the hygienic reprocessing (see "10.2 Performing a function check", page 148).
- You can find further information about hygienic reprocessing and a list of all the suitable cleaning agents and disinfectants in a brochure on our website at www.weinmann-emergency.com.

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9.2 Intervals

Wipe disinfection	After each use	At least 1x weekly
Device	x	x
Reusable components	x	x
Reusable accessories	x	x
Short-term NIBP cuffs	x	x

9.3 Hygienic reprocessing of the device

NOTICE

Damage to the device caused by ingress of liquids!
The device is protected from water jets in line with IP55. Ingress of liquids may damage the device, components and accessories.
⇒ Do not immerse the device, components, or accessories in liquids.

1. Disconnect the device from the patient.
2. Switch off the device (see "5.2 Switching the device off", page 77).
3. If necessary: Disconnect the device from the line power.
4. Remove the battery.
5. Disconnect the following parts from the device:
   - Trunk cable with defibrillation electrodes
   - Pulse oximetry sensor connecting cable with pulse oximetry sensor
   - ECG cable
   - NIBP connecting tube with NIBP cuff
6. Disconnect the defibrillation electrodes from the trunk cable.

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7. Carry out hygienic reprocessing of the device, components, and accessories as specified in the table below:

Part	Cleaning	Disinfection	Thermal disinfection	Sterilization
Device	Wipe with a damp cloth: Use water or mild soap	Wipe disinfection (Recommendation: terralin® protect)	Not permitted	Not permitted
Battery				
Power supply unit and charger				
Trunk cable				
Defibrillation electrodes	Disposable item, do not reuse			
Pulse oximetry sensor connecting cable	Wipe with a damp cloth: Use water or mild soap	Wipe disinfection (Recommendation: terralin® protect)	Not permitted	Not permitted
Reusable pulse oximetry sensor				
Disposable pulse oximetry sensor	Disposable item, do not reuse			
ECG cable	Wipe with a damp cloth: Use water or mild soap	Wipe disinfection (Recommendation: terralin® protect)	Not permitted	Not permitted
ECG electrodes	Disposable item, do not reuse			
NIBP connecting tube	Wipe with a damp cloth: Use water or mild soap	Wipe disinfection (Recommendation: terralin® protect)	Not permitted	Not permitted
Reusable NIBP cuff				
Disposable NIBP cuff	Disposable item, do not reuse			
Short-term NIBP cuff	Wipe with a damp cloth: Use water or mild soap	Wipe disinfection (Recommendation: terralin® protect), maximum of 20 cycles	Not permitted	Not permitted
Protective transport bag	Wipe with a damp cloth: Use water or mild soap	Wipe disinfection (Recommendation: terralin® protect)	Not permitted	Not permitted

The applicable instructions are those in the Instructions for Use from the manufacturers of the individual components or accessories. Follow these Instructions for Use.

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8. Connect the following parts to the device:
   - Trunk cable with defibrillation electrodes
   - Pulse oximetry sensor connecting cable with pulse oximetry sensor
   - ECG cable
   - NIBP connecting tube with NIBP cuff
9. Insert battery.
10. If necessary: Reconnect to line power.
11. Perform a function check (see "10 Function check", page 148).

Result The device, components, and accessories have been hygienically reprocessed.

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10 Function check

After being switched on, the device performs an automatic function check which serves to check the functionality of all the key functions.

The device also offers a step-by-step guide to performing a function check (see "10.2 Performing a function check", page 148).

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, the user must assess functionality himself (e.g. external damage to the device, functionality of the ECG cable or the NIBP cuff).

10.1 Intervals

Part concerned	Interval
Device including accessories	• Before each use • After each hygienic reprocessing • After each repair

10.2 Performing a function check

Requirement

- The device is disconnected from the patient.
- A battery with a battery status of at least 2 bars is inserted in the device. If the battery status is less, the function check cannot be started.
- An SD card is in the SD card slot.
- A pulse oximetry sensor connecting cable with pulse oximetry sensor is connected.

1. Check the following parts for external damage:
   - Device

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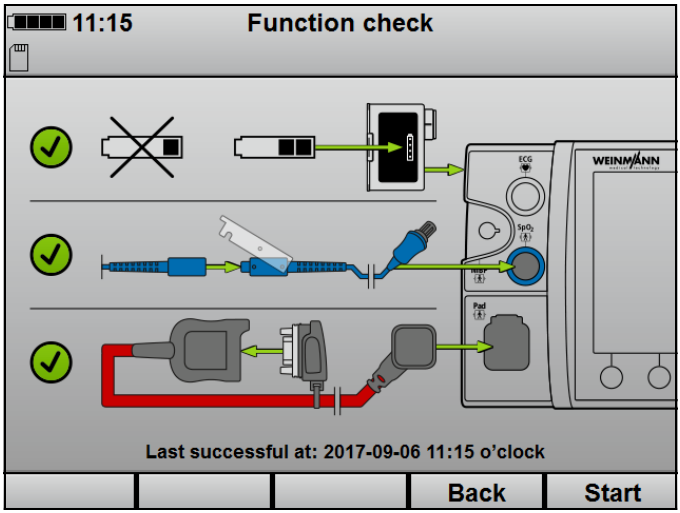
- Defibrillation electrode packaging
- ECG electrode packaging
- ECG cable
- Pulse oximetry sensor connecting cable
- Pulse oximetry sensor
- NIBP connecting tube
- NIBP cuff

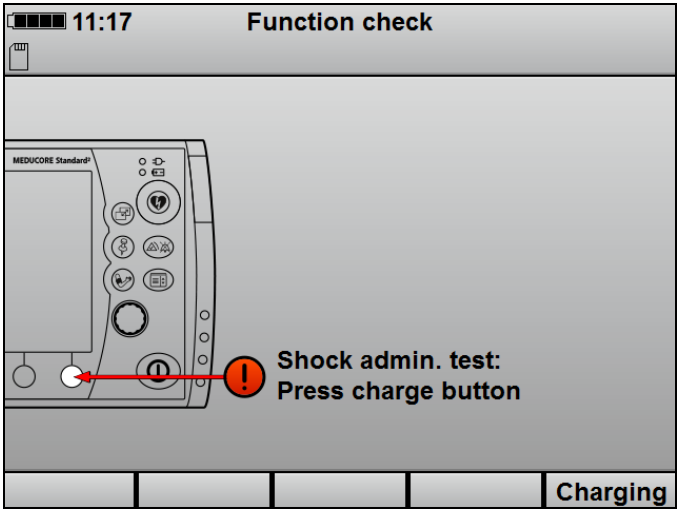
2. If necessary: Replace parts.
3. Check the expiry date on the ECG electrodes and defibrillation electrodes.
   If necessary: Replace ECG electrodes and/or defibrillation electrodes.
4. Switch on the device (see "5.1 Switching the device on", page 76).
5. Select the menu item **Function check** in the start menu.



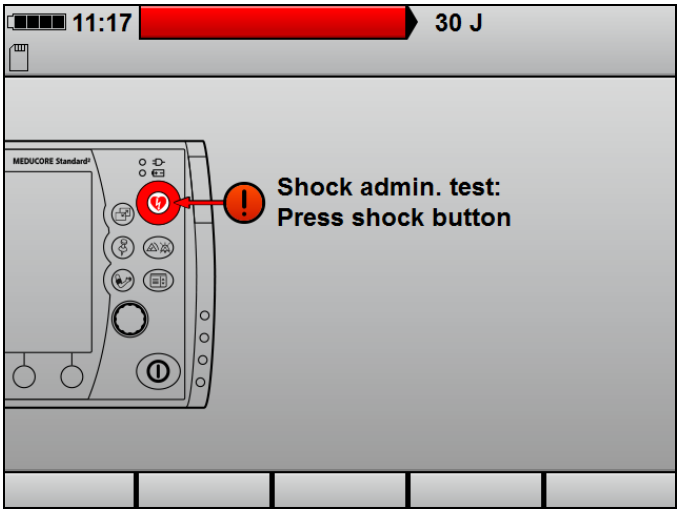
The automatic function check starts and the date of the last successful function check is displayed.

6. Connect the function test resistor to the trunk cable.

7. Once all components are marked with a green checkmark:
   Press the **Start** function button.
   The function check starts and the shock administration test begins. The function check can now no longer be canceled.



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



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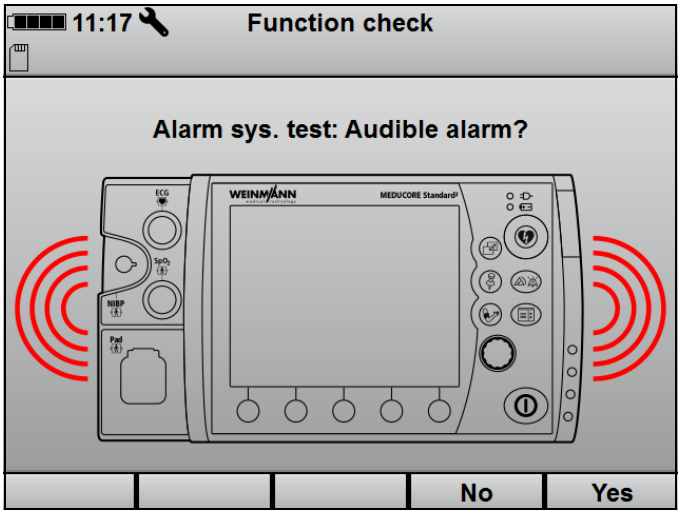
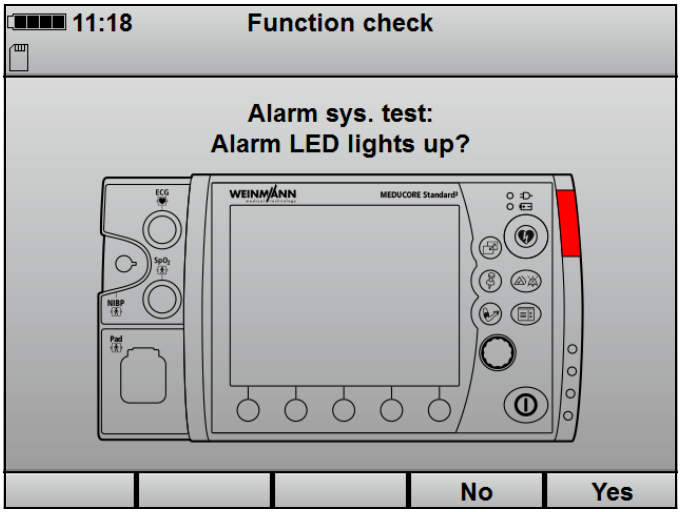
9. If the shock energy capacitor is fully charged and the shock button flashes: Press shock button .

10. Alarm system test:



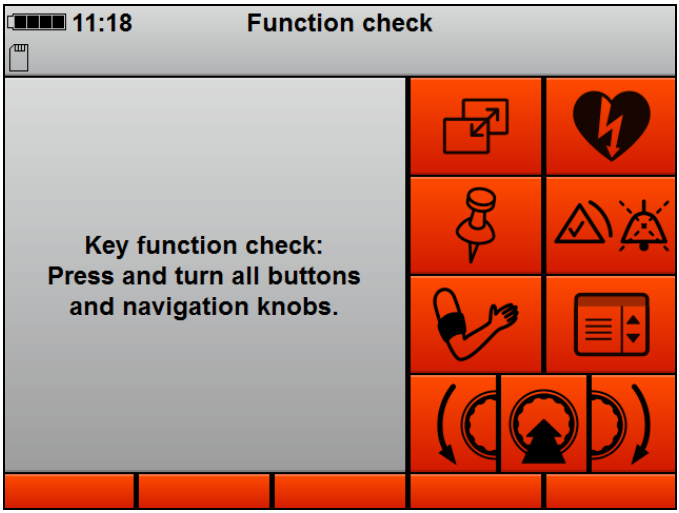
- If an audible alarm is output: Press the **Yes** function button.



- If the alarm LED lights up red: Press the **Yes** function button.

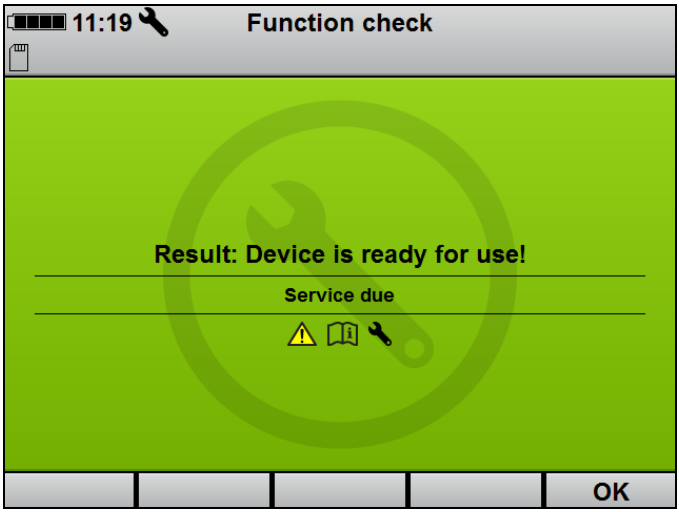
11. If a part of the alarm system functions: Press the **Yes** function button.

12. If a part of the alarm system does not function: Press the **No** function button.



13. In the key function check, press all of the controls one after the other except for the On/Off button ⏻.
14. If necessary: Press the menu button ☰ twice to cancel the key function check.

The status report appears (example):



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⚠ CAUTION

Risk of injury due to inoperational device!
Operation of the device after a failed function check may result in injury to the patient.
⇒ Only operate the device after it passes the function check.

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

Display	Meaning	Action
Device is ready for use	Function check passed	Use device without restriction.
Device is not ready for use	Function check failed	Contact your authorized dealer or the manufacturer.
Device is 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.

16. End function check with the **OK** function button.
    The start menu appears.
17. Disconnect the function test resistor from the trunk cable.
18. Connect the defibrillation electrodes to the trunk cable.
19. If necessary: Connect the ECG cable to the ECG cable connection point.
20. If necessary: Connect the NIBP cuff to the NIBP connection using the NIBP connecting tube.

Result The function check is complete.

10.3 Checking the ECG cables

In addition to visual inspection of the ECG cables, WEINMANN Emergency recommends checking function at regular intervals (see "10.2 Performing a function check", page 148):

1. Connect the ECG simulator to the ECG cable connection using the ECG cable.

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In principle, any ECG simulator can be used.
WEINMANN Emergency recommends the ECG simulator WM 45444. Alternatively, the ECG cable can be tested on a voluntary test person.

2. Switch on the ECG simulator and set a sinus rhythm.
3. Switch on the device (see "5.1 Switching the device on", page 76).
4. Select the **Adult** patient group (see "5.4 Selecting the patient group", page 78).
5. If necessary: Press the **Monitor** function button.
   The device switches to monitor mode.
6. If the ECG curve is shown in the middle curve field: Press the **Lead** button to show all ECG leads.
7. Assess the ECG leads:
   - All ECG leads must be shown.
   - All ECG leads must show the set sinus rhythm.
   - Shaking the cable must not result in one or more ECG leads either not being shown or being shown with faults.
8. If ECG leads are not shown or are shown with faults: Replace ECG cable.
9. Switch off the device (see "5.2 Switching the device off", page 77).
10. Disconnect the ECG simulator and ECG cable from the device.

Result The ECG cable has been checked.

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10.4 Checking the NIBP cuff and NIBP connecting tube

In addition to the visual inspection of the NIBP cuff and NIBP connecting tube, WEINMANN Emergency recommends checking function at regular intervals (see "10.2 Performing a function check", page 148):

To check the functionality of the NIBP cuff and NIBP connecting tube, in addition to performing a visual inspection (see "10.2 Performing a function check", page 148), perform the following test:

1. Measure the blood pressure on a voluntary test person (see "5.8 Performing non-invasive blood pressure measurement (NIBP)", page 92).
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 the measurement takes too long or produces implausible results: Check whether the patient group and NIBP cuff have been correctly selected for the test person and that the NIBP cuff has been attached correctly (see "4.7 Attaching the NIBP cuff", page 68).
6. Repeat the measurement.
7. If the measurement again takes too long or produces incorrect results: Contact your authorized dealer or WEINMANN Emergency.

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

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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. This does not apply to NIBP measurement alarms or the **battery operation** alarm. These are only displayed for 10 seconds and then go out of their own accord.

The device emits physiological and technical alarms. Every alarm has a certain priority.

Priority	Color in the 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 alarm is no longer active.
- Multiple alarms of identical priorities: The device displays the alarms alternately.

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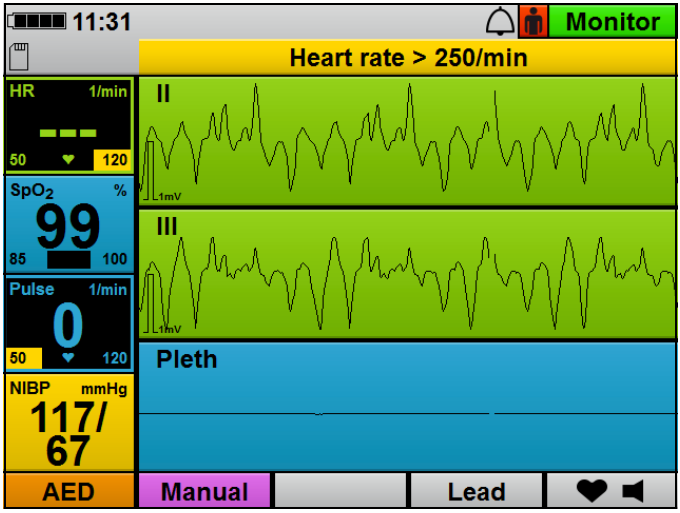

11-1 Alarm line with VF/VT alarm (example)

The device displays alarms as follows:

- As text in the alarm line on 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 emitted according to their priority:

Type of alarm signal	**High priority**	**Medium priority**	**Low priority**
Alarm line			
Flashing frequency	2 Hz	1 Hz	Does not flash
Size	90 mm x 5 mm		
Audio alarm			
Number of impulses	5	3	1
Duration of impulses	120 ms	200 ms	200 ms
Impulse interval	240 ms	200 ms	Not applicable
Impulse frequency	480 Hz	840 Hz	1200 Hz

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Type of alarm signal	High priority	Medium priority	Low priority
Alarm light			
Color	Red	Off	Off
Frequency	2 Hz	Not applicable	Not applicable
Duty cycle	33 % on	Not applicable	Not applicable
Size	10 mm x 35 mm		

The device additionally displays physiological alarms through the flashing of the respective parameter field.

The device's alarm behavior depends on the mode selected:

- In AED mode, the device does not emit alarms. The device provides information which could result in the AED mode being impaired via AED statement texts and voice prompts.
- The 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 the audio alarm output is to be activated upon activating manual mode.

11.2 Alarm messages

11.2.1 High-priority alarm (red)

Alarm	Cause	Remedy
Battery defective	Battery defective.	Let the device run on battery power without line power until it switches off. Fully recharge battery (see 4.3.2, p. 55). If the device continues to display the alarm: Replace battery (see 4.3.4, p. 56).
Insert battery	Battery not inserted or incorrectly inserted (manual mode).	Insert battery correctly (see 4.2, p. 53).
Battery empty	Very low battery status.	Replace battery (see 4.3.4, p. 56).
		Connect device to the line power (see 4.2, p. 53) and charge battery (see 4.3.2, p. 55).

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Alarm	Cause	Remedy
Asystole	Asystole detected.	Proceed according to the latest resuscitation guidelines.
		If medically indicated, perform suitable treatment.
Defibrillation module defective	Internal defibrillation module defective.	Have the device repaired.
Device malfunction (display turns yellow)	Temporary device malfunction.	• Switch device off and back on again. • Perform a function check.
	Device defective.	Have the device repaired.
Check pad electrodes (Manual mode)	Defibrillation electrodes not attached or not correctly attached to the patient.	Attach defibrillation electrodes to the patient correctly (see 4.4, p. 57).
Plug in pad connector (Manual mode)	Defibrillation electrodes not connected or not correctly connected to the trunk cable.	Connect the pad connector on the trunk cable correctly to the device (see 4.4, p. 57).
	Trunk cable not connected or not correctly connected to the device.	Connect the trunk cable correctly to the device (see 4.4, p. 57).
VF/VT*	Ventricular fibrillation or ventricular tachycardia detected.	Proceed according to the latest resuscitation guidelines.
		Switch to the AED mode or the manual mode and perform defibrillation, if medically indicated (see 5.5, p. 80).

* In the operator menu, the device can be preset so that the VF/VT alarm can be deactivated and activated by the user. It can also be preset in the operator menu whether the device is to start with an activated or deactivated VF/VT alarm.

11.2.2 Medium-priority alarm (yellow)

Alarm	Cause	Remedy
Battery weak	Low battery status.	Replace battery (see 4.3.4, p. 56) or connect device to the line power (see 4.2, p. 53).
NIBP diastolic ↑	Measured diastolic blood pressure is above the set upper alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).

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Alarm	Cause	Remedy
NIBP diastolic ↓	Measured diastolic blood pressure is below the set lower alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
Settings lost	Settings had to be reset to factory settings.	Re-enter presets in the operator menu. If this recurs: Have the device repaired.
Check seating of ECG electrodes	ECG electrodes not attached or not correctly attached to the patient or the ECG cable is not correctly connected to the ECG electrodes.	Attach ECG electrodes to the patient correctly and connect the ECG cable correctly to the ECG electrodes (see 4.6, p. 64).
ECG module defective	Internal ECG module defective.	Have the device repaired.
Plug in ECG connector	ECG connector of the ECG cable not connected or incorrectly connected to the device.	Attach ECG connector of the ECG cable to the device correctly (see 4.6, p. 64).
Heart rate ↑	Measured heart rate is above the set upper alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
Heart rate > 250/min	Measured heart rate is above 250/min (device shows --- as heart rate).	If medically indicated, perform suitable treatment.
Heart rate ↓	Measured heart rate is below the set lower alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
Heart rate < 30/min	Measured heart rate is below 30/min (device shows --- as heart rate).	If medically indicated, perform suitable treatment.
NIBP outside measuring range	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	The NIBP module is unable to detect a pulse wave signal.	• Make sure that the patient lies still when taking measurements • Rule out the risk of patient vibration • Use a suitable cuff size. • Ensure that the cuff is properly attached. • Ensure that there is no clothing between the blood pressure cuff and the patient

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Alarm	Cause	Remedy
Excessive NIBP cuff pressure	The pressure in the NIBP cuff was increased to such a degree by external influences that the safety valve opened.	Check which influences resulted in the increase of excess pressure and remedy these before the next measurement.
NIBP measurement error	No NIBP measurement could be performed.	• Make sure that the patient lies still when taking measurements • Rule out the risk of patient vibration • Use a suitable cuff size. • Ensure that the cuff is properly attached. • Ensure that there is no clothing between the blood pressure cuff and the patient
NIBP module defective	Internal NIBP module defective.	Have the device repaired.
NIBP tube blocked	NIBP connecting tube kinked or blocked.	Check NIBP cuff connector tube and, if necessary, replace.
NIBP tube leaking	NIBP cuff connector tube or NIBP cuff are leaky or not correctly connected. Sufficient pressure cannot be built up.	Check NIBP cuff connector tube and NIBP cuff and, if necessary, replace.
NIBP safety shutdown	Pressure in the NIBP cuff is too high for too long.	Remove the NIBP cuff from the patient. Have device repaired.
NIBP signal disrupted	Unable to detect pulse wave signal for NIBP measurement reliably.	• Make sure that the patient lies still when taking measurements. • Rule out the risk of patient vibration • Use a suitable cuff size. • Ensure that the cuff is properly attached. • Ensure that there is no clothing between the blood pressure cuff and the patient.
Check pad electrodes (Monitor mode)	Defibrillation electrodes not attached or not correctly attached to the patient.	Attach defibrillation electrodes to the patient correctly (see 4.4, p. 57).

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Alarm	Cause	Remedy
Plug in pad connector (Monitor mode)	Pad connector of the defibrillation electrodes not connected or not correctly connected to the trunk cable, or trunk cable not connected or not correctly connected to the device.	Connect the pad connector of the defibrillation electrodes correctly to the trunk cable, or connect the trunk cable correctly to the device.
Pulse rate ↑	Measured pulse rate is above the set alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
Pulse rate ↓	Measured pulse rate is below the set alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
Memory error	Internal memory module defective.	Have the device repaired.
SpO_2 ↑	Measured oxygen saturation is above the set alarm limit and the SpO_2 signal quality is ≥ 40 %.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
SpO_2 ↓	Measured oxygen saturation is below the set alarm limit and the SpO_2 signal quality is ≥ 40 %.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
SpO_2 module defective	Internal SpO_2 module defective.	Have the device repaired.
NIBP systolic ↑	Measured systolic blood pressure is above the set alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).
NIBP systolic ↓	Measured systolic blood pressure is below the set alarm limit.	If medically indicated, perform suitable treatment or adapt the alarm limits (see 7.3.1, p. 111).

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11.2.3 Low-priority alarm (turquoise)

Alarm	Cause	Remedy
Battery operation	Line power too low.	Alarm goes off automatically after 10 s. Restore line power.
	Disconnect the line power supply by removing from the wall mounting.	
	Power outage	
Insert battery	Battery not inserted or incorrectly inserted (monitor mode).	Insert battery correctly (see 4.2, p. 53).
Date wrong	Date read-out error.	Insert battery (see 4.2, p. 53).
		Reset date.
	Internal module defective.	If this recurs: Have the device repaired.
Internal memory full	No SD card inserted and session duration > 4 h-10 h.	To continue to record the session: Insert SD card (see 4.8.1, p. 73), copy data to SD card, and resume session with SD card.
		Continue with session and do not record any more data.
SD card defective	SD card write/read error.	Insert new SD card (see 4.8.1, p. 73), switch off device (see 5.2, p. 77), and switch device back on after at least 30 s (see 5.1, p. 76).
		Continue with session and do not record any more data.
Insert SD card	No SD card/SD not detected.	Insert new SD card (see 4.8.1, p. 73), switch off device (see 5.2, p. 77), and switch device back on after at least 30 s (see 5.1, p. 76).
SD card full	SD card full.	Insert new SD card (see 4.8.1, p. 73), switch off device (see 5.2, p. 77), and switch device back on after at least 30 s (see 5.1, p. 76).
		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.

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Alarm	Cause	Remedy
Check seating of SpO_2 sensor	Pulse oximetry sensor not attached or not correctly attached to the patient.	Attach pulse oximetry sensor to the patient correctly (see 4.5, p. 60).
SpO_2 signal quality ↓	SpO_2 signal quality < 40 %.	Attach pulse oximetry sensor to the patient correctly (see 4.5, p. 60). If medically indicated, perform suitable treatment.
Plug in SpO_2 sensor	SpO_2 connector of the pulse oximetry sensor connecting cable not connected or incorrectly connected to the device.	Connect SpO_2 connector of the pulse oximetry sensor connecting cable to the device correctly.

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11.3 Faults

If you are not able to clear an error message with the aid of the table, you should contact the manufacturer WEINMANN Emergency or your authorized dealer to have the device repaired. To avoid more serious damage, do not continue using the device.

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 the line power.	Check power supply.
	Device defective.	Have the device repaired.
Device cannot be switched off	Operating error.	Press and hold the On/Off button ⏻ for at least 2 seconds.
Yellow-highlighted error message	Temporary device malfunction	Switch device off (see 5.2, p. 77) and back on again (see 5.1, p. 76). Perform a function check (see 10.2, p. 148).
	Device defective.	Have the device repaired.
Function check does not start	Battery weak or empty.	Insert battery with a charge level of at least 2 LEDs and restart the function check.
	Function test resistor not detected.	Connect the function test resistor and trunk cable correctly.
	Pulse oximetry sensor not detected.	Connect pulse oximetry sensor connecting cable and pulse oximetry sensor correctly.
Brightness of the display too low	Brightness of the display set too low.	Increase brightness of the display.
	Night colors activated.	Deactivate night colors.
Alarm output too quiet	Volume set to 25 %.	Increase the volume in the application menu or the volume preset in the operator menu (see 8.3, p. 122).
Power failure/black screen	Battery empty and device not connected to the line power.	Check power supply.

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Fault	Cause	Remedy
Device failure • Alarm LED flashes • Audio alarm output	Device defective.	Have the device repaired.

11.3.2 Defibrillation

Fault	Cause	Remedy
The **Check pad electrodes** alarm appears although the defibrillation electrodes are attached to the patient and to the device via the trunk cable.	Defibrillation electrodes incorrectly attached to the patient or pad connector incorrectly connected to the trunk cable or the trunk cable is incorrectly connected to the device.	Attach defibrillation electrodes to the patient correctly (see 4.4, p. 57).
		Connect pad connector of the defibrillation electrodes to the device correctly.
		Replace defibrillation electrodes.
		Connect the trunk cable correctly to the device. If necessary: Replace the trunk cable.
		Have the device repaired.

11.3.3 Battery

Fault	Cause	Remedy
Red fault indicator lights up when status button on battery is pressed or red battery status indicator on device lights up	Battery defective.	Replace battery.
	Battery temperature outside the permitted range (> 70 °C).	Use battery within permitted temperature range (see 15.3, p. 178).
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 hours (see 4.3.2, p. 55). After 24 hours: Green LED is lit: Battery fully charged and ready for use. Red LED or no LED is lit: Battery defective. Replace battery.
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 15.3, p. 178).
	Battery defective.	Replace battery.

11.3.4 6-lead ECG

Fault	Cause	Remedy
The **Plug in ECG connector** alarm appears although the ECG cable is connected to the device	Device does not detect connected ECG cable.	Check connection.
		Replace ECG cable.
		Have the device repaired.
The ECG cable is not connected to the device but the **Plug in ECG connector** alarm does not appear	Device incorrectly detects ECG cable as connected.	Have the device repaired.
	The alarm is only emitted if an ECG has been successfully derived since switching on.	-
The **Check seating of ECG electrodes** alarm appears although the ECG electrodes are attached to the patient	ECG electrodes not correctly attached to the patient.	Attach ECG electrodes to the patient correctly (see 4.6, p. 64).
		Replace ECG cable.
		Have the device repaired.
ECG cable not attached or not correctly attached to the patient, but the alarm **Check seating of ECG electrodes** does not appear	Device incorrectly detects ECG cable as attached to the patient.	Have the device repaired.
	The alarm is only emitted if an ECG has been successfully derived since switching on.	-

11.3.5 Pulse oximetry

Fault	Cause	Remedy
The **Plug in SpO_2 sensor** alarm is emitted even though the pulse oximetry sensor is connected to the device	Device does not detect connected pulse oximetry sensor.	Check connection.
		Replace pulse oximetry sensor connecting cable.
		Replace pulse oximetry sensor.
		Have the device repaired.

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Fault	Cause	Remedy
The pulse oximetry sensor is not connected to the device but the **Plug in SpO_2 sensor** alarm does not appear	Device incorrectly detects pulse oximetry sensor as connected.	Have the device repaired.
	The alarm is only emitted if an SPO_2 signal has been successfully detected since switching on.	-
The **Check seating of SpO_2 sensor** alarm appears although the pulse oximetry sensor is attached to the patient	Pulse oximetry sensor not correctly attached to the patient.	Attach pulse oximetry sensor to the patient correctly (see 4.5, p. 60).
		Replace pulse oximetry sensor connecting cable.
		Replace pulse oximetry sensor.
		Have the device repaired.
Pulse oximetry sensor is not attached or not correctly attached to the patient, but the **Check seating of SpO_2 sensor** alarm does not appear	Device incorrectly detects pulse oximetry sensor as attached to the patient.	Have the device repaired.
	The alarm is only emitted if an SPO_2 signal has been successfully detected since switching on.	-
Implausible measured values	Strong ambient light or direct light, UV light or infrared.	Remove or reduce light source.
		Protect sensor from light incidence.
		Apply sensor at another site which is better protected from light.
		Remove the patient and sensor from the light.
		Cover pulse oximetry sensor.
	Intravascular dyes (e.g. methylene blue).	Impairment of the measured result cannot be remedied. Measures to treat patient based on medical indication.
	Nail varnish, artificial fingernails.	• Rotate SpO_2 sensor through 90° • Clean finger nail • Select a different suitable measuring site
	Significant patient movement.	Fix sensor cable in a strain relief loop on patient using adhesive tape.

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11.3.6 Non-invasive blood pressure (NIBP) monitoring

Fault	Cause	Remedy
Implausible measured values	NIBP cuff attached incorrectly.	Reattach NIBP cuff (see 4.7, p. 68).
	NIBP cuff leaky.	Replace NIBP cuff.
	Unsuitable patient position.	Reposition the patient.
	NIBP module defective.	Have the device repaired.
	Cuff size not suitable (too large or too small).	Use a suitable cuff size.
NIBP measurement cannot be started	NIBP cuff and/or NIBP connecting tube not correctly connected.	Connect NIBP cuff and/or NIBP connecting tube correctly.
NIBP measurement is continuously interrupted	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.	Restore connection of NIBP cuff and/or NIBP connecting tube.

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12 Maintenance

12.1 General instructions

Maintenance, safety checks (Germany only), inspections, and repairs must only be carried out by the manufacturer or a technician specifically authorized by the manufacturer.

12.2 Intervals

Part concerned	Interval	Maintenance by
Device	Maintenance-free	
	Annual safety check recommended	Manufacturer or a technician specifically authorized by the 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 every 5 months. Recommendation: Replace battery after 2 years.	
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 shall apply.	

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12.3 Sending in device

⚠ WARNING

Risk of infection due to contaminated parts during maintenance work!
The device, components, and accessories may be contaminated, and infect the technicians with bacteria or viruses.
⇒ Clean and disinfect the device, components, and accessories.
⇒ Do not send in parts which are potentially contaminated.

1. Remove components and accessories.
2. Clean and disinfect the device, components, and accessories (see "9.3 Hygienic reprocessing of the device", page 145).
3. Send in the device and, if necessary, components and accessories to WEINMANN Emergency or a technician specifically authorized by WEINMANN Emergency.

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If you send in parts that are obviously contaminated, they will be disposed of at your expense by WEINMANN Emergency or by a technician authorized by WEINMANN Emergency.

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13 Storage

13.1 General instructions

- When storing between sessions, observe the ambient conditions for continuous operation (see "15 Technical data", page 175).
- During extended storage periods, observe the ambient conditions for storage (see "15 Technical data", page 175).
- If stored outside the operational ambient conditions: Before putting the device back into operation, it must be tempered to the operating temperature. Recommendation: Initially store the device at room temperature for at least 12 hours.

13.2 Storing the device

1. Switch off the device (see "5.2 Switching the device off", page 77).
2. If necessary: Disconnect the device from the line power.
3. Remove the battery.
4. Clean and disinfect the device (see "9.3 Hygienic reprocessing of the device", page 145).
5. Store the device in a dry place.

Result The device is stored in a dry place.

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13.3 Storing the battery

Requirement

- The device and the battery have been cleaned and disinfected (see "9.3 Hygienic reprocessing of the device", page 145).
- 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.

   or

   Store the battery in a dry place outside of the device.

NOTICE

Material damage due to prolonged storage of the battery without recharging!
Storing the battery for a prolonged period of time without recharging can 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 battery every 5 months.

2. Charge battery at regular intervals:

Type of storage	Charging interval
In device without a power supply	Every 3 months
Outside the device	Every 5 months

Result The battery is stored in a dry place and is ready for use.

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14 Disposal

14.1 Electronic waste

Do not dispose of the product in the household waste. Consult an authorized, certified electronic waste recycling company for proper disposal. You can find out their address from your environmental officer or from your local council.
The device packaging (cardboard box and inserts) can be disposed of as waste paper.

The following products are categorized as electronic waste:

- Device
- Trunk cable
- Defibrillation electrodes
- Pulse oximetry sensor connecting cable
- Pulse oximetry sensor
- ECG cable
- ECG electrodes
- Power supply unit and charger
- Function test resistor

14.2 Battery

Do not dispose of used batteries in the household waste. Contact WEINMANN Emergency or a public waste disposal authority.

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15 Technical data

15.1 Device

The technical data of components and accessories may deviate. You should also note the sections which follow, as well as the Instructions for Use for the component/accessory part.

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 • Height above sea level	 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 site of use): • Temperature range • Humidity • Air pressure • Height above sea level	 -20 °C to +55 °C 15 % rh to 95 % rh, no condensation 540 hPa to 1100 hPa -500 m to 5000 m
Storage/transport*: • Temperature range • Humidity • Air pressure • Height above sea level	 -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
Vehicle electrical system operation: • Rated voltage • Max. internal resistance of vehicle electrical system • Maximum current consumption	 12 V 500 mΩ < 3 A
Operating mode	Continuous operation

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Specification	Device
Classification acc. to EN 60601-1: • Type of protection against elec. shock • Degree of protection against elec. shock (SpO_2) • Degree of protection against elec. shock (ECG) • Degree of protection against elec. shock (pad) • Degree of protection against elec. shock (NIBP)	 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
Resistance to falling	1 m
Electromagnetic compatibility (EMC) as per 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)
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
Display	5.7" TFT color display Resolution VGA 640 pixels x 480 pixels
Sound pressure level range for alarms	35 dBa to 85 dBa
Sound pressure level range for QRS beeps	35 dBa to 85 dBa
Sound pressure level range for pulse tones	35 dBa to 85 dBa
Resistance to shock and vibration	• EN 1789 • EN 60601-1-12 (Categories: Secured in a rescue vehicle, secured in an aeroplane, 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 Aeroplanes Cat. S and Helicopter Cat. U2)

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Specification	Device
Type of rescue vehicle	Secured in rescue vehicle, aeroplane and helicopter as well as portable at the site of the emergency)
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 60601-2-27 EN 60601-2-49 EN 80601-2-30 EN 80601-2-61 EN 1789 EUROCAE ED-14G (RTCA DO 160 G)
Resuscitation guidelines	ILCOR/ERC/AHA 2015

* See "13 Storage", page 172.

CE 0197 Subject to alterations in design.

15.2 Defibrillation electrodes

Specification	Defibrillation electrodes
Delivery condition of electrodes for adults	Self-adhesive disposable electrodes, packaged with connector guided out (pad connector)
Delivery condition of electrodes for children	Self-adhesive disposable electrodes, connector, not guided out
Cable length	Adults: 1.3 m; Children: 0.6 m
Electrode surface area	86 cm^2 each (defibrillation electrodes for adults) 54 cm^2 each (defibrillation electrodes for children)
Temperature range for storage	0 °C to 50 °C
Temperature range for operation	0 °C to 50 °C

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15.3 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 run time for resuscitation	4 h with shocks of 200 J
Rated capacity	4.2 Ah (≥ 46.4 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

15.4 Power supply unit and charger

Specification	Power supply unit and charger
Operation: • Temperature range • Humidity • Air pressure • Height above sea level	 0 °C to +40 °C 5 % rh to 95 % rh, no condensation 700 hPa to 1100 hPa -500 m to 3000 m
Max. power consumption	100 W
Input voltage	100 V-240 V~/50 Hz-60 Hz
Rated voltage output	15 V
Degree of protection against • Ingress of solid objects • Ingress of dust • Ingress of water with harmful effect	IP21: Protected against foreign solids and dripping water
Disconnection from line power	Pulling out the power plug disconnects the device from line power on all poles.

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15.5 CARDIObiphasic defibrillation system

Specification	Defibrillation system
Operating mode	Semi-automatic (AED mode) Manual (Manual mode)
Shock form	Biphasic, current-limited, impedance-compensated
Patient impedance: Max. Min.	 200 Ω 5 Ω
Shock sequence	Adjustable: Energy curve: First shock: 1 J to 200 J Further shocks: 1 J to 200 J
Analysis time	8 s under typical conditions
Time taken for analysis and shock charging in the AED mode: With fully charged energy source After 15 discharges After 6 discharges	 8 s to 15 s 8 s to 15 s 8 s to 15 s
Time taken to switch on device, perform analysis and charge shock in the AED mode: With fully charged energy source 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 "15.14 The CARDIObiphasic shock impulse", page 187)
Time taken to charge shock in manual mode	2 s to 9 s (depending on the selected shock energy)
Impedance compensation	Yes
Defibrillator voltage	2 kV
Recovery time for the derivation of defibrillation electrodes after a defibrillation shock	5 s
Analysis unit	Capacitor charging is canceled if there is an unshockable signal. Capacitor charging is canceled if a shockable signal is detected during the first analysis, but an unshockable signal is detected during charging.

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15.6 ECG monitoring system

Specification	ECG monitoring system
Max. patient impedance with 6-lead ECG	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 (6-lead ECG)
Displayed heart rates with pacemaker impulses (with ECG derivation via ECG cable)	If pacemaker impulses are detected, "---" is displayed instead of the heart rate.
Pacemaker impulses detected by the device: Amplitude Pulse width Overshoot	 2 mV to 700 mV 0.5 ms to 2 ms Not detected
Device operating mode in the event of a power interruption lasting > 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
Heart rate averaging	The mean heart rate is obtained by averaging up to 7 heart beat intervals, updated with every heart beat 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 detected RR interval.
Inputs and input impedance	< 2.5 MΩ for 6-lead ECG
Alarm time for tachycardia (as per 60601-2-27)	Signal B1: 1 mV 206/min: 9 s Signal B1: 0.5 mV 206/min: 10 s Signal B1: 2 mV 206/min: 8 s Signal B2: 2 mV 195/min: 7 s Signal B2: 1 mV 195 /min: 7 s Signal B2: 4 mV 195 /min: 7 s
Response time of heart rate display: Steep rise Steep drop	 5 s 7 s
Recovery time after a defibrillation shock	2 s
Band width: 6-lead ECG Pad ECG	 0.67 Hz to 40 Hz (ECG leads I, II, III, aVR, aVL, aVF) 0.67 Hz to 40 Hz (ECG lead pad)
Protection against malfunction caused by electrosurgery	Yes

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15.7 ECG analysis system CARDIOlogic

Specification	ECG analysis system
Analysis time (VF/VT)	Duration of analysis in the AED mode: 8 s under typical conditions Duration of analysis VF/VT alarm: 8 s with continuous measurement
ECG derivation used for analysis	Lead II of the pad electrodes is primarily used for analysis. If the pad electrodes are not attached, lead II of ECG electrodes is used.
Impedance measurement	Checks electrode contact
Response to implanted cardiac pacemakers	Impulses from implanted pacemakers can affect or prevent correct arrhythmia detection. As a result, not all defibrillatable rhythms may be detected and shock delivery may not be recommended by the device.
Asystole threshold	0.2 mV

The effectiveness of the rhythm detector has been validated with a representative cross-section of ECG data from the following database:

- 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 (> 0.35 mV)	944	> 90 %	98.31 %	-
Rapid VT (f>180/min)	252	> 75 %	94.05 %	-
Not shockable				
Non-shockable rhythms	3070	> 99 %	-	99.64 %

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)

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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 %

15.8 Pulse oximetry monitoring

Due to the statistical distribution of the measured values for pulse oximetry sensors, on average two thirds of all measurements are within the ±arm value of CO oximeters as a reference method (see table). To determine bpm accuracy, comparative measurements were performed with an original sensor and original monitor.

Specification	**Pulse oximetry**
SpO_2 display range	45 % to 100 %
Accuracy (for all SpO_2 sensors which are specified in the chapter entitled Scope of supply (see "16 Scope of supply", page 190))	70 % to 100 %: ≤ 2.1 % 45 % to 70 %: Not specified
Pulse rate	20 bpm to 300 bpm ± 3 bpm

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Specification	Pulse oximetry
Reference methods for determining the accuracy of the pulse rate	Oxitest simulator testing
Wavelength with maximum intensity	660 nm/890 nm (2.5 to 4.5 mW)
Curve form	Normalized
Update rate of SpO_2 mean	8 s (It can 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 the 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. • As per EN ISO 10993-10

15.9 Non-invasive blood pressure (NIBP) monitoring

Specification	Non-invasive blood pressure measurement
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

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15.10 Operation/data management

Specification	Operation/data management
Display	Light symbols Device status indicators
Audio outputs	Voice prompts Alarm tones Signal tones
Session documentation	Automatic recording of ECG, SpO_2 and NIBP measurement values and event data
Data transfer	Via SD card: SD card with 32 GB
Data evaluation	Via DEFIview PC software

15.11 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

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Alarm	Delay time
SpO_2 saturation ↓	10.0 s
SpO_2 signal quality ↓	10.0 s
VF/VT Patient is connected with this condition Patient already connected	 11.3 s 5.3 s

15.12 Saving of session data

	Hours of memory with typical use with 6-lead ECG, SpO_2 measurement and NIBP measurement)
Internal device memory (100 MB)*	18
SD card WM 39510 (32 GB)*	1675

* Since different curve forms can be compressed to differing degrees, the actual number of storage hours can deviate. The data are typical values.

15.13 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.

The key performance characteristics of this device include:

- Administration of defibrillation treatment
- Exact differentiation between cardiac rhythms to be defibrillated and rhythms not to be defibrillated
- Display of the electrocardiogram (ECG)
- Display of the plethysmogram and oxygen saturation of the hemoglobin (SpO_2)
- Display of the systolic and diastolic arterial blood pressure (NIBP)

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⚠ CAUTION

Delay in treatment due to power supply network faults!
Transient or pulsed conducted interference may cause artifacts in the ECG signal and thus interfere with device functioning and delay treatment.
⇒ If there is major interference in the power supply network, only operate the device with a battery.

⚠ CAUTION

Treatment delays due to strong high-frequency interference signals!
Overly strong high-frequency interference signals can lead to a false analysis, false measurement results and false alarms and therefore impair the functioning of the device and delay treatment.
⇒ Maintain separation distances.
⇒ Maintain a minimum distance of 30 cm.

Recommended separation distances between portable and mobile RF telecommunications equipment and MEDUCORE Standard^2

MEDUCORE Standard^2 is intended for use in an electromagnetic environment in which RF 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 RF telecommunication equipment (transmitters) and the MEDUCORE Standard^2 (as recommended below, according to the maximum output power of the RF telecommunications equipment).

Rated power of the RF device in W	Separation distance according to 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

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Recommended separation distances between portable and mobile RF telecommunications equipment and MEDUCORE Standard[2]				
Rated power of the RF device in W	Separation distance according to transmission frequency in m			
	When used as a defibrillator		Defibrillator: No unintended release of energy	
	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

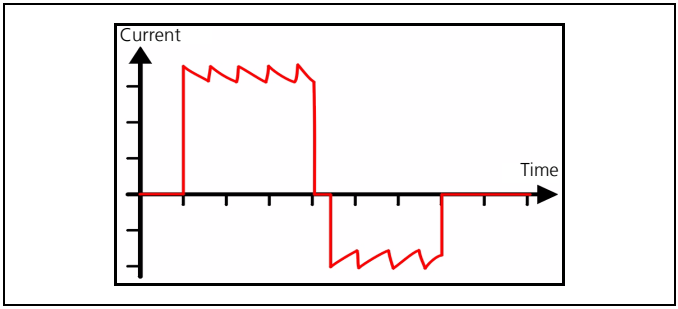
Further technical data can be requested from the manufacturer WEINMANN Emergency.

15.14 The CARDIObiphasic shock impulse

A characteristic of the CARDIObiphasic shock impulse is that it limits the maximum current. This greatly reduces the risk of myocardial damage, which is mainly caused by electric currents that are too high, especially where patient impedance is low.

15.14.1 Functional principle

A target value controls the delivered current, which produces a sawtooth-shaped impulse.



15-1 Basic shape of the cardio-biphasic shock impulse

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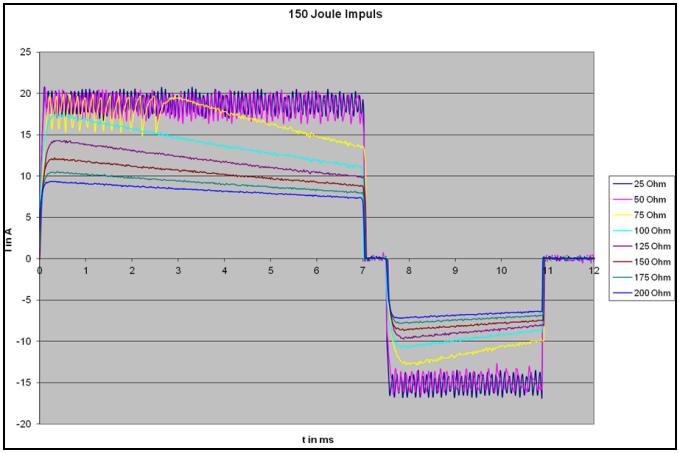
The mean ratio of delivered electric charge between the second (negative) and the first (positive) phase is 0.38.

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.



15-2 Currents as a function of patient impedance

15.14.2 Accuracy of the delivered energies

The shock impulse is created current-controlled (I = const.) and with a fixed duration (t = const.). Patient impedance is the only variable. The shock impulse energy is the result of the current, impulse duration and patient impedance. Since the current and impulse duration are specified, the shock impulse can be individually adapted for each patient.

The current control of the shock impulse ensures that patients with lower impedance receive the same current as patients with higher impedance since it is not the energy but the current which is decisive for defibrillation. Furthermore, current control prevents patients with a lower impedance from being shocked with an overly high current.

Due to current control and the dependence of the energy administered on patient impedance, it is possible that the energy which is delivered deviates from the selected energy (see table below).

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Selected energy in J	Delivered energy as a function of patient impedance*								Precision of delivered energy
	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 %

*The selected energy differs from the delivered energy due to the laws of physics. The delivered energy depends on the patient impedance (see also IEC 60601-2-4:2010 Chapter 201.12.1 and Annex AA).

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16 Scope of supply

16.1 Standard product

MEDUCORE Standard^2 **WM 45300**

Article	Article number
MEDUCORE Standard^2, basic device	WM 45310
Battery	WM 45045
Trunk cable	WM 45397
Defibrillation electrodes for adults	WM 45418
SoftTip® pulse oximetry sensor, size M, reusable	WM 45432
Pulse oximetry sensor connecting cable	WM 45430
ECG cable, 2 m, ERC	WM 45451
ECG cable guide	WM 45450
ECG electrodes for adults and children	WM 45201
NIBP connecting tube, 2 m	WM 45481
NIBP cuff, adult plus, for 28-40 cm upper arm circumference, reusable	WM 45464
Set, fastenings	WM 17806
SD card, 32 GB	WM 39510
Function test resistor	WM 45428
Medical device book	WM 16430
Delivery record	WM 67388
MEDUCORE Standard^2 Instructions for Use	WM 68201

16.2 Options

Article	Article number
Manual defibrillation option	WM 45499

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16.3 Accessories

Accessories can be ordered separately, if required.

Article	Article number
Power supply	
Charging station for battery WM 45045	WM 45190
Power supply unit/charger, 100 W, including power cord WM 17465	WM 28937
Adapter MAG for charging with power supply unit/charger or 12 V adapter cable	WM 28979
Adapter cable 12 V vehicle electrical system/ODU connector	WM 28356
Defibrillation electrodes	
Defibrillation electrodes for adults	WM 45418
Defibrillation electrodes for children	WM 45419
Pulse oximetry sensors	
SoftTip® pulse oximetry sensor, size S, reusable	WM 45431
SoftTip® pulse oximetry sensor, size M, reusable	WM 45432
SoftTip® pulse oximetry sensor, size L, reusable	WM 45433
Wrap pulse oximetry sensor, reusable	WM 45434
Ear-clip pulse oximetry sensor, reusable	WM 45435
Set of 24 pulse oximetry sensors, adult (Adult), disposable	WM 45436
Set of 24 pulse oximetry sensors, infant (Infant), disposable	WM 45437
Set of 24 pulse oximetry sensors, child (Pediatric), disposable	WM 45439
Set of 10 fastening straps for wrap pulse oximetry sensor	WM 45442
Set of 5 hooks for ear-clip pulse oximetry sensor	WM 45443
ECG cable	
ECG cable, 3 m, ERC	WM 45452
ECG cable, 2 m, ERC	WM 45451
ECG cable, 2 m, AHA	WM 45453
ECG cable, 3 m, AHA	WM 45454
NIBP	
NIBP connecting tube, 3 m	WM 45482
NIBP connecting tube, 2 m	WM 45481
NIBP cuff, infant, for 8-13 cm upper arm circumference, reusable	WM 45460
NIBP cuff, child, for 12-19 cm upper arm circumference, reusable	WM 45461

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Article	Article number
NIBP cuff, small adult, for 17-25 cm upper arm circumference, reusable	WM 45462
NIBP cuff, adult, for 23-33 cm upper arm circumference, reusable	WM 45463
NIBP cuff, adult plus, for 28-40 cm upper arm circumference, reusable	WM 45464
NIBP cuff, large adult plus, for 40-55 cm upper arm circumference, reusable	WM 45465
NIBP cuff, thigh, adult, for 38-50 cm thigh circumference, reusable	WM 45466
Adapter tube for connection of NIBP disposable cuffs for neonates	WM 45467
Set of 20 NIBP cuffs, neonate, size 1, for 3-6 cm upper arm circumference, disposable	WM 45468
Set of 20 NIBP cuffs, neonate, size 2, for 4-8 cm upper arm circumference, disposable	WM 45469
Set of 20 NIBP cuffs, neonate, size 3, for 6-11 cm upper arm circumference, disposable	WM 45470
Set of 20 NIBP cuffs, neonate, size 4, for 7-13 cm upper arm circumference, disposable	WM 45471
Set of 20 NIBP cuffs, neonate, size 5, for 8-15 cm upper arm circumference, disposable	WM 45472
Set of 20 NIBP cuffs, infant, for 8-13 cm upper arm circumference, short-time use	WM 45473
Set of 20 NIBP cuffs, child, for 12-19 cm upper arm circumference, short-term use	WM 45474
Set of 20 NIBP cuffs, small adult, for 17-25 cm upper arm circumference, short-term use	WM 45475
Set of 20 NIBP cuffs, adult, for 23-33 cm upper arm circumference, short-term use	WM 45476
Set of 20 NIBP cuffs, adult plus, for 28-40 cm upper arm circumference, short-term use	WM 45477
Set of 20 NIBP cuffs, large adult plus, for 40-55 cm upper arm circumference, short-term use	WM 45478
Set of 20 NIBP cuffs, thigh, adult, for 38-50 cm thigh circumference, short-term use	WM 45479
Miscellaneous	
Protective transport bag	WM 45490
DEFIview PC software	WM 45120

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Article	Article number
ECG simulator, 6-lead ECG, shockable	WM 45444
Adapter cable for connection to Laerdal/Ambu manikin	WM 45424

16.4 Replacement parts

Replacement parts can be ordered separately, if required. A current list of replacement parts is available on the Internet at www.weinmann-emergency.com or from your authorized dealer.

17 Appendix

17.1 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 replacement parts 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 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, incl. accessories (excluding: masks) for oxygen therapy and emergency medicine	2 years
Masks, incl. accessories, batteries (unless otherwise stated in the technical documentation), sensors, patient circuits	6 months
Disposable products	None

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17.2 Declaration of conformity

WEINMANN Emergency Medical Technology GmbH + Co. KG declares herewith that the product complies fully with the respective regulations of the Medical Device Directive 93/42/EEC. The unabridged text of the Declaration of Conformity can be found on our website at www.weinmann-emergency.com.

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