MEDUVENT Standard

Ventilator

Instructions for use for devices from software version 3.1

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

Table of contents

WM 67891a 2024-08

WM 67891a 2024-08

WM 67891a 2024-08

WM 67891a 2024-08

WM 67891a 2024-08

WM 67891a 2024-08

1 Introduction

1.1 About this document

This document describes all possible versions of the device.

The functions, accessories and other parts described in this document or shown in illustrations depend on the version procured, and are not available in all cases.

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

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

Texts shown in the device display appear in this document in bold. Example: Select the **Function check** menu item.

1.2 Explanation of warnings

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

WM 67891a 2024-08

2 Safety

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

⇒ Follow instructions for use in their entirety.
⇒ Keep the instructions for use accessible and near the device at all times.
⇒ Use the device only for the intended purpose (see "2.1 Intended purpose", page 9).
⇒ Do not use the device if it is contra-indicated.
⇒ Follow the instructions for use of accessories and other parts.

Report any serious incidents involving the device to the manufacturer and to the responsible authority.

2.1 Intended purpose

If the specifications for the accessories are not listed separately, the following specifications apply to both the device and the accessories.

2.1.1 Indications and medical purpose

MEDUVENT Standard

MEDUVENT Standard is an emergency and transport ventilator with functions for the monitoring of respiratory values. The device can be used for invasive and non-invasive ventilation via the nose, mouth and trachea.

VENTcirc-MVS breathing circuit

VENTcirc-MVS directs the respiratory gas to the patient and has a medical purpose only in combination with MEDUVENT Standard.

HF-MVS hygiene filter

HF-MVS filters the intake air and has a medical purpose only in combination with MEDUVENT Standard.

WM 67891a 2024-08

MEDUtrigger

MEDUtrigger provides manual triggering of a mechanical breath and has a medical purpose only in combination with an emergency and transport ventilator.

FlowCheck sensor

The FlowCheck sensor is used to measure the proximal flow during a ventilation therapy and has a medical purpose only in combination with an emergency and transport ventilator.

MEDUtrigger with FlowLine-FlowCheck connection line

MEDUtrigger with FlowLine-FlowCheck connection line enables manual triggering of a mechanical breath and is used to transmit measured values from the FlowCheck sensor to a combined emergency and transport ventilator. A medical purpose exists only in combination with an emergency and transport ventilator.

2.1.2 Patient target group(s)

MEDUVENT Standard is used in the treatment of infants, children, and adults with a body weight of 7 kg and more. In the case of volume-controlled ventilation, tidal volumes of 50 ml or more are possible.

The patient target group of the accessory corresponds to the permissible patient target group of the combined emergency and transport ventilator.

2.1.3 Intended users

Qualified healthcare professionals

2.1.4 Contra-indications

There are no known contra-indications for the use of this product.

2.1.5 Intended environments of use

- Mobile use in emergency medicine or primary care at the site of the emergency

WM 67891a 2024-08

- In rooms and departments of healthcare facilities and during transport between such rooms and departments
- During transport between the hospital and other premises by ambulance, aircraft, helicopter or ship

2.1.6 Undesirable side effects and complications

MEDUVENT Standard

- Undesired effect on the cardiovascular system (e.g. reduced cardiac output, reduced venous return)
- Drying of the airways
- Hyperinflation of lung tissue (e.g. lung rupture)
- Gastric insufflation during mask ventilation (e.g. aspiration of stomach contents)

VENTcirc-MVS, HF-MVS, MEDUtrigger

There are no known side effects or complications related to the use of the accessory. When used in combination with MEDUVENT Standard, undesirable side effects and complications may occur.

FlowCheck sensor

The use of the FlowCheck sensor increases the dead space of the breathing circuit. An excessive dead space can lead to hypoventilation of the patient. When used in combination with the emergency and transport ventilator, further undesirable side effects and complications may occur.

MEDUtrigger with FlowLine-FlowCheck connection line

There are no known side effects or complications related to the use of the accessory. When used in combination with the FlowCheck sensor and MEDUVENT Standard, undesirable side effects and complications may occur.

WM 67891a 2024-08

2.1.7 Clinical benefit of the product

MEDUVENT Standard

The medical benefit of ventilation therapy is the sustained oxygenation and ventilation (CO_2 evacuation) of the lungs in case of failed or insufficient spontaneous breathing.

A mechanical ventilator also offers the following benefits in comparison to a bag-valve mask:

- Constant tidal volume and lower peak pressures
- Less risk of hyperventilation
- Less risk of undesired hypoventilation
- Less risk of gastric insufflation

VENTcirc-MVS, HF-MVS, MEDUtrigger, FlowCheck sensor, MEDUtrigger with FlowLine-FlowCheck connection line

The accessories have no clinical benefit of their own but support the clinical benefit of MEDUVENT Standard.

2.1.8 Exclusions and limitations of the intended purpose

MEDUVENT Standard

The device has **not** been approved for the following applications:

- Operation in hyperbaric chambers
- Operation in conjunction with magnetic resonance imaging machines
- Long-term ventilation of over 24 hours

VENTcirc-MVS, HF-MVS, MEDUtrigger, FlowCheck sensor, MEDUtrigger with FlowLine-FlowCheck connection line

The accessories are subject to the same exclusions and limitations of the intended purpose as MEDUVENT Standard.

WM 67891a 2024-08

2.2 Requirements on the user

The user must meet the following requirements:

- The user is medically trained and has the necessary technical knowledge and experience in the emergency medical treatment of patients.
- On the basis of this technical knowledge and experience, the user is in a position to perform the tasks assigned to him or her safely, and to independently recognize, assess and avoid potential risks to him or herself, to the patient or to bystanders.
- The user has been trained and has received instruction in the use of the device.
- The user has been trained to apply the necessary hygiene procedures.

2.3 Requirements on the operator

The operator must ensure that accessories and other parts connected to MEDUVENT Standard are compatible with the device. The compatibility of the accessories is indicated by the ☑ symbol and the name of the device.

2.4 Safety information

⚠ WARNING

Risk of injury from using the device for too long without further humidification of the respiratory gas!
If the device is used for too long, the patient may be ventilated with dry gas for too long. This may cause serious or life-threatening injury to the patient.
⇒ Do not use the device for sustained ventilation (longer than 24 h).

WM 67891a 2024-08

⚠ WARNING

Hazardous therapy as a result of inadequate patient monitoring!

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

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

⇒ Use suitable monitoring (e.g. SpO_2 and/or $etCO_2$).

⚠ WARNING

Failure of therapy as a result of device malfunction or loss of pneumatic or electric power!

A device failure may result in failure of the therapy. This may cause serious or life-threatening injury to the patient.

⇒ Provide an alternative ventilation option.

⚠ WARNING

Risk of injury resulting from incorrectly set limitation of maximum airway pressure!

An excessively high airway pressure may cause the patient serious or life-threatening injury.

⇒ Always set the pressure limit pMax to match the current patient and the current therapy.

⚠ WARNING

Risk of suffocation resulting from extubation during patient transport!

If the device falls off, or the breathing circuit becomes disconnected during patient transport, the patient may be extubated, resulting in laryngospasm. This may cause serious or life-threatening injury to the patient.

⇒ Secure the device against falling while transporting the patient on a stretcher.

⇒ Always fix the breathing circuit in place while transporting the patient.

⚠ WARNING

Risk of asphyxia as a result of aspiration!

Mask ventilation at excessive ventilation pressures may lead to gastric insufflation and aspiration of stomach contents. This may cause serious or life-threatening injury to the patient.

⇒ Avoid high pressures during mask ventilation.

WM 67891a 2024-08

⚠ WARNING

Hazardous therapy due to leaks during ventilation!
If the applied respiratory volume is too low due to leaks, this can cause serious or life-threatening injuries to the patient.
⇒ Use suitable monitoring ($etCO_2$, SpO_2 or expiratory volume measurement (MVe)).
⇒ When using the device without the FlowCurve Pro option: Do not use the measured MVi value as a means of assessing ventilation.
⇒ Check that the mask or tracheal tube is correctly positioned.

⚠ WARNING

Risk of infection resulting from failure to use hygiene filter!
If the device is used without a hygiene filter in a contaminated environment, it may draw in contaminated ambient air. This may cause the patient and the user serious or life-threatening injury.
⇒ Always use a hygiene filter when operating the device in a contaminated environment.

⚠ WARNING

Reduced ventilation performance resulting from increased device input resistance as a result of using the device in a very dusty atmosphere!
If the device is operated in a very dusty atmosphere, it may draw in dust and dirt from the ambient air, which might get into the patient's lungs. Ventilation performance may also be reduced by increased device input resistance. This may cause serious or life-threatening injury to the patient, and damage the device.
⇒ Only operate the device with a hygiene filter.
⇒ Replace the hygiene filter after operating the device in a very dusty atmosphere.

WM 67891a 2024-08

⚠ WARNING

Disrupted or failed therapy due to defective or non-operational device or accessories!

Using defective devices or defective accessories may result in device malfunctions. This may cause the patient and the user serious or life-threatening injury.

⇒ Perform a complete function check prior to every use.
⇒ Only operate the device and accessories if they are externally undamaged.
⇒ Only use devices and accessories which have passed the function check.
⇒ Have defective devices repaired.
⇒ Have defective accessories repaired, or replace them.
⇒ Follow the instructions for use of the accessories.
⇒ Observe the maintenance intervals.

⚠ WARNING

Disrupted or failed therapy due to inadequate protection from dust and damp!

If the interfaces for the SD card or the breathing circuit are not protected when transporting the device in a dusty or damp environment, disruption or failure of therapy may occur as a result of device failure. This may cause serious or life-threatening injury to the patient, and damage the device.

⇒ Close the SD card cover to assure IP protection.
⇒ Connect the breathing circuit or close the protective caps to assure IP protection.

⚠ WARNING

Inadequate patient monitoring and device operability resulting from device being operated in an unsuitable position!

Operating the device in an unsuitable position may mean that alarm transmitters cannot be heard or the display is hard to read. This may cause serious or life-threatening injury to the patient.

⇒ Use the device only in the following positions:

- Display facing upward (when the device is lying on a table for example).
- Display facing forward (when the device is mounted on a wall by a portable unit for example).

WM 67891a 2024-08

⚠ WARNING

Risk of injury and treatment delay due to imperceptible alarm signals!
Alarm signals which are quieter than the ambient noise level prevent alarm situations from being detected. This may result in treatment delays and thus to injury to the patient.
⇒ Always set the device volume to be louder than ambient noise level.

⚠ WARNING

Electric shock resulting from incompatibility with other devices!
Connecting a different device or non-approved accessories may cause voltage on a part of the device which can be contacted, and so lead to electric shock. This may cause serious or life-threatening injuries to the user.
⇒ Use only approved accessories.

⚠ WARNING

Disrupted or failed therapy due to operation of the device and accessories outside the specified ambient conditions!
Using the device and accessories outside the specified ambient conditions may result in tolerances being exceeded, and in device failure. This may cause serious or life-threatening injury to the patient.
⇒ Only operate the device and accessories within the specified ambient conditions (see "16 Technical data", page 210).
⇒ Never use the device and accessories in hyperbaric chambers.

⚠ WARNING

Risk of explosion due to flammable gases in the environment!
Operating the device in an environment with flammable gases or explosive gas mixtures can lead to explosions. This can cause serious or life-threatening injury to the patient, user and bystanders.
⇒ Do not use the device in environments where flammable or explosive gas mixtures may occur.

⚠ WARNING

Risk of explosion if the device is used in hyperbaric chambers!
If the device is used in a hyperbaric chamber, this may lead to explosions.
⇒ Never use the device in hyperbaric chambers.

WM 67891a 2024-08

⚠ WARNING

Disrupted or failed therapy due to use of bubble humidifiers!
Using bubble humidifiers may cause moisture at the oxygen inlet and result in malfunctions and device failure. This may cause serious or life-threatening injury to the patient.
⇒ Do not use bubble humidifiers.

⚠ WARNING

Risk of injury from operating the device in a toxic environment!
Operating the device in a toxic environment may cause toxic gases to reach the patient's lung, causing him or her serious or life-threatening injury.
⇒ Do not use the device in a toxic environment.

⚠ WARNING

Disrupted or failed therapy due to lack of maintenance!
If maintenance intervals are not observed, malfunctions may occur. This may cause serious or life-threatening injury to the patient.
⇒ Observe the maintenance schedule according to the instructions for use and the displays on the device.
⇒ Observe the maintenance schedule even for devices and accessories in storage.

⚠ WARNING

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

WM 67891a 2024-08

⚠ WARNING

Risk of fire and explosion resulting from incorrect handling of highly compressed oxygen/oxygen cylinder!

Compressed oxygen in combination with combustible substances in an oxygen-enriched environment may cause fires and explosions. This can cause serious or life-threatening injury to the patient, user and bystanders.

⇒ Never smoke near oxygen-carrying fittings.
⇒ Keep the oxygen supply away from naked flames and other ignition sources.
⇒ Ensure adequate ventilation.
⇒ Keep the device and screw fittings free of oil and grease.
⇒ Wash your hands to remove any oil or grease before working on the oxygen supply.
⇒ Secure the oxygen cylinder against toppling over.
⇒ Tighten or loosen all screw fittings on the oxygen cylinder and on the pressure reducer by hand only.

⚠ WARNING

Risk of fire resulting from use of the device in conjunction with anesthetics!

Flammable gases and anesthetics can cause spontaneous explosions. This may cause the patient, user and bystanders serious or life-threatening injury, as well as damage the device.

⇒ Do not use the device in environments with flammable gases or gaseous and ignitable anesthetics.

⚠ WARNING

Risk of injury resulting from incorrect handling of the rechargeable battery!

Incorrect handling of the rechargeable battery may cause the patient, user and bystanders serious or life-threatening injury.

⇒ Do not throw the rechargeable battery into a fire, and never expose it to high temperatures.
⇒ Do not open the rechargeable battery.
⇒ Do not deform the rechargeable battery.
⇒ Do not short-circuit the rechargeable battery.
⇒ Protect the rechargeable battery from moisture.
⇒ Protect the rechargeable battery from high temperatures.
⇒ Do not subject the rechargeable battery to high pressure.
⇒ Have the rechargeable battery replaced only by trained personnel.

WM 67891a 2024-08

⚠ WARNING

Premature failure of therapy resulting from use of a rechargeable battery with a low state of charge at low temperatures!

Using a rechargeable battery with a low state of charge at low temperatures (< 0 °C) may result in a much reduced device operating time, and thus to premature failure of therapy. This may cause serious or life-threatening injury to the patient.

⇒ Always use a fully charged rechargeable battery at low temperatures.

⚠ WARNING

Disrupted or failed therapy due to interaction between medical electrical devices!

Medical electrical devices which are operated directly next to or on top of one another can cause mutual interference to functionality. This may cause serious or life-threatening injury to the patient.

⇒ 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: WEINMANN Emergency devices which have been tested to ensure that they can be operated alongside the device without problems. A list of the tested devices can be provided on request).

⇒ 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.

⚠ WARNING

Disrupted or failed therapy due to magnetic resonance imaging machines in the immediate vicinity of the device!

The magnetic action of magnetic resonance imaging machines in the immediate vicinity of the device may throw the device around. This may lead to therapy being interrupted, and cause the patient serious or life-threatening injury.

⇒ Never operate device in conjunction with magnetic resonance imaging machines.

WM 67891a 2024-08

⚠ WARNING

Disrupted or failed therapy due to portable radio-frequency communication equipment in the immediate vicinity of the device!

Portable high-frequency communication equipment (e.g. radios, antennas and antenna cables) in the immediate vicinity of the device may impair the performance characteristics of the device, and injure the patient.

⇒ Keep portable radio-frequency communication equipment a minimum distance of 30 cm away from the device and its accessories.

⚠ WARNING

Faults in, or failure of, the device or its accessories during therapy as a result of high-frequency surgical equipment in the immediate vicinity of the device!

High-frequency surgical equipment in the immediate vicinity of the device or its accessories may lead to faults or failure of the device or its accessories. This may cause serious or life-threatening injury to the patient.

⇒ Do not use the device and its accessories in the vicinity of high-frequency surgical equipment.

⚠ WARNING

Disrupted or failed therapy due to incompatibility of the device with consumables, accessories and other medical devices!

Defective or non-approved accessories may cause malfunctions, increased electromagnetic interference or reduced electromagnetic immunity of the device, incorrect output values, and reduced ventilation performance. This may cause serious or life-threatening injury to the patient.

⇒ Before using accessories and other parts, check that they are compatible with the device.

⇒ Follow the instructions for use of the accessories.

⇒ Do not connect any accessories to the disposable patient valve's Luer-Lock connection.

⇒ Do not use a closed suction system during ventilation.

WM 67891a 2024-08

⚠ WARNING

Disrupted and failed therapy due to incorrect use of disposables!

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

⇒ Do not reuse disposables.

⇒ Do not subject disposables to hygienic reprocessing.

⚠ WARNING

Risk of infection and contamination due to contamination of the inside of the device!

If the check valve diaphragm in the patient valve is damaged, the inside of the device may be contaminated by re-inhalation. This can lead to an infection of the next patient.

⇒ Always use the recommended breathing system filter.

⚠ WARNING

Risk of injury resulting from condensation in the patient valve or the FlowCheck sensor at temperatures below 5 °C!

If patients are subjected to sustained ventilation at temperatures below 5 °C, the exhalation moisture in the patient valve or FlowCheck sensor may condense and impair the function of the parts. This may cause serious or life-threatening injury to the patient.

⇒ Quickly move the patient to a warmer location.

⇒ Always use the recommended breathing system filter.

⚠ WARNING

Delayed or incorrect therapy as a result of illegible labeling on device!

Unsuitable cleaning agents and disinfectants may remove device labeling and markings, and lead to material damage, with the result that the user is unable to use the device and its accessories properly in an emergency situation. This may cause serious or life-threatening injury to the patient.

⇒ Only use the recommended cleaning agents and disinfectants.

⇒ Replace illegible labels.

WM 67891a 2024-08

⚠ CAUTION

Increased spontaneous breathing resistance and reduced ventilation performance resulting from blocked intake opening/blocked hygiene filter!

A blocked intake opening/blocked hygiene filter will reduce ventilation performance in operation, and in the event of device failure will result in increased spontaneous breathing resistance. This may injure the patient.

⇒ Do not conceal or block the intake opening/hygiene filter.

⚠ CAUTION

Hazardous therapy due to lack of monitoring of the oxygen concentration administered!

The device does not monitor inspiratory oxygen concentration in the same way as an RGM (respiratory gas monitor), and has no corresponding alarm. Dispensing respiratory gas at a slightly different oxygen concentration may put the therapy at risk. This may injure the patient.

⇒ Use a separate respiratory gas monitor to monitor the oxygen concentration administered to the patient.

⚠ CAUTION

Inadequate oxygen concentration due to leaks during ventilation!

Leaks during ventilation may lead to the concentration of oxygen administered in the respiratory gas being reduced. This may injure the patient.

⇒ Check that the mask or tracheal tube is correctly positioned.

⇒ Note measured value O_2i for assessing ventilation. Also correct oxygen supply if necessary.

⇒ Use suitable monitoring (e.g. SpO_2).

⚠ CAUTION

Risk of injury as a result of using the device at high ambient temperatures!

Using the device at high ambient temperatures may result in the temperatures of the respiratory gas and of applied parts rising. Temperatures > 41 °C may injure the patient if applied for a prolonged period.

⇒ Note that all applied parts can warm up to ambient temperature.

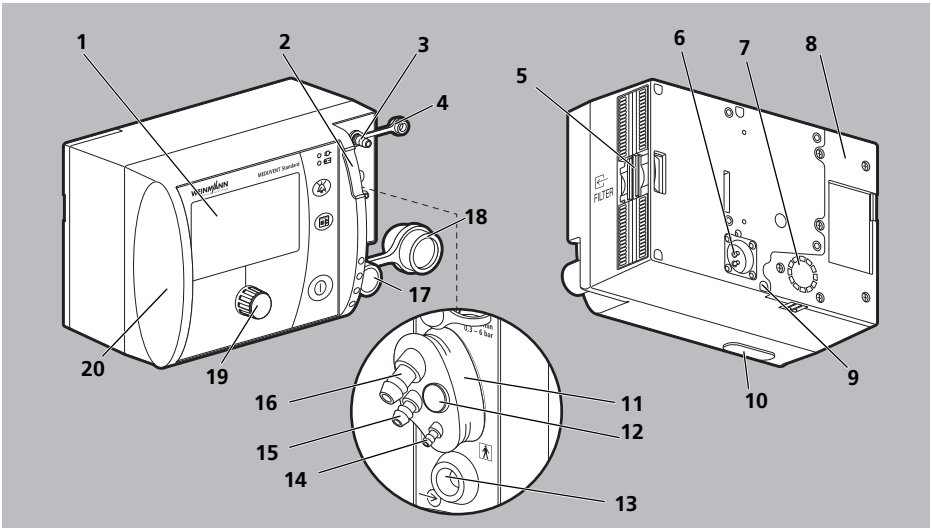
⇒ Note that the applied respiratory gas can reach a temperature > 41 °C.

⇒ Shorten the application time at ambient temperatures > 41 °C.

WM 67891a 2024-08

3 Description

3.1 Overview



3-1 Device overview

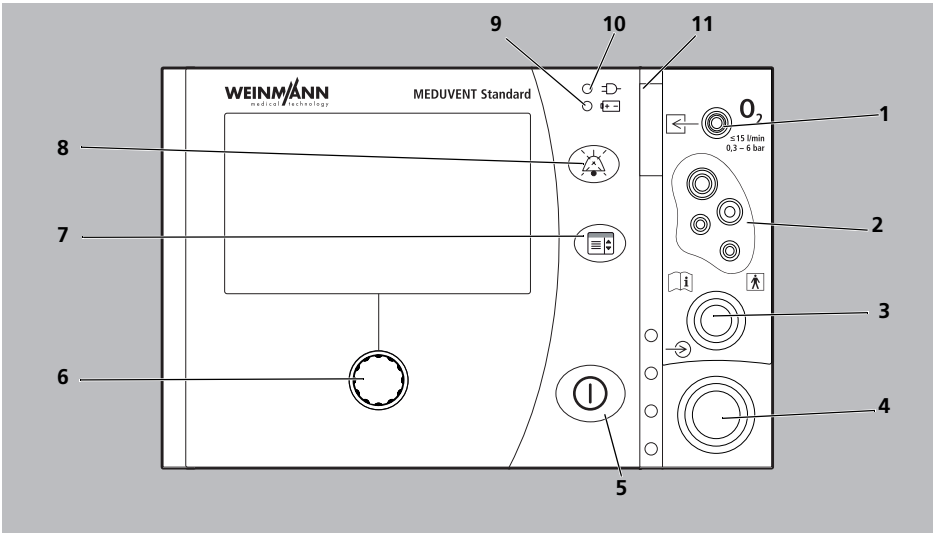
No.	Designation	Description
1	Display	Displays settings and current values (see "3.3.7 Symbols in the display", page 35).
2	Alarm light	Displays high-priority alarms visually.
3	Oxygen inlet	Used to connect the oxygen supply.
4	Protective cap for oxygen inlet	Protects the oxygen inlet when it is not in use.
5	Filter compartment (with intake opening for ambient air)	Holds the hygiene filter.
6	Power supply connection	Connects the device to the power supply.
7	Cooling air outlet	Used to dissipate heat from the inside of the device.
8	Battery compartment cover	Covers the battery compartment.
9	Security seal	Indicates whether the device has been opened without authorization.
10	SD card slot with SD card cover	For inserting an SD card.
11	Measuring circuit connection	Connects the device to the measuring circuit of the breathing circuit.

WM 67891a 2024-08

No.	Designation	Description
12	Protective cap for connection terminal	• With adapter for reusable breathing circuit: Covers the bore in the measuring circuit connection. • With adapter for disposable breathing circuit: Covers the screw that secures the adapter for disposable breathing circuit.
13	Accessories connection	• Connects the device to the MEDUtrigger. • Connects the device to MEDUtrigger with FlowLine-FlowCheck connection line.
14	PEEP control tube connection (only with adapter for reusable breathing circuit)	Connects the device to the PEEP control tube.
15	Pressure measuring tube connection	Connects the device to the pressure measuring tube.
16	Flexible oxygen tube connection	Connects the device to the flexible oxygen tube.
17	Ventilation hose connection	Connects the device to the ventilation hose of the breathing circuit.
18	Protective cap for ventilation hose connection	Protects the ventilation hose connection when it is not in use.
19	Navigation knob	Permits navigation in the menus.
20	Loudspeaker (not seen)	Emits audio alarms.

WM 67891a 2024-08

3.2 Control panel and connections



3-2 Front view

No.	Designation	Description
1	Oxygen inlet	Used to connect the oxygen supply.
2	Measuring circuit connection	Used to connect the adapter for reusable breathing circuit or the adapter for disposable breathing circuit.
3	Accessories connection	• Connects the device to the MEDUtrigger. • Connects the device to MEDUtrigger with FlowLine-FlowCheck connection line.
4	Ventilation hose connection	Connects the device to the ventilation hose of the breathing circuit.
5	On/Off button	Switches the device on or off.
6	Navigation knob	Permits values for ventilation parameters to be selected and confirmed.
7	Menu button	In the start menu: • Briefly press the menu button: Activate quick settings. • Press and hold the menu button for 2 s: Activate the operator menu.
		During ventilation: Briefly press the menu button: Activate the user menu.

WM 67891a 2024-08

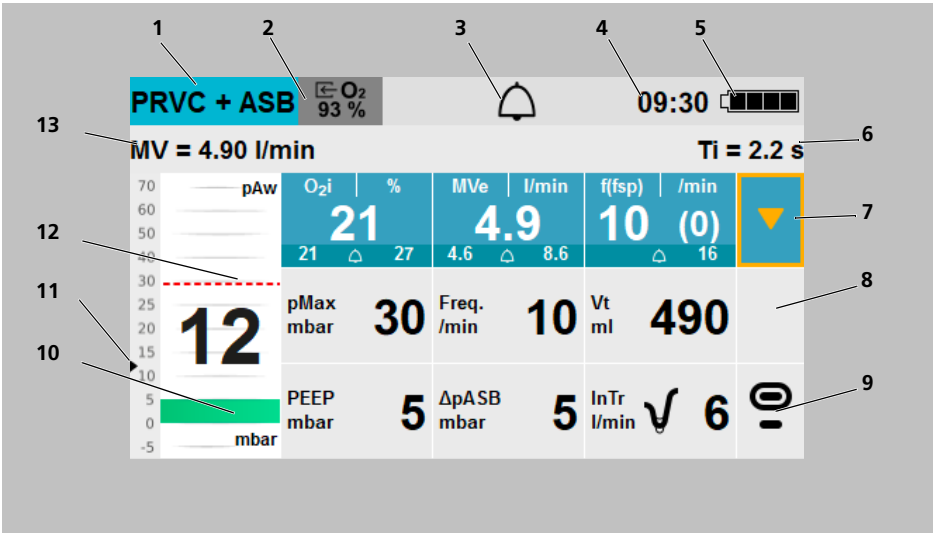
No.	Designation	Description
8	Alarm mute button	• Briefly press the alarm mute button: Mute alarm for 120 s. • During ventilation: Press and hold the alarm mute button for 2 s: Set alarm limits.
9	Battery status indicator	• LED showing green: The rechargeable battery is fully charged. • LED flashing green: The rechargeable battery is being charged. • LED showing red: The rechargeable battery is defective or not in the device. • LED not on: The device is being operated by the rechargeable battery and not by line power. • LED flashing red and green alternately: The battery is outside charging temperature and cannot be charged, even though the device is being supplied by line power.
10	Line power indicator	• LED showing green: Indicates that the device is connected to line power. • LED not on: The device is being operated by the rechargeable battery and not by line power.
11	Alarm light	Displays high-priority alarms visually.

WM 67891a 2024-08

3.3 Display

3.3.1 Ventilation mode with bar graph view (example)

In the standard view, the applied ventilation pressure is displayed as a bar graph.



3-3 Ventilation mode with bar graph (example)

No.	Designation	Description
1	Ventilation mode	Indicates the ventilation mode set.
2	Supply gas 93 % O_2	Is displayed if oxygen content of 93 % is set for the supply gas in the device settings (concentrator oxygen).
3	Alarm	Indicates whether the audio alarm output is active or muted (see "3.3.7 Symbols in the display", page 35).
4	Time	Displays current time.
5	Battery status	Indicates the charge level of the battery (see "3.5 Rechargeable battery and battery status indicator", page 46).
6	Inspiratory time Ti	Indicates the calculated inspiratory time. If an alarm is displayed, this display is omitted.

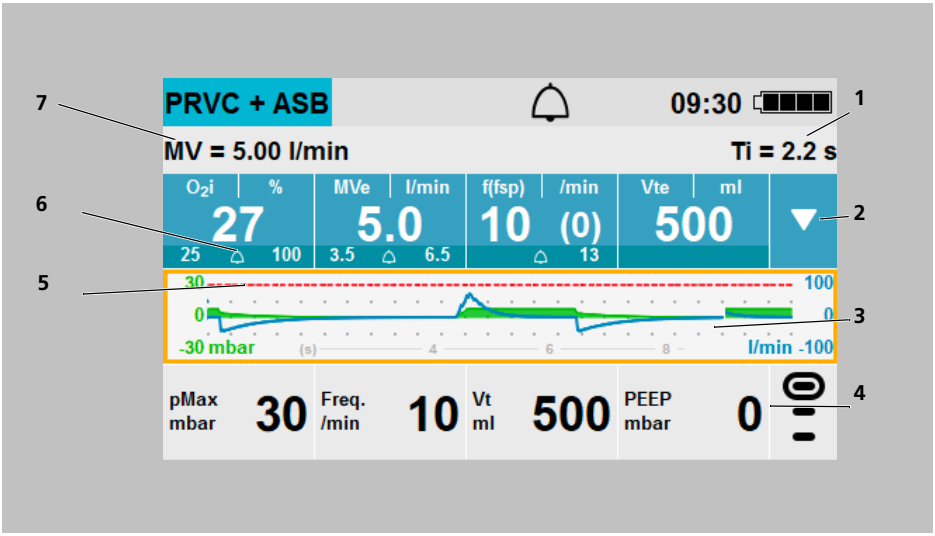
WM 67891a 2024-08

No.	Designation	Description
7	Measured values	This area shows measured values and alarm limits. The arrow can be used to expand or reduce the displayed measured values.
8	Ventilation parameters	Ventilation parameters which can be set to control ventilation.
9	Parameter level display	For scrolling through the levels of the parameter view.
10	Bar graph	Indicates the level of ventilation pressure being administered.
11	Maximum value indicator	Indicates the ventilation pressure achieved at the end of inspiration.
12	Pressure limit	Indicates the value set for pressure limit pMax.
13	Minute volume MV	Indicates the calculated minute volume. If an alarm is displayed, this display is omitted.

WM 67891a 2024-08

3.3.2 Ventilation mode with curve view (example)

The curve view is only available with the FlowCurve Pro option.

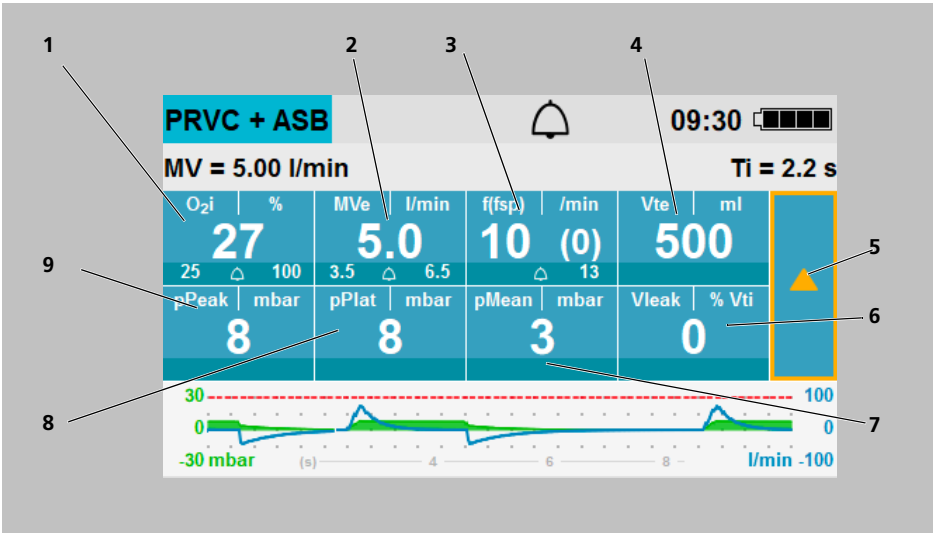


3-4 Ventilation mode with curve (example)

No.	Designation	Description
1	Inspiratory time Ti	Indicates the calculated inspiratory time. If an alarm is displayed, this display is omitted.
2	Measured values	This area shows measured values and alarm limits. The arrow can be used to expand or reduce the displayed measured values.
3	Curve view	Displays pressure curve (green) and flow curve (blue).
4	Ventilation parameters	Ventilation parameters which can be set to control ventilation
5	Pressure limit	Indicates the value set for pressure limit pMax.
6	Alarm limits	Displays the set lower and upper alarm limit for the measured value.
7	Minute volume MV	Indicates the calculated minute volume. If an alarm is displayed, this display is omitted.

WM 67891a 2024-08

3.3.3 Measured values view (example)



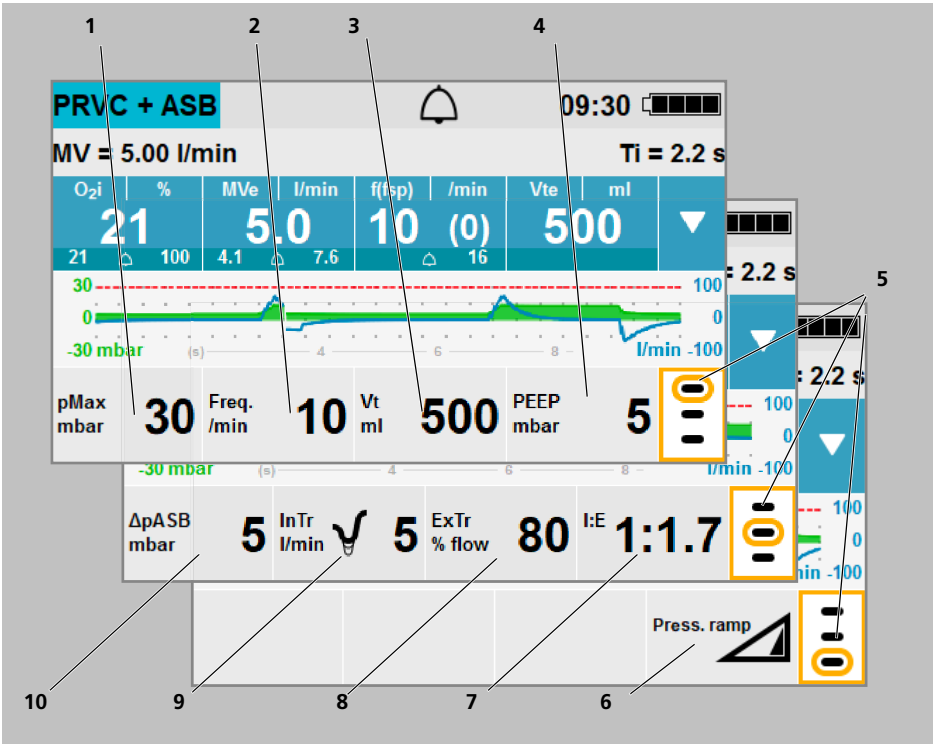
3-5 Expanded measured values view (example)

No.	Designation	Description
1	O_2i	Displays the oxygen concentration delivered.
2	MVe	Indicates the expiratory minute volume.
3	f(fsp)	• f indicates the total respiratory rate per minute. • (fsp) indicates the number of spontaneous breaths per minute.
4	Vte	Indicates the expiratory tidal volume.
5	Arrow (yellow, if selected)	Can be used to expand or reduce the displayed measured values.
6	Vleak	Leakage: Displays the leakage.
7	pMean	Mean pressure: Displays the mean pressure across all measured pressure values during a ventilation cycle.
8	pPlat	Plateau pressure: Displays the pressure during the plateau time.
9	pPeak	Peak pressure: Indicates the maximum pressure.

A description of all the measured values can be found in the chapter entitled Ventilation modes (see 10.3.2, p. 158).

WM 67891a 2024-08

3.3.4 Parameter view (example)



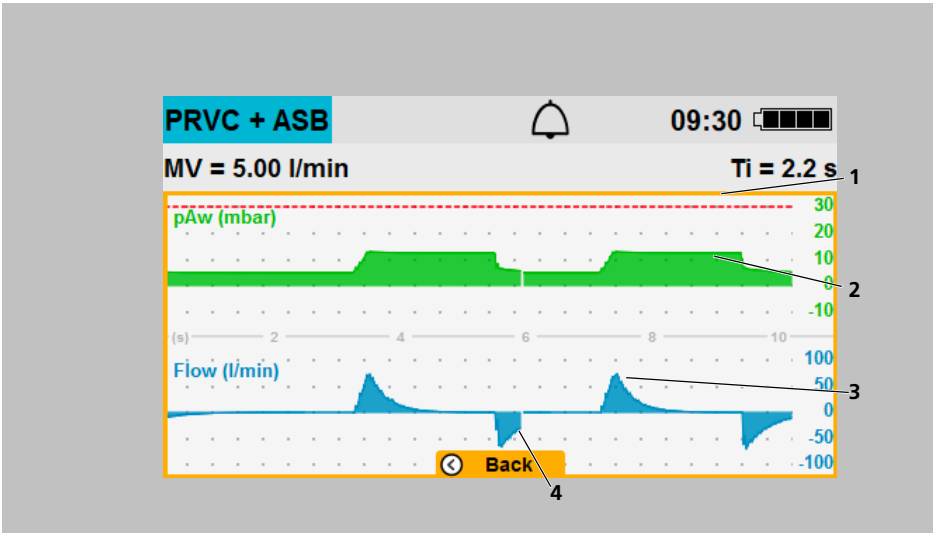
3-6 Expanded parameter view (example)

No.	Designation	Description
1	pMax	Maximum ventilation pressure
2	Freq.	Ventilation rate
3	Vt	Tidal volume (breath volume)
4	PEEP	Positive end-expiratory pressure
5	Parameter level display	For scrolling through the levels of the parameter view
6	Pressure ramp	Speed of pressure rise
7	I:E	Ratio of inspiration to expiration
8	ExTr	Expiratory trigger
9	InTr	Inspiratory trigger
10	ΔpASB	Pressure support

A description of all the ventilation parameters can be found in the chapter entitled Ventilation modes (see 10.3.1, p. 157).

WM 67891a 2024-08

3.3.5 Ventilation mode with extended curve view (example)

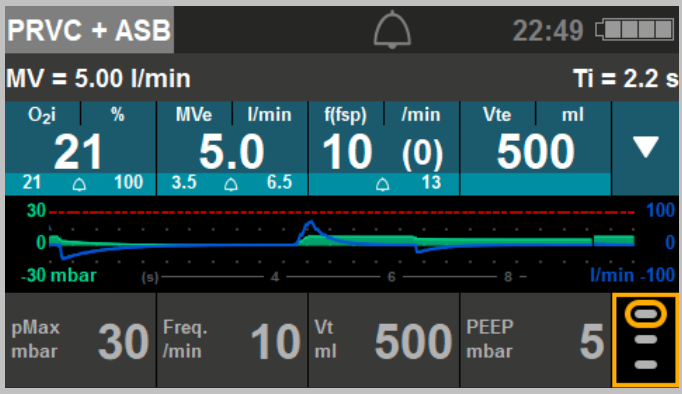


3-7 Ventilation mode with curve (example)

No.	Designation	Description
1	Pressure limit	Indicates the value set for pMax.
2	Pressure curve	Displays the ventilation pressure curve.
3	Flow curve	Displays the flow curve.
4	Back	Reduce curve view and return to ventilation mode view.

WM 67891a 2024-08

3.3.6 Night colors

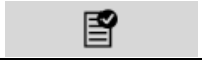


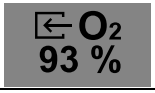
3-8 Night colors display (example)

The night colors can be set in the user menu during ventilation: **User menu | Display settings | Night colors**.

WM 67891a 2024-08

3.3.7 Symbols in the display

Symbol	Designation	Description
	Alarm symbol	Audio alarm output active
		Audio alarm output muted for 120 s
	Battery status symbol	Indicates current battery status (see "3.5 Rechargeable battery and battery status indicator", page 46).
	Symbols in the status report of the function check	Fault determined during function check
		Consult instructions for use
		Servicing measure required
	Service reminder symbol	Flashing on the start screen: • Maintenance interval has expired • Interval for device Technical Safety Check („Sicherheitstechnische Kontrolle" in accordance with § 11 of the German regulation MPBetreibV) has expired • Battery life has expired
	Emergency mode symbol	Emergency mode Infant (up to about 1 year old)
		Emergency mode Child (between about 1 and 12 years old)
		Emergency mode Adult (from about 13 years old)
	New patient symbol	Set ventilation mode and parameters for a new patient individually
	Function check symbol	Start function check
	Start ventilation symbol	Start ventilation in the selected ventilation mode

Symbol	Designation	Description
	Parameter level symbol	For scrolling through the levels of the parameter view
	Arrow	Can be used to expand or reduce the displayed measured values.
	Back symbol	Return from apnea ventilation mode to the previous ventilation mode (only with active apnea ventilation)
	Interdependent parameters symbol	Indicates that the setting of a parameter is dependent on other parameters.
	Alarm limit symbol	Indicates that alarm limits are activated for a measured value.
	Supply gas symbol	Operation with concentrator oxygen
	Symbols for trigger sensitivity	Inspiratory trigger • Low sensitivity • Medium sensitivity • High sensitivity Setting in l/min For CPAP + PS and PRVC + PS ventilation modes (only available in selected countries): Setting in 3 levels

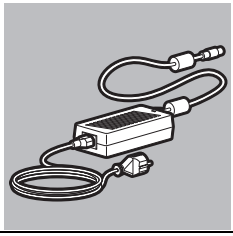
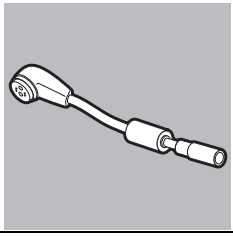
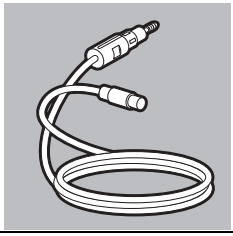
There is an overview of the symbols and labels on the device and its packaging in the Labels subchapter (see 3.7, p. 48).

WM 67891a 2024-08

3.4 Accessories and other parts

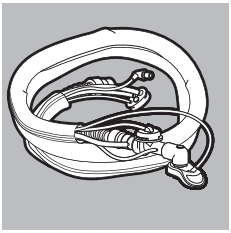
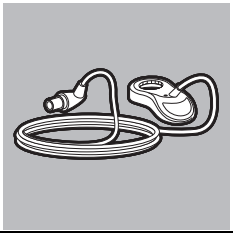
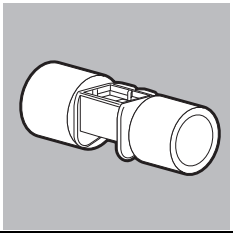
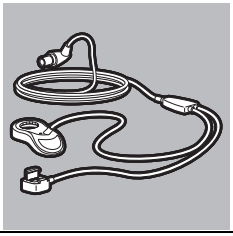
The following presents an overview of accessories and other parts of the device. For a complete list, including the relevant article numbers, refer to the Scope of supply chapter (see "15 Scope of supply", page 205). Please follow the instructions for use for accessories and other parts.

3.4.1 Power supply

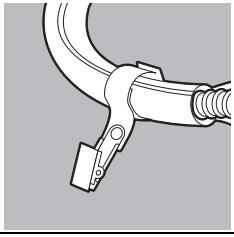
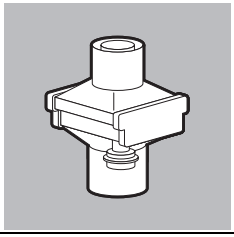
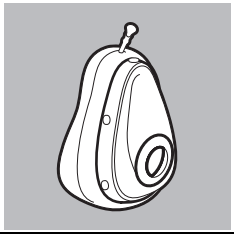
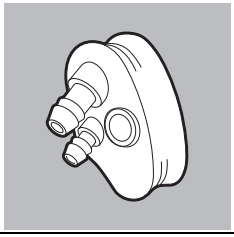
	Designation	Description
	Power supply unit and charger	Supplies power to the device.
	Charging adapter	Connects the power supply connection on the device to the power supply unit and charger or to the adapter cable for 12 V on-board power supply/circular connector.
	Adapter cable for 12 V on-board power supply/circular connector	Connects the device together with the charging adapter to the 12 V on-board power supply of a vehicle.

WM 67891a 2024-08

3.4.2 Breathing circuit

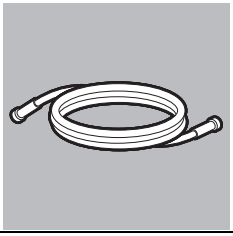
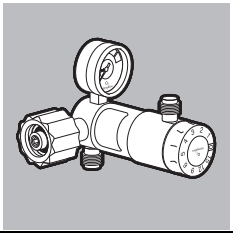
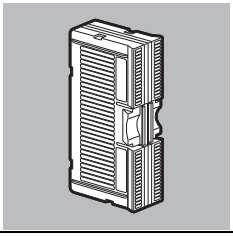
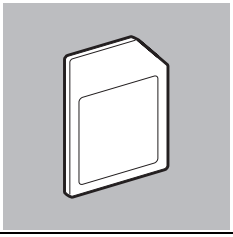
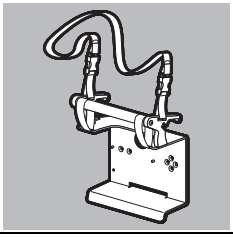
	Designation	Description
	Breathing circuit VENTcirc-MVS	Directs the respiratory gas to the patient. There are two types of breathing circuit: • Reusable breathing circuit (see 3.4.4, p. 42) • Disposable breathing circuit (see 3.4.5, p. 44)
	MEDUtrigger (with connection line)	Enables manual triggering of a mechanical breath.
	FlowCheck sensor	Measures the flow toward the patient and toward the device.
	MEDUtrigger with FlowLine-FlowCheck connection line	Connects MEDUtrigger and the FlowCheck sensor to the device.

WM 67891a 2024-08

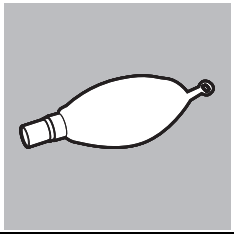
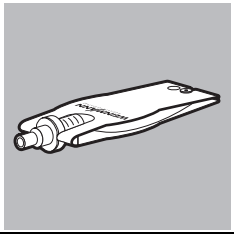
	Designation	Description
	Hook and loop strap with clip	Attaches the breathing circuit to the patient's clothing.
	Breathing system filter	For filtering and humidifying respiratory air.
	Ventilation mask	Connects the breathing circuit to the patient.
	Adapter for disposable breathing circuit	Allows the device to be operated with a disposable breathing circuit.

WM 67891a 2024-08

3.4.3 Miscellaneous

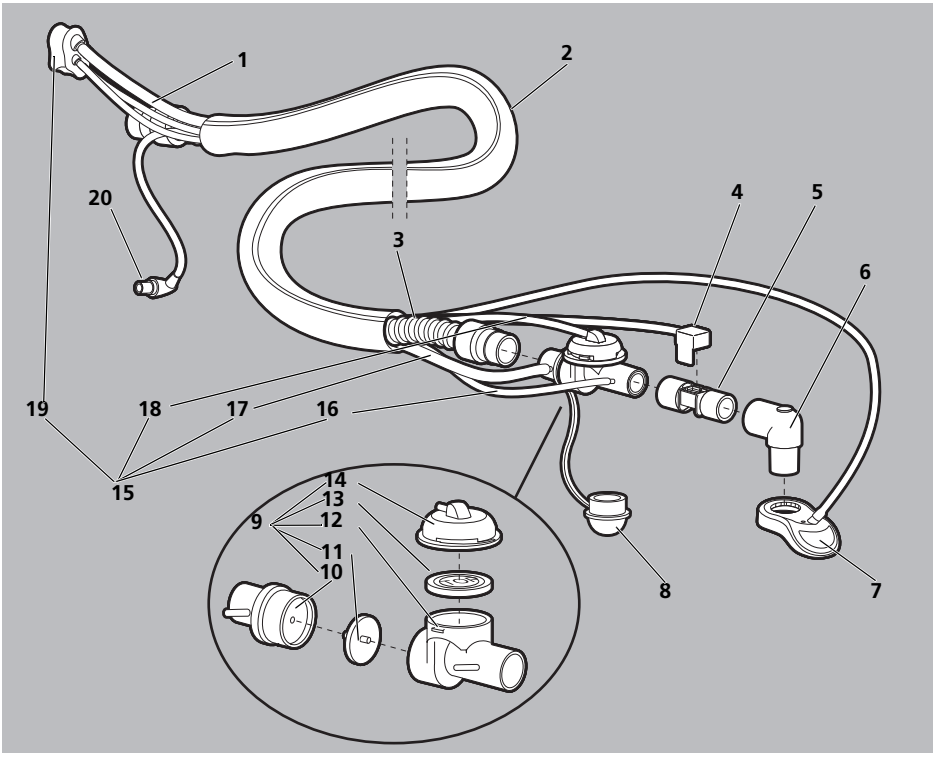
	Designation	Description
	Oxygen inlet tube	Routes the oxygen from the oxygen supply to the device.
	Pressure reducer	Used to provide an inhalation flow that enriches the air with oxygen.
	Hygiene filter	Protects the device from viral and bacterial contamination.
	SD card	For reading out session data and service data, and for performing software updates.
	Portable unit (example)	Used to transport the device (see "3.6 Transport options", page 47).

WM 67891a 2024-08

	Designation	Description
	Testing bag for function check	Simulates a ventilated patient in the function check.
	EasyLung test lung for function check	Simulates a ventilated patient for presentation purposes and in the function check.

WM 67891a 2024-08

3.4.4 Reusable breathing circuit



3-9 Reusable breathing circuit

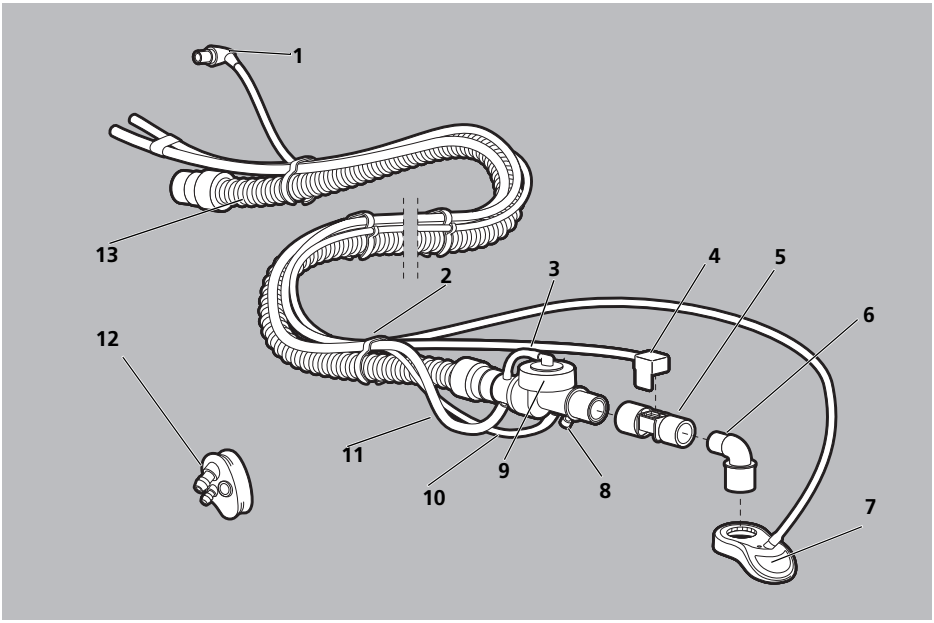
No.	Designation	Description
1	Service label (concealed)	Indicates the time of the next maintenance.
2	Protective sleeve	Protects the ventilation hose from dirt and damage.
3	Ventilation hose	The respiratory gas flows through the ventilation hose from the device to the patient valve.
4	FlowCheck sensor connector (only with FlowCurve Pro option)	Part of the FlowLine-FlowCheck connection line with MEDUtrigger. Connects the FlowCheck sensor to the device.
5	FlowCheck sensor (only with FlowCurve Pro option)	Measures the flow toward the patient and toward the device.
6	Elbow	Connects the reusable breathing circuit to the mask or tracheal tube.
7	MEDUtrigger	Used to trigger mechanical breaths manually.

WM 67891a 2024-08

No.	Designation	Description
8	Protective cap	Protects the patient end of the breathing circuit from damage and dirt.
9	Patient valve	Implements device commands relating to inspiration and expiration.
Comprising:		
10	Holder for check valve diaphragm	Connects the patient valve to the ventilation hose, and includes the check valve diaphragm.
11	Check valve diaphragm	The respiratory gas flows through the check valve diaphragm only toward the patient. No rebreathing takes place.
12	Main body	Provides a connection for a mask, a tracheal tube or the elbow.
13	PEEP control diaphragm	In combination with the control cover, creates a pressure chamber for PEEP control.
14	Control cover	In combination with the PEEP control diaphragm, creates a pressure chamber for PEEP control.
15	Reusable measuring circuit	The measuring circuit connects the device to the patient valve.
Comprising:		
16	Pressure measuring tube	Passes ventilation pressure on to the device.
17	Flexible oxygen tube	Routes oxygen into the breathing circuit.
18	PEEP control tube	The device controls the patient valve and PEEP by way of the PEEP control tube.
19	Adapter for reusable breathing circuit	Connects the measuring circuit to the measuring circuit connection on the device.
20	MEDUtrigger with FlowLine-FlowCheck connection line (only with FlowCurve Pro option)	Connects MEDUtrigger and the FlowCheck sensor to the device. Alternatively, you can use the MEDUtrigger connection line.

WM 67891a 2024-08

3.4.5 Disposable breathing circuit



3-10 Disposable breathing circuit

No.	Designation	Description
1	MEDUtrigger with FlowLine-FlowCheck connection line (only with FlowCurve Pro option)	Connects MEDUtrigger and the FlowCheck sensor to the device. Alternatively, you can use the MEDUtrigger connection line.
2	Tube clip	Holds the tubes and the connection line together.
3	PEEP control tube	The device controls the patient valve and PEEP by way of the PEEP control tube.
4	FlowCheck sensor connector (only with FlowCurve Pro option)	Part of the FlowLine-FlowCheck connection line with MEDUtrigger. Connects the FlowCheck sensor to the device.
5	FlowCheck sensor (only with FlowCurve Pro option)	Measures the flow toward the patient and toward the device.
6	Elbow	Connects the breathing circuit to the mask or tracheal tube.
7	MEDUtrigger	Manually triggers mechanical breaths.
8	Luer-Lock connection	Not used in combination with MEDUVENT Standard.
9	Patient valve	Implements device commands relating to inspiration and expiration.

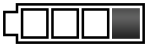
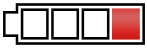
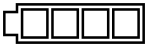
WM 67891a 2024-08

No.	Designation	Description
10	Pressure measuring tube	Passes ventilation pressure on to the device.
11	Flexible oxygen tube	Routes oxygen into the breathing circuit.
12	Adapter for disposable breathing circuit	Connects the device to the measuring circuit of the disposable breathing circuit. The adapter for disposable breathing circuit remains permanently on the device.
13	Ventilation hose	The respiratory gas flows through the ventilation hose from the device to the patient valve.

WM 67891a 2024-08

3.5 Rechargeable battery and battery status indicator

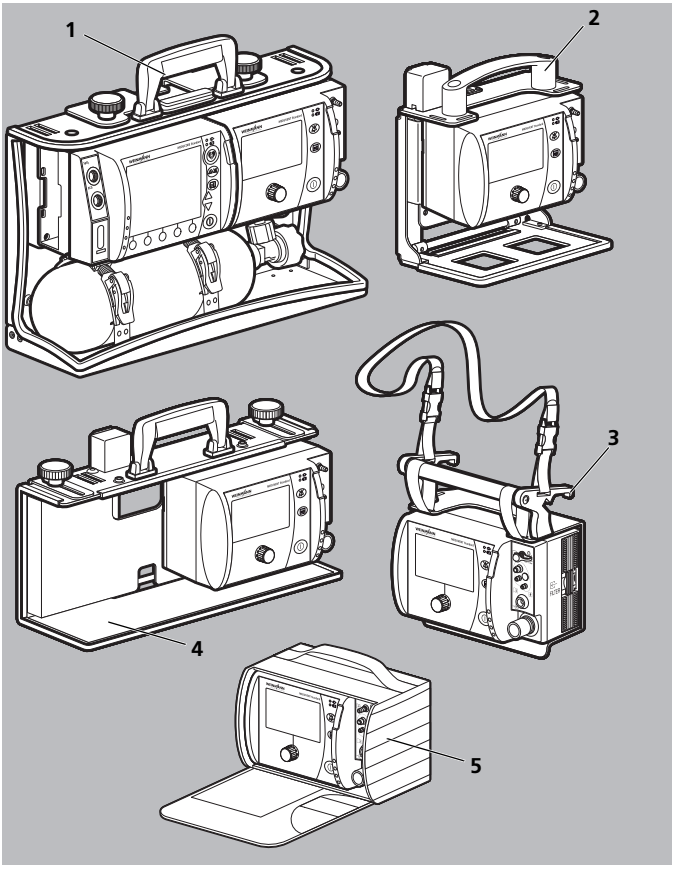
The device has an integrated rechargeable battery which may only be replaced by the operator. This rechargeable battery is automatically charged when the power supply is connected.

Symbol	Designation
	Battery status > 90 %
	Battery status approx. 60 % - 90 %
	Battery status approx. 40 % - 60 %
	Battery status approx. 10 % - 40 %
	Battery status < 10 % • The last remaining segment in the battery status indicator is red. • **Battery weak** appears in the display.
	Battery almost empty. **Battery empty** appears in the display. The device can be used for at least another 5 min.
	• Battery is defective. **or** • No battery. **or** • Battery not at suitable temperature.
	Green arrow: Battery is charging.

WM 67891a 2024-08

3.6 Transport options

Portable units and bags are available for transporting the device and carrying accessories. If the device is mounted on a portable unit, you can attach it to a wall mounting to establish a power supply for charging.



3-11 Transport options (examples)

No.	Designation
1	LIFE-BASE 3 NG
2	LIFE-BASE 1 NG XS
3	LIFE-BASE light XS
4	LIFE-BASE 1 NG XL
5	Protective transport bag (MOLLE-compatible)

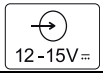
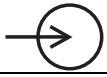
WM 67891a 2024-08

3.7 Labels

A summary of the symbols in the display can be found in the subchapter entitled Symbols in the display (see 3.3.7, p. 35).

Symbol	Description
	Article no.
	Serial number
	Production batch number
	Manufacturer
	Date of manufacture
	Expiry date
	CE marking (confirms that the product complies with the applicable European regulation)
	Unique Device Identifier (UDI): Allows individual products to be uniquely identified in the market
	Medical device
	Compatible devices
	Consult instructions for use
	Consult instructions for use. Colors: blue, white
	Attention: Observe the warnings and precautions in the instructions for use
	Safety check label (STK, only applies to Germany): Indicates when the next Technical Safety Check ("Sicherheitstechnische Kontrolle" in accordance with § 11 of the German regulation MPBetreibV) is required.

WM 67891a 2024-08

Symbol	Description
	Maintenance label: Indicates when the next maintenance is due.
	Disposable item, do not reuse
	Do not sit on device. Colors: white, red, black
	Do not climb on device. Colors: white, red, black
	Limits of the storage temperature range
	Limits of the storage humidity range
	Limits of the storage air pressure range
	Keep out of sunlight
	Do not dispose of device in domestic waste
	Type BF applied part
	Direct current
	Type of protection against electric shock: Protection class II device
IP54	• Complete protection against solid objects • Protected from ingress of dust • Protected from splashes from any angle
	Input voltage (12 V to 15 V)
	Input for energy and signals: MEDUtrigger connection

Symbol	Description
	• Intake opening for ambient air/hygiene filter • Oxygen inlet
WARNING: EMERGENCY AIR INTAKE — DO NOT OBSTRUCT	Emergency air inlet: Do not conceal or block the intake opening/hygiene filter.
TOP	Indicates the correct installation position of the PEEP control diaphragm.
	Date of manufacture
	Indicates the date of the next maintenance (position: on service label).
 INSP 	Indicates the correct flow direction during inspiration.
>PC<	Material designation: Polycarbonate
>PP<	Material designation: Polypropylene

WM 67891a 2024-08

4 Preparation

4.1 Mounting the device

The device is mounted on a portable unit and is ready for use as standard. Follow the instructions for use of the portable unit for mounting the device on the portable unit, and mounting the portable unit in emergency vehicles.

Do not use the device, accessories, and other parts in the following cases. Contact your specialist dealer or WEINMANN Emergency.

- The device, accessories, and other parts or packaging are damaged.
- The packaging was opened accidentally.

4.2 Connecting a power supply

⚠ WARNING

Failure of therapy or loss of power resulting from use of an incorrect power supply unit and charger!
If you are using a portable unit with the MEDUVENT Standard and MEDUCORE Standard or MEDUCORE Standard² device combination, the devices might lose power when using the 50 W power supply unit and charger, and therapy might fail prematurely.
⇒ Use only the more powerful power supply unit and charger 100 W (WM 28937) for the MEDUVENT Standard and MEDUCORE Standard/MEDUCORE Standard² device combination.

⚠ WARNING

Failure of therapy as a result of defective power supply unit and charger!
A power supply unit and charger which is defective due to shock, vibration or wet can no longer charge the battery, and so may lead to therapy failing.
⇒ Do not use the power supply unit and charger outdoors.
⇒ Protect the power supply unit and charger from wet.
⇒ Do not use the power supply unit and charger in an emergency vehicle.

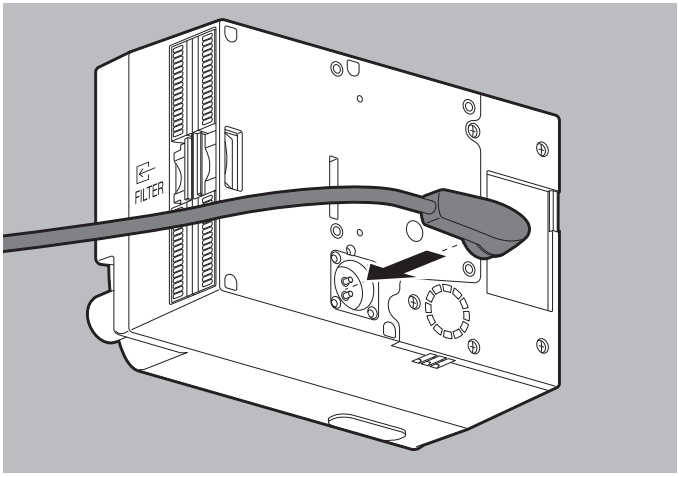
WM 67891a 2024-08

⚠ CAUTION

Risk of infection from contaminated power supply unit and charger!

A contaminated power supply unit and charger may lead to infections.

⇒ Protect the power supply unit and charger from contamination.



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

   or

   When operating on a portable unit: Attach the portable unit to a wall mounting with a charging interface.

   or

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

Result The device has been connected to the power supply. The device automatically starts charging the battery.

WM 67891a 2024-08

4.3 Connecting the breathing circuit

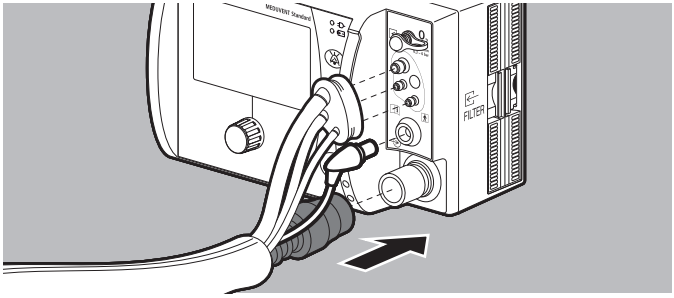
The disposable breathing circuit and the reusable breathing circuit are connected to the device differently:

- Reusable breathing circuit: The adapter for reusable breathing circuit is connected directly to the device.
- Disposable breathing circuit: The adapter for disposable breathing circuit is permanently connected to the device. The flexible oxygen tube and pressure measuring tube are connected to the adapter for disposable breathing circuit.

⚠ WARNING

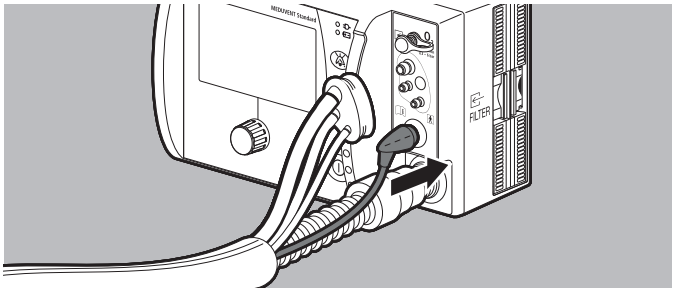
Hypoventilation resulting from use of additional breathing system filters!
Using additional breathing system filters (breathing system filter, bacteria filter or combined breathing system/bacteria filter) increases the dead space volume of the overall system. Increased dead space volume may lead to hypoventilation. This may cause serious or life-threatening injury to the patient.
⇒ Use only approved accessories.
⇒ Pay attention to increased dead space volume when ventilating at low tidal volumes.

4.3.1 Connecting the reusable breathing circuit

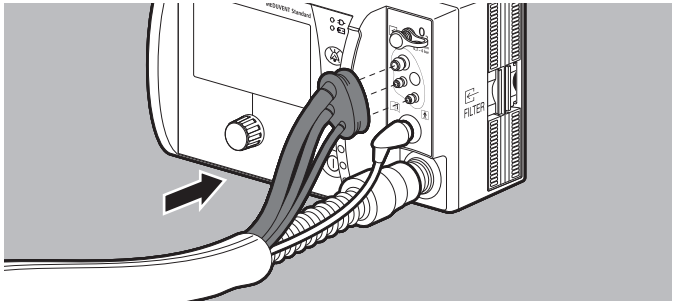


1. Connect the ventilation hose to the ventilation hose connection.

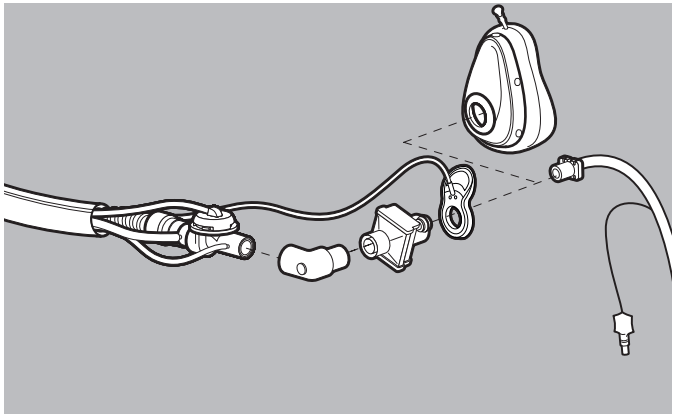
WM 67891a 2024-08



2. If present: Connect MEDUtrigger or MEDUtrigger with FlowLine-FlowCheck connection line (optional) to the accessories connection.



3. Fit the adapter for reusable breathing circuit on the measuring circuit connector.



4. In the case of invasive ventilation: Connect the patient valve of the breathing circuit to the tracheal tube following intubation:

WM 67891a 2024-08

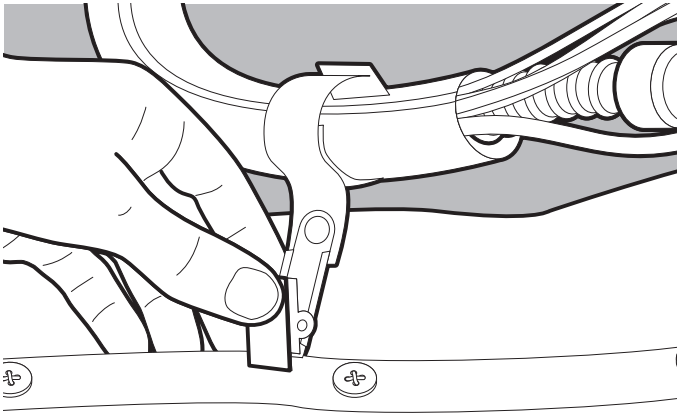
- With/without elbow
- With breathing system filter

or

For mask ventilation: Connect the ventilation mask to the patient valve of the breathing circuit:

- With/without elbow
- With breathing system filter

5. With disposable CPAP/NIV masks: Check mask is positioned correctly.
   Please note: The mask must be positioned firmly on the patient valve or the breathing system filter.



6. If necessary: Fix the breathing circuit to the patient's clothing using the hook and loop strap with clip.

Result The reusable breathing circuit has been connected to the device and is ready for use.

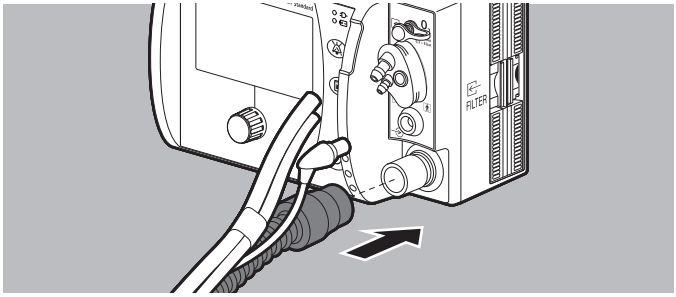
WM 67891a 2024-08

4.3.2 Connecting the disposable breathing circuit

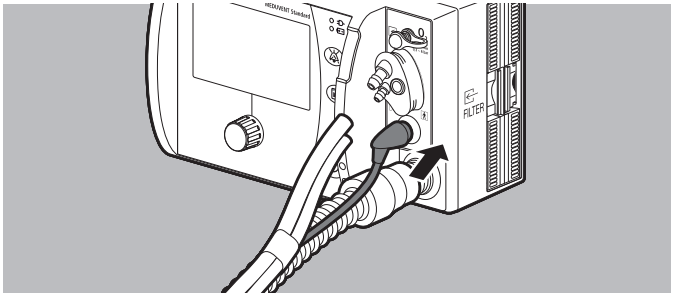
⚠ WARNING

Disrupted or failed therapy due to non-approved accessories!
The Luer-Lock connection on the disposable patient valve is not used in combination with MEDUVENT Standard. Defective or non-approved accessories may cause malfunctions, incorrect output values, and improper ventilation performance. This may cause serious or life-threatening injury to the patient.
⇒ Do not connect any accessories to the disposable patient valve's Luer-Lock connection.

Prerequisite The adapter for disposable breathing circuit is fitted to the device (see "4.6.1 Converting the device to a disposable breathing circuit", page 64).

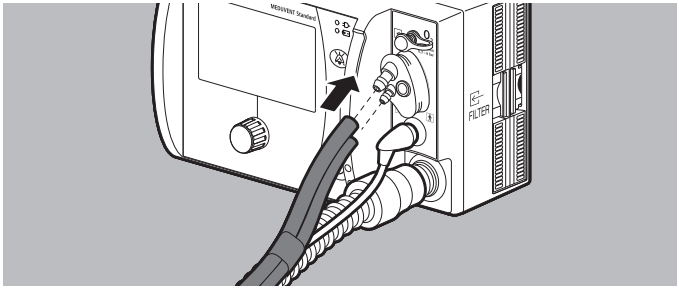


1. Connect the ventilation hose to the ventilation hose connection.

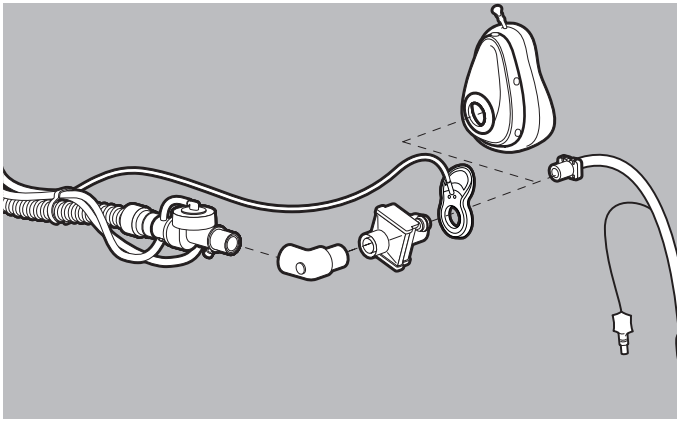


2. If present: Connect MEDUtrigger or MEDUtrigger with FlowLine-FlowCheck connection line (optional) to the accessories connection.

WM 67891a 2024-08



3. Connect the flexible oxygen tube and pressure measuring tube.



4. In the case of invasive ventilation: Connect the patient valve of the breathing circuit to the tracheal tube following intubation:
   - With/without elbow
   - With breathing system filter

   or

   For mask ventilation: Connect the ventilation mask to the patient valve of the breathing circuit:
   - With/without elbow
   - With breathing system filter

WM 67891a 2024-08

5. With disposable CPAP/NIV masks: Check mask is positioned correctly.
   Please note: The mask must be positioned firmly on the patient valve or the breathing system filter.

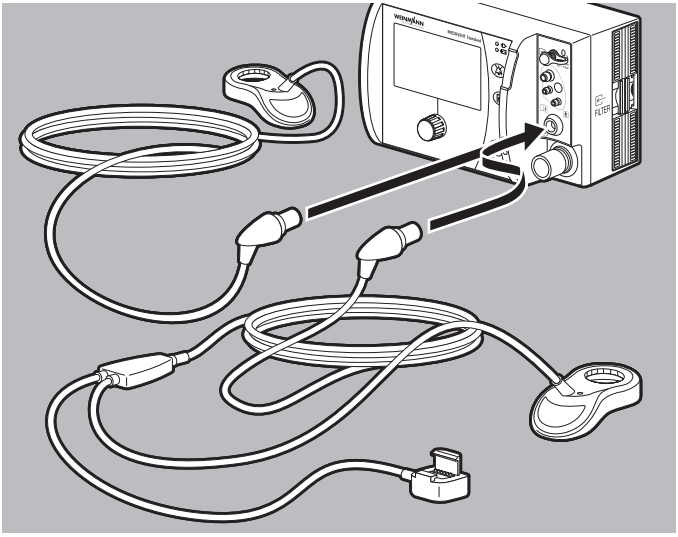
Result The disposable breathing circuit has been connected to the device and is ready for use.

4.3.3 Connecting the FlowCheck sensor

⚠ CAUTION

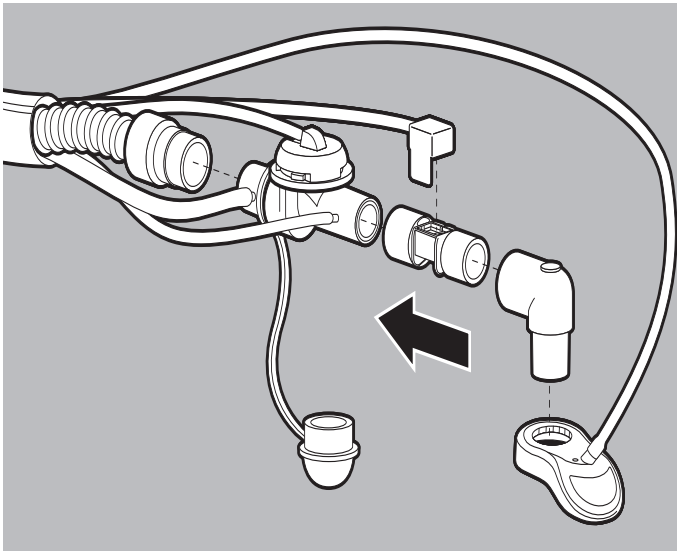
Risk of injury from touching the pins of the FlowLine-FlowCheck connection line with MEDUtrigger!
The pins on the FlowLine-FlowCheck connection line with MEDUtrigger are live. If the pins are touched, the user or patient may be injured.
⇒ Do not touch the pins on the FlowCheck sensor connector and the patient at the same time.

The FlowCheck sensor enables flow measurement (only with FlowCurve Pro option).

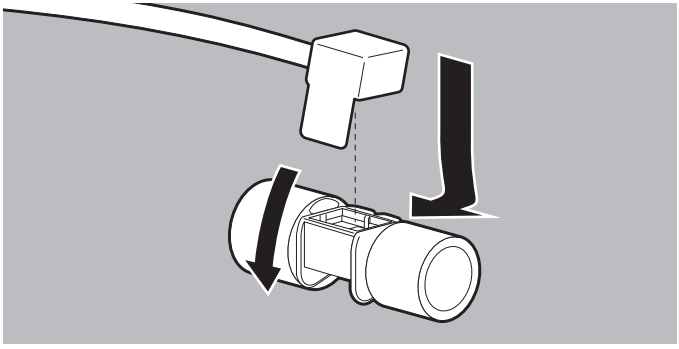


1. Connect the plug of the FlowLine-FlowCheck connection line with MEDUtrigger to the accessories connection on the device.

WM 67891a 2024-08



2. Connect the FlowCheck sensor to the patient valve.



3. Hook the FlowCheck sensor connector onto the FlowCheck sensor and press down until you hear it click into place.
4. For the reusable breathing circuit: Guide the connection line with the measuring circuit and ventilation hose into the protective sleeve of the breathing circuit.
5. If necessary: Activate FlowCurve Pro option (see "9.6.1 Enabling options", page 147).

WM 67891a 2024-08

6. Perform a function check to update the connection line software (see "5.2 Preparing for the function check", page 66).

4.4 Connecting the oxygen supply

⚠ CAUTION

Hazardous therapy as a result of inadequate oxygen concentration!
If oxygen is supplied from non-approved, inadequately cleaned or damp oxygen sources, the pneumatic connections in the device may be blocked by impurities or particles. This may injure the patient.
⇒ Use only oxygen sources which conform to the specifications (see "16 Technical data", page 210).
⇒ Use only oxygen sources which are free of particles, clean and dry.

⚠ CAUTION

Corrupted oxygen therapy resulting from use of unsuitable oxygen!
Unsuitable oxygen may corrupt the therapy. This may cause serious or life-threatening injury to the patient.
⇒ Use only concentrator oxygen (90 % to 96 % oxygen) or medical oxygen.

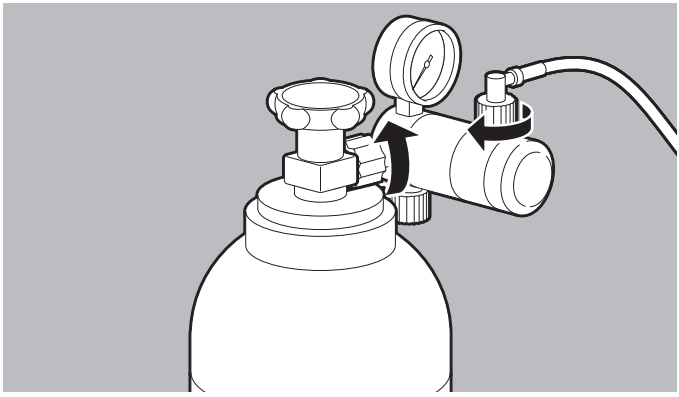
⚠ CAUTION

Failure of oxygen therapy resulting from inadequate supply of oxygen!
An inadequate oxygen supply will prevent ventilation of the patient. This may injure the patient.
⇒ Check the pressure in the oxygen cylinder prior to ventilation.

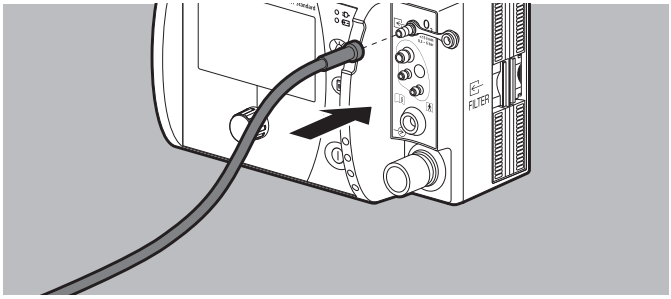
Prerequisite
- The oxygen cylinder has been filled.
- The outlet flow of the inhalation source for the oxygen supply is ≤ 15 l/min.

1. Briefly open the oxygen cylinder valve and then close it again to blow off dirt particles.

WM 67891a 2024-08



2. Connect the pressure reducer to the oxygen cylinder valve using a fluted union nut, and tighten it by hand.
3. Connect the oxygen inlet tube to the inhalation outlet of the pressure reducer.



4. Connect the oxygen inlet tube to the device's oxygen inlet.
5. Set the type of supply gas (O_2 100 % or O_2 93 %) in the operator menu (see "9.3 Device settings", page 141).

Result The device has been connected to the oxygen supply.

4.5 Using the SD card

⚠ WARNING

Disrupted or failed therapy due to inadequate protection from dust and damp!

If the interfaces for the SD card or the breathing circuit are not protected when transporting the device in a dusty or damp environment, disruptions or failure of therapy might occur as a result of device failure. This may cause serious or life-threatening injury to the patient, and damage the device.

⇒ Close the SD card cover to assure IP protection.

⇒ Connect the breathing circuit or close the protective caps to assure IP protection.

NOTICE

Data loss or material damage resulting from incorrect handling of the SD card during data export or software update!

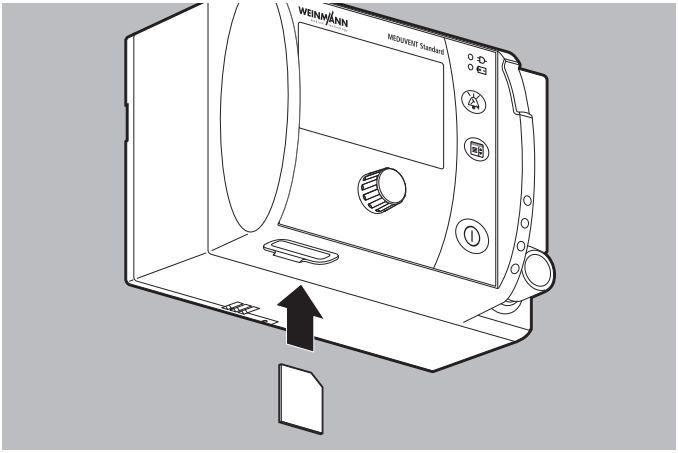
If you remove the SD card while exporting service data or performing a software update, data may be lost or the device damaged.

⇒ Only remove the SD card when no service data are being exported and the device software is not being updated.

WM 67891a 2024-08

4.5.1 Inserting the SD card

1. Open the SD card cover.



2. Push the SD card into the SD card slot until you hear it engage.
   Please note: The beveled corner of the SD card must be at the top right during insertion.
3. Close the SD card cover.

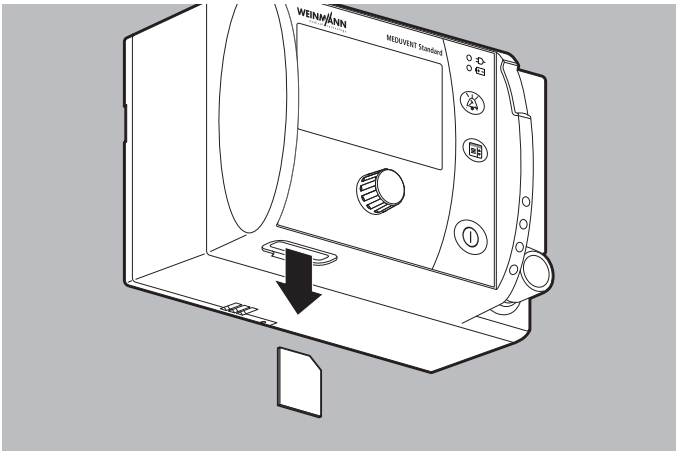
Result The SD card is inserted in the device and ready for use.

4.5.2 Removing the SD card

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

1. Open the SD card cover.
2. Briefly push the SD card into the device.
   The SD card is ejected slightly.

WM 67891a 2024-08



3. Remove the SD card.

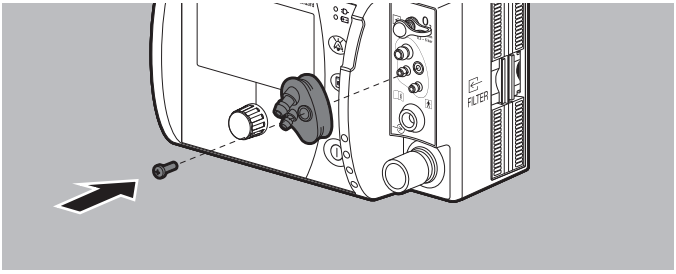
4. Close the SD card cover to protect the device from ingress of moisture.

4.6 Converting the device

4.6.1 Converting the device to a disposable breathing circuit

Required tools Phillips screwdriver, size PH1

1. Remove the protective cap for connection terminal from the bore on the measuring circuit connector.



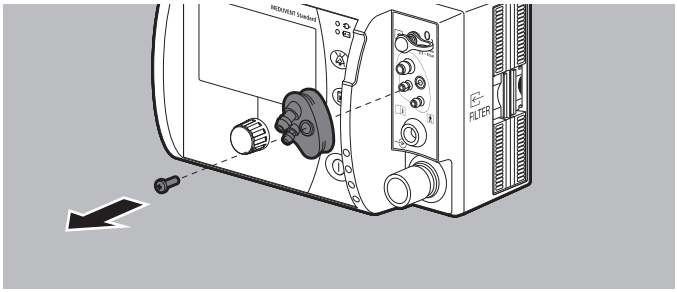
2. Fit the adapter for disposable breathing circuit on the measuring circuit connector.

WM 67891a 2024-08

3. Secure the adapter for disposable breathing circuit using the screw supplied.
4. Fit the protective cap for connection terminal in the adapter for disposable breathing circuit to cover the screw.

Result The device has been converted for use with a disposable breathing circuit. The adapter for disposable breathing circuit remains on the device.

4.6.2 Converting the device to a reusable breathing circuit



1. Remove the protective cap for connection terminal from the adapter for disposable breathing circuit.
2. Loosen the screw on the adapter for disposable breathing circuit.
3. Remove the adapter for disposable breathing circuit from the device.
4. Fit the protective cap for connection terminal on the open bore on the measuring circuit connection.

Result The device has been converted for use with a reusable breathing circuit.

WM 67891a 2024-08

5 Function check

⚠ WARNING

Disrupted or failed therapy due to defective or non-operational device or accessories!
Using defective devices or defective accessories may result in device malfunctions. This may cause the patient and the user serious or life-threatening injury.
⇒ Perform a complete function check prior to every use.
⇒ Only operate the device and accessories if they are externally undamaged.
⇒ Replace illegible or damaged labels.
⇒ Only use devices and accessories which have passed the function check.
⇒ Have defective devices repaired.
⇒ Have defective accessories repaired, or replace them.
⇒ Observe the maintenance intervals.
⇒ Keep alternative means of ventilation at the ready.

5.1 Intervals

Perform a function check at the following intervals:

Item	Interval
Device	• Before each use • After each hygienic reprocessing • After each repair
Breathing circuit (reusable breathing circuit)	• Before each use • After each hygienic reprocessing • After each disassembly

5.2 Preparing for the function check

1. Check battery status: The rechargeable battery must be fully charged.
   If necessary: Charge battery.

WM 67891a 2024-08

2. Check the following parts for external damage:
   - Device
   - Labels on the device
   - Connectors, plugs and cables
   - Breathing circuit (ventilation hose, pressure measuring tube, PEEP control tube, flexible oxygen tube)
   - Patient valve with diaphragms (see "5.4 Checking the reusable patient valve", page 74)
   - Further accessories and other parts

   If necessary: Replace damaged parts.
3. Check that the hygiene filter is positioned correctly.
4. Check the fill level of the oxygen cylinder.
   If necessary: Replace the oxygen cylinder.

5.3 Performing the function check

You can perform the function check with the following test lungs:

- Testing bag for function check WM 1454
- EasyLung test lung for function check WM 28625

⚠ WARNING

Hazardous therapy if device connected to patient during function check!
If the device is connected to the patient during the function check, this might lead to therapy posing a risk as a result of excessively high pressures or unsuitable ventilation volumes. This may cause serious or life-threatening injury to the patient.
⇒ Always disconnect the device from the patient during the function check.

Prerequisite

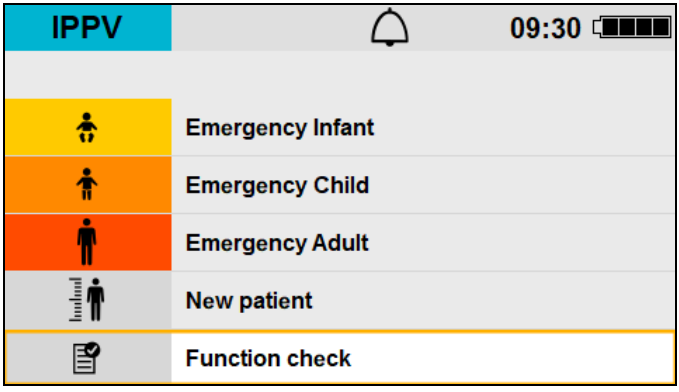
- The device is disconnected from the patient.
- The rechargeable battery is fully charged.
- The SD card is in the SD card slot.
- The hygiene filter is inserted in the filter compartment.

WM 67891a 2024-08

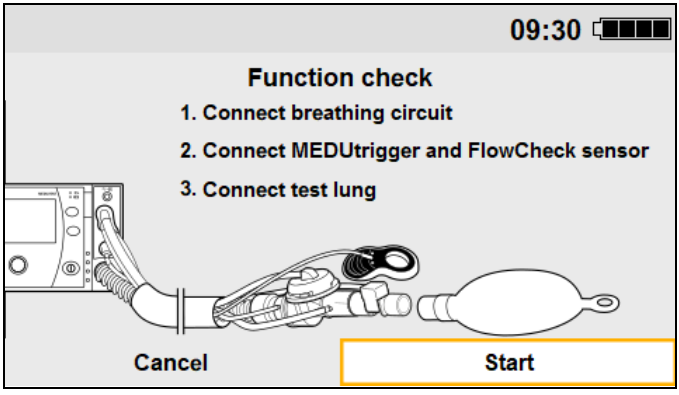
- If the oxygen supply is to be tested: The oxygen inlet tube is connected to the oxygen inlet of the device and to the oxygen supply. The oxygen supply is shut off.

  or

  If the oxygen supply is not to be tested: The oxygen inlet is sealed off by the protective cap for oxygen inlet.
- The function check has been prepared (see "5.2 Preparing for the function check", page 66).
- The device is switched on (see "6.2 Switching on the device", page 77).



1. Select the **Function check** menu item.

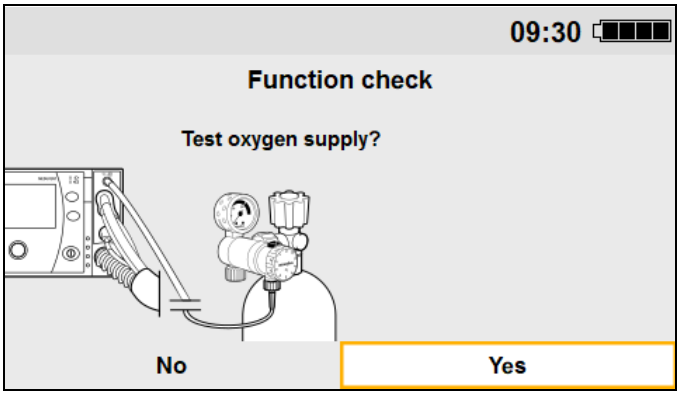


2. Prepare the device:
   - Connect the breathing circuit to the device.

WM 67891a 2024-08

- Connect MEDUtrigger or MEDUtrigger with FlowLine-FlowCheck connection line and FlowCheck sensor.
- Connect the test lung to the breathing circuit.

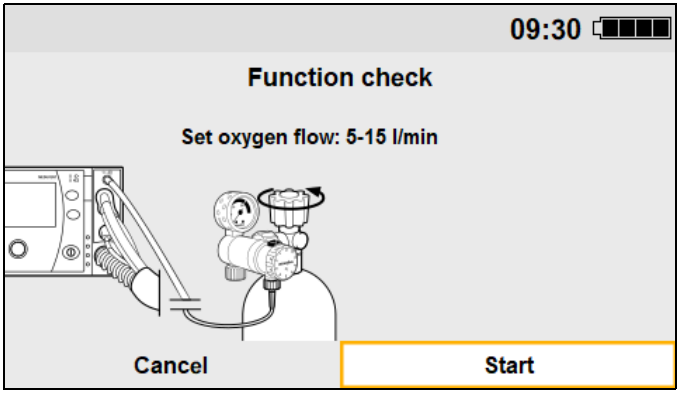
3. Select **Start**.



4. If you want to test the oxygen supply: Select **Yes**.

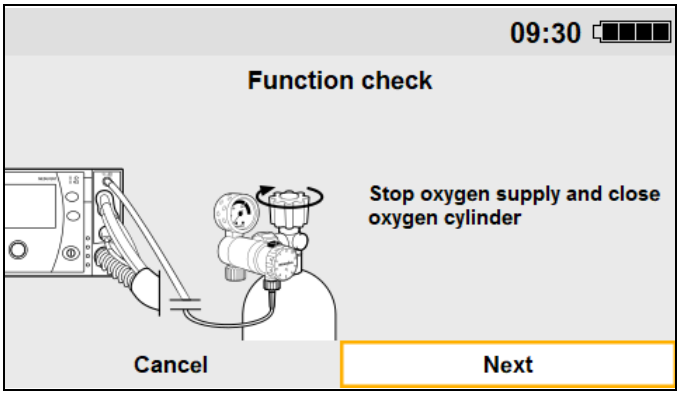
   or

   If you do not want to test the oxygen supply: Select **No**. The device skips the oxygen test.



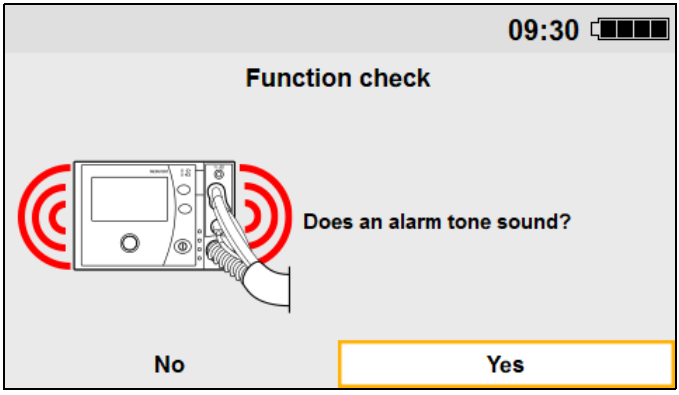
5. Set oxygen supply (5 l/min - 15 l/min) (see "6.10 Supplying oxygen", page 97).
6. Select **Start**.

WM 67891a 2024-08



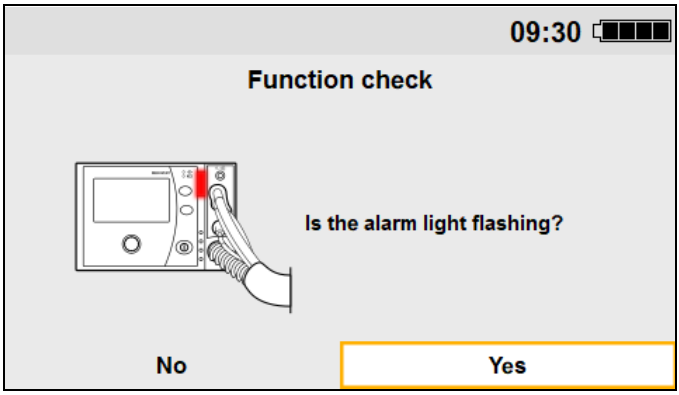
7. Stop the oxygen supply and close the oxygen cylinder (see "6.10 Supplying oxygen", page 97).

8. Select **Next**.

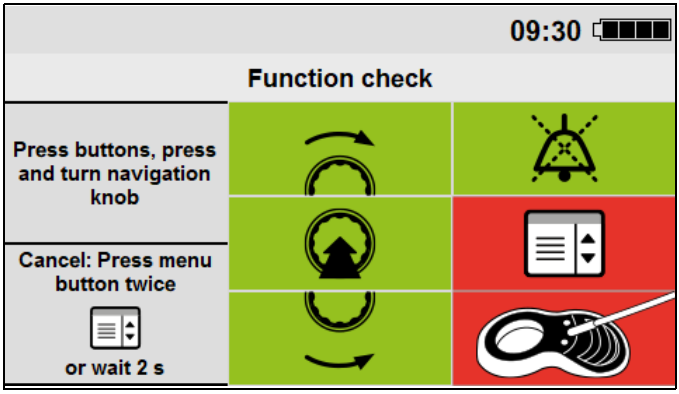


9. If an alarm tone is emitted: Select **Yes**.

WM 67891a 2024-08



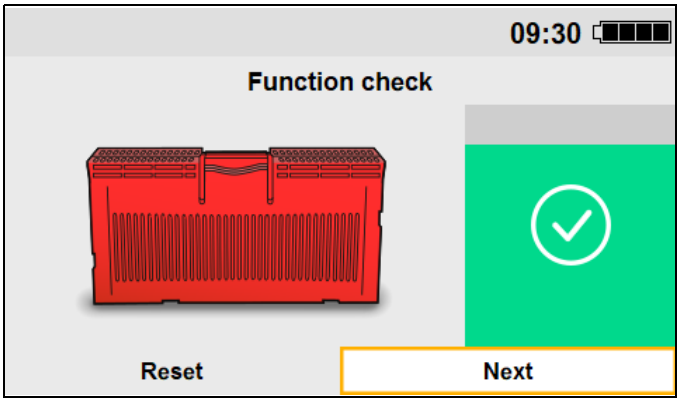
10. If the alarm light is red: Select **Yes**.



11. Within 20 s, press or turn the required controls (except the On/Off button ⏻) one after the other until all the fields go green.

12. If MEDUtrigger is connected but is not displayed in the function check: Activate the Manual option in the operator menu (see "9.6.1 Enabling options", page 147). Repeat the function check.

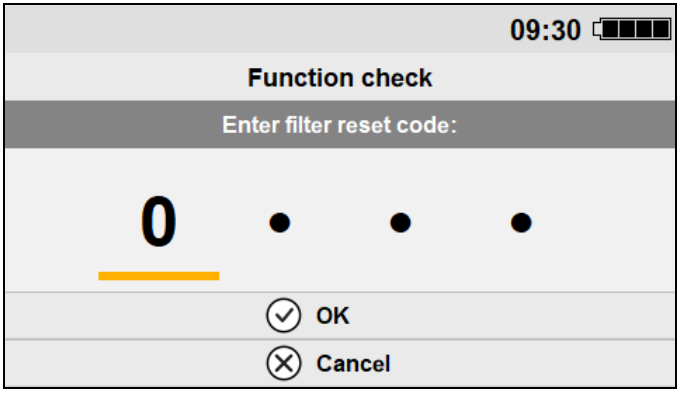
WM 67891a 2024-08



13. Proceed with the hygiene filter in accordance with the following table:

Color	Action
Green	Continue to use hygiene filter.
Yellow	Keep hygiene filter at the ready **or** Order hygiene filter.
Red	Replace hygiene filter (see 12.4, p. 194).
Gray	Indicates the filter life used.

14. If the hygiene filter has been replaced: Select **Reset**.



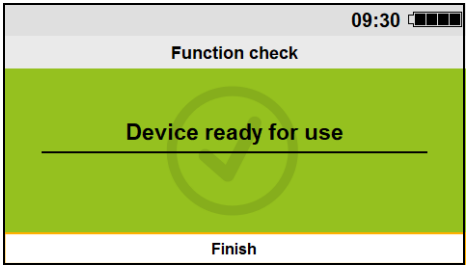
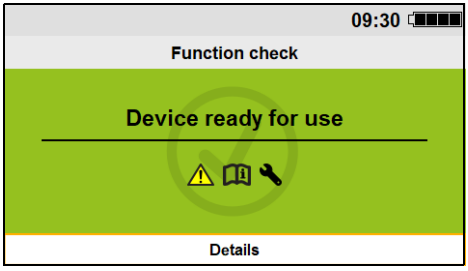
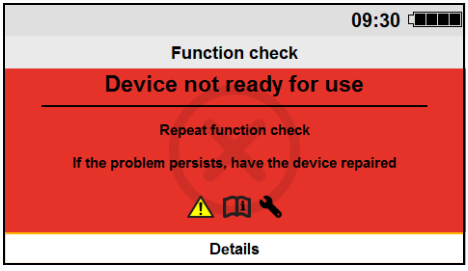
15. Enter the filter reset code specified in the operator menu.

WM 67891a 2024-08

On delivery, the filter reset code is 0000. WEINMANN Emergency recommends changing this code as soon as the device is put into operation.

16. Select **Next**.
    The status report appears.

17. Proceed with the device in accordance with the following table:

Display	Meaning	Action
Device ready for use 	Function check passed	Use device without restriction.
Device ready for use 	Function check passed, but service required. Information about the scheduled service.	Select **Details**. Check the parts listed in the display and replace them if necessary. Contact your specialist dealer or the manufacturer.
Device not ready for use 	Function check failed **or** Function check canceled	Select **Details**. Check the parts listed in the display and replace them if necessary. Repeat the function check. If the function check is still not passed: Contact your specialist dealer or the manufacturer.

For precise details on the individual tests in the function check, refer to the **fcheck** file on the SD card (see "16.10.2 Recorded function checks (fcheck file)", page 229).

18. Select **Finish**.
19. Switch off the device.
20. Disconnect the test lung from the breathing circuit.

Result The function check is complete.

5.4 Checking the reusable patient valve

Prerequisite The patient valve of the reusable breathing circuit has been disassembled (see "7.2.1 Disassembling the reusable breathing circuit", page 106).

1. Check all parts of the patient valve for external damage. If necessary: Replace damaged parts.
2. Check the PEEP control diaphragm and check valve diaphragm. If a diaphragm is torn, corrugated, distorted or sticky: Replace the diaphragm.
3. Assemble the reusable breathing circuit (see "7.3 Reprocessing parts mechanically", page 109).
4. Check the system for leaks with a new function check.

Result The reusable patient valve has been checked.

WM 67891a 2024-08

6 Operation

⚠ WARNING

Risk of fire resulting from simultaneous use of ventilator and defibrillator in oxygen-enriched environments!

If a ventilator and defibrillator are used simultaneously in oxygen-enriched atmospheres and in the presence of combustible materials (e.g. textiles), sparking associated with defibrillation might cause explosions and fires. This can cause serious or life-threatening injury to the patient, user and bystanders.

⇒ Use self-adhesive electrodes for defibrillation whenever possible.

⇒ Ensure that the oxygen/air mixture coming from the exhalation valve can flow away from the patient's torso.

⇒ Use the device only in ventilated rooms or environments.

⚠ WARNING

Inadequate patient monitoring due to concealed alarm transmitters!

A concealed alarm light, loudspeaker or display might prevent the user from noticing alarms and reacting to dangerous situations. This may cause serious or life-threatening injury to the patient.

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

⇒ Position the device display facing upward (e.g. on a table) or forward (e.g. on a wall).

⚠ CAUTION

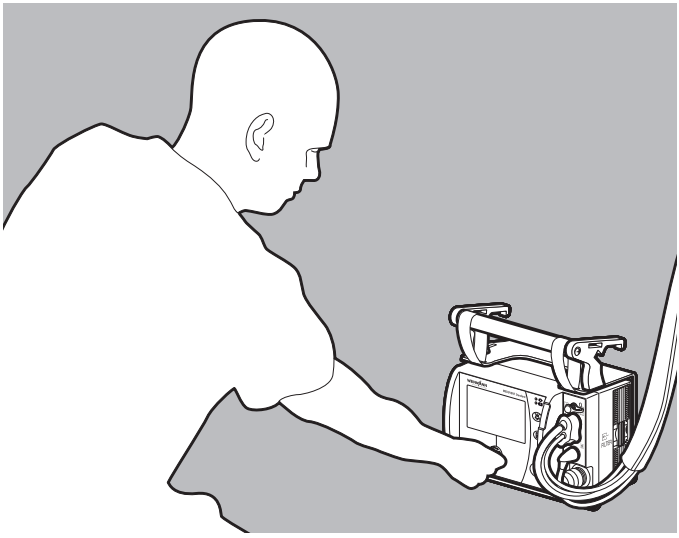
Increased breathing effort for the patient due to covered patient valve!

Covering the patient valve may impair its function and put therapy at risk. This may injure the patient.

⇒ Do not cover/seal the expiration opening of the patient valve.

WM 67891a 2024-08

6.1 Intended operating position



The operating position must be selected so that the user can observe, identify and, if necessary, adjust the monitored ventilation parameters, alarm transmitters and alarm statuses at all times.

WM 67891a 2024-08

6.2 Switching on the device

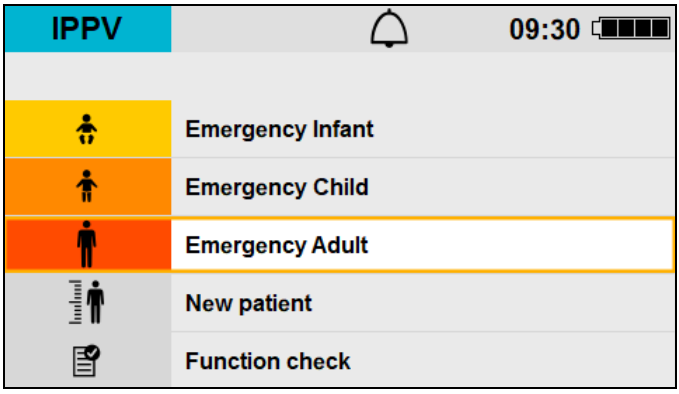
Prerequisite If present: The device has been connected to the oxygen supply (see "4.4 Connecting the oxygen supply", page 60).

1. Briefly press the On/Off button .

   An automatic self-test starts, which comprises the following sequence:

   - Alarm light flashes twice and 2 short test tones are emitted in parallel
   - The start screen appears

   The self-test is successful when all of the steps have been completed.
   After the self-test, the device displays the start menu:



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

Result The device is switched on and on standby.

6.3 Navigating in the device

Action	Result			
	In a menu	**Within a menu item**	**In the start menu**	**During ventilation**
 Turn the navigation knob counter-clockwise	Navigate upward	Decrease value	Navigate upward	Navigate to a ventilation parameter or a measured value in the display
 Turn the navigation knob clockwise	Navigate downward	Increase value	Navigate downward	Navigate to a ventilation parameter or a measured value in the display
 Press the navigation knob	Select menu item	Confirm the set value	Select menu item	Change ventilation parameters or alarm limits.
 Press the menu button	–	–	• Briefly press the menu button: Activate quick settings. • Press and hold the menu button for 2 s: Activate the operator menu.	Briefly press the menu button: Activate the user menu.
 Press the alarm mute button	–	–	Briefly press the alarm mute button: Mute alarm for 120 s.	• Briefly press the alarm mute button: Mute alarm for 120 s. • Press and hold the alarm mute button for 2 s: Set alarm limits.

WM 67891a 2024-08

6.4 Starting ventilation

⚠ WARNING

Hazardous therapy as a result of inadequate patient monitoring!

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

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

⇒ Use suitable monitoring (e.g. SpO_2 and/or $etCO_2$).

⚠ WARNING

Risk of injury resulting from incorrectly set limitation of maximum airway pressure!

An excessively high airway pressure may cause the patient serious or life-threatening injury.

⇒ Always set the pressure limit pMax to match the current patient and the current therapy.

⚠ WARNING

Hazardous therapy due to leaks during ventilation!

If the applied respiratory volume is too low due to leaks, this can cause serious or life-threatening injuries to the patient.

⇒ Use suitable monitoring ($etCO_2$, SpO_2 or expiratory volume measurement (MVe)).

⇒ When using the device without the FlowCurve Pro option: Do **not** use the measured MVi value as a means of assessing ventilation.

⇒ Check that the mask or tracheal tube is correctly positioned.

⚠ WARNING

Risk of contamination or infection resulting from failure to use hygiene filter!

If the device is used without a hygiene filter in a contaminated environment, it may draw in contaminated or infected ambient air. This may cause the patient and the user serious or life-threatening injury.

⇒ Only operate the device with a hygiene filter.

WM 67891a 2024-08

⚠ CAUTION

Hazardous therapy due to lack of monitoring of the oxygen concentration administered!

The device does not monitor inspiratory oxygen concentration in the same way as an RGM (respiratory gas monitor), and has no corresponding alarm. Dispensing respiratory gas with a differing oxygen concentration might place the therapy at risk. This may injure the patient.

⇒ Use a separate respiratory gas monitor to monitor the oxygen concentration administered to the patient.

⚠ CAUTION

Inadequate oxygen concentration due to leaks during ventilation!

Leaks during ventilation may lead to the concentration of oxygen administered in the respiratory gas being reduced. This may injure the patient.

⇒ Check that the mask or tracheal tube is correctly positioned.

⇒ Note measured value O_2i for assessing ventilation. Also correct oxygen supply if necessary.

⇒ Use suitable monitoring (e.g. SpO_2).

⚠ WARNING

Disrupted or failed therapy due to incompatibility of the device with consumables, accessories and other medical devices!

Defective or non-approved accessories may cause malfunctions, increased electromagnetic interference or reduced electromagnetic immunity of the device, incorrect output values, and reduced ventilation performance. This may cause serious or life-threatening injury to the patient.

⇒ Before using accessories and other parts, check that they are compatible with the device.

⇒ Follow the instructions for use of the accessories.

⇒ Do not connect any accessories to the disposable patient valve's Luer-Lock connection.

⇒ Do not use a closed suction system during ventilation.

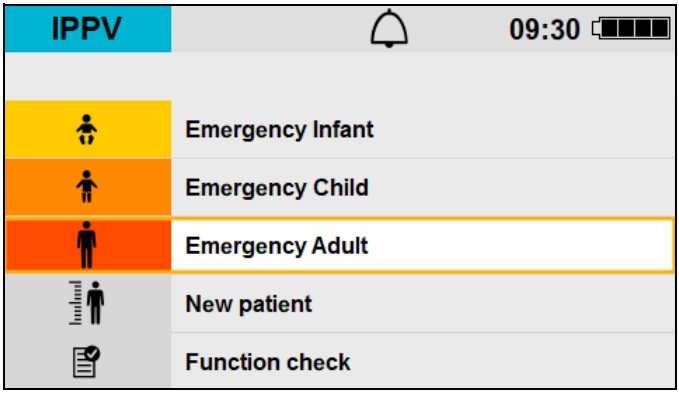
WM 67891a 2024-08

6.4.1 Starting ventilation for a patient group

Prerequisite

- Function check has been carried out and passed (see "5 Function check", page 66).
- The device is switched on and, after the self-test, displays the start menu.

1. Connect the patient to the device via a ventilation mask or tracheal tube.



2. Set emergency mode:
   - **Emergency Infant**
   - **Emergency Child**
   - **Emergency Adult**

   The device starts ventilation in IPPV ventilation mode.
   The parameters and measurements in the device are adapted to match the respective patient group.
3. If the patient group was initially set incorrectly:
   First change the patient group (see "6.7 Changing patient group", page 88), then adapt the parameters.

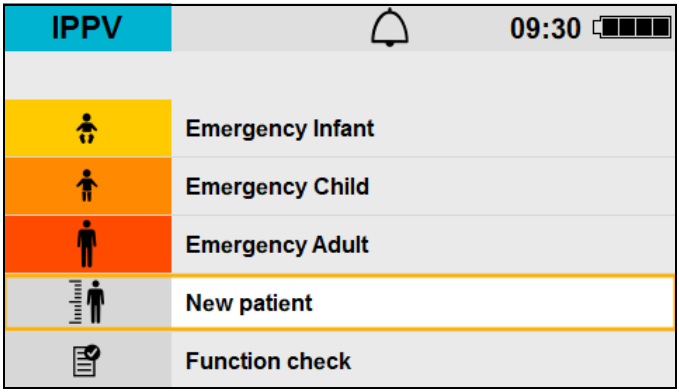
Result Ventilation for a specific patient group has been started.

WM 67891a 2024-08

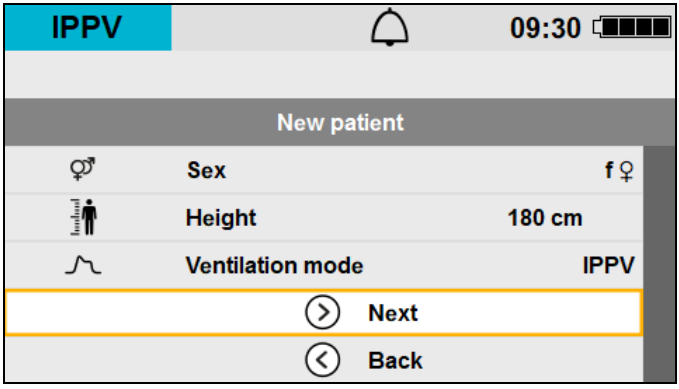
6.4.2 Starting ventilation for a new patient

Prerequisite

- Function check has been carried out and passed (see "5 Function check", page 66).
- The device is switched on and, after the self-test, displays the start menu.



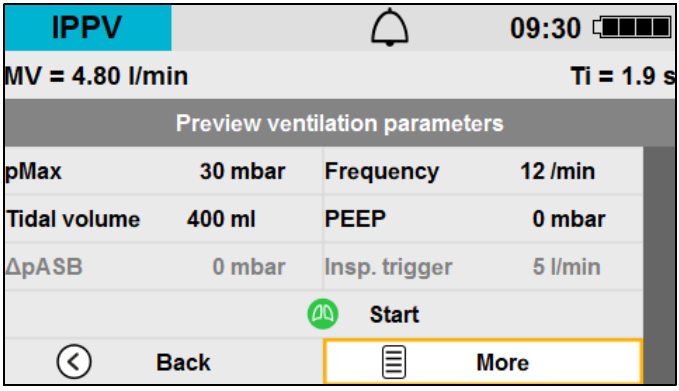
1. Select **New patient**.



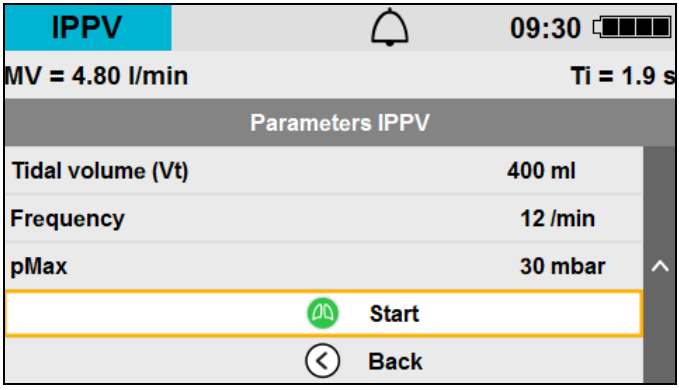
2. Select the following parameters:
   - **Sex**
   - **Height**
   - **Ventilation mode**

WM 67891a 2024-08

3. Select **Next**.
   The device shows a preview of the ventilation parameters calculated. The parameters which are not active in ventilation mode are grayed out and cannot be set.



4. If necessary: Select **More** and adjust additional ventilation parameters.



5. Connect the patient to the device via a ventilation mask or tracheal tube.

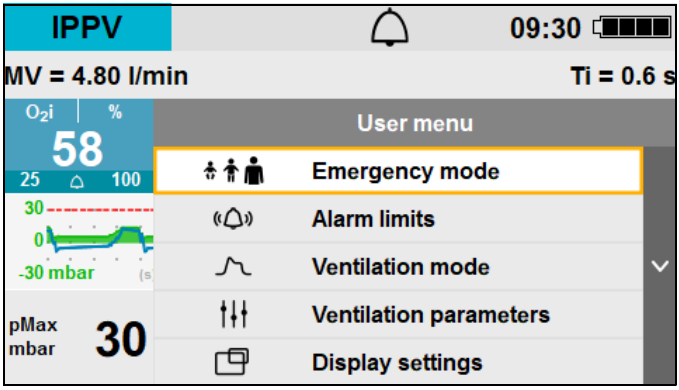
6. Select **Start**. The device starts ventilation.

6.5 Changing ventilation mode

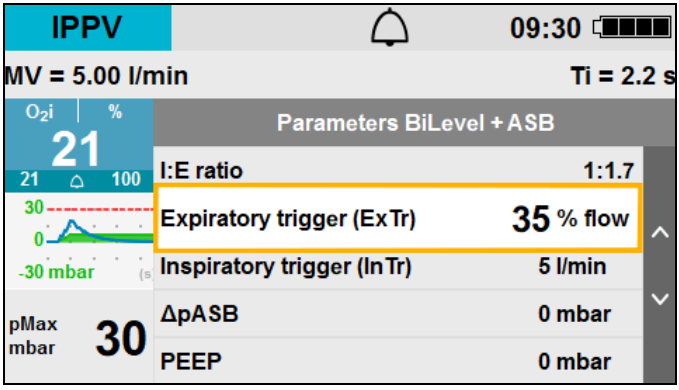
Prerequisite

- The device is switched on (see "6.2 Switching on the device", page 77).
- Ventilation has been started (see "6.4 Starting ventilation", page 79).

1. Briefly press the menu button .
   The user menu opens.

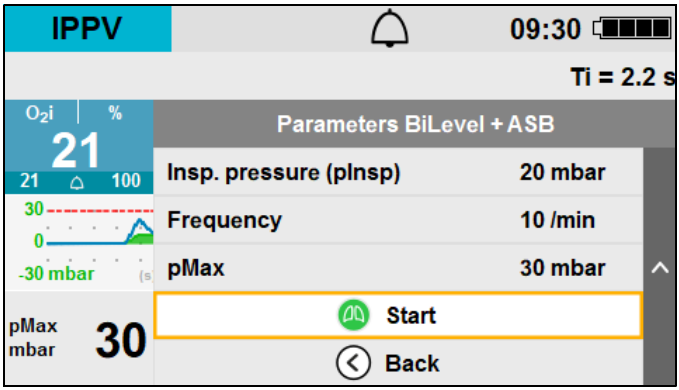


2. Select the **Ventilation mode** menu item.
3. Select the desired ventilation mode.
   The parameters of the new ventilation mode are displayed.

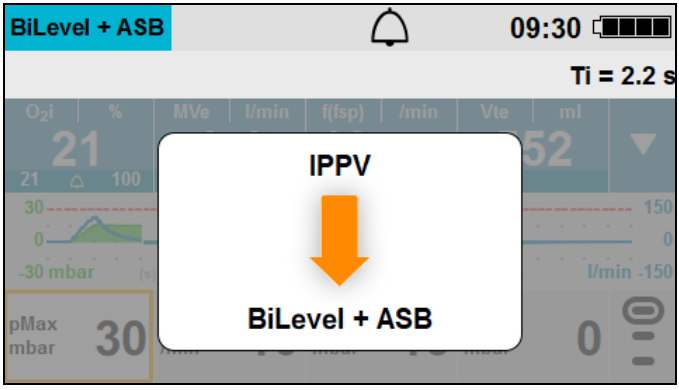


4. If necessary: Change the ventilation mode parameters.

WM 67891a 2024-08



5. Select **Start**.
   The change of ventilation mode is displayed briefly.

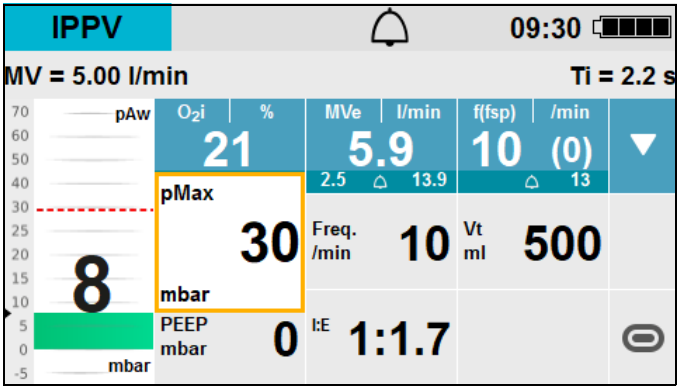


Result The ventilation mode has been changed.

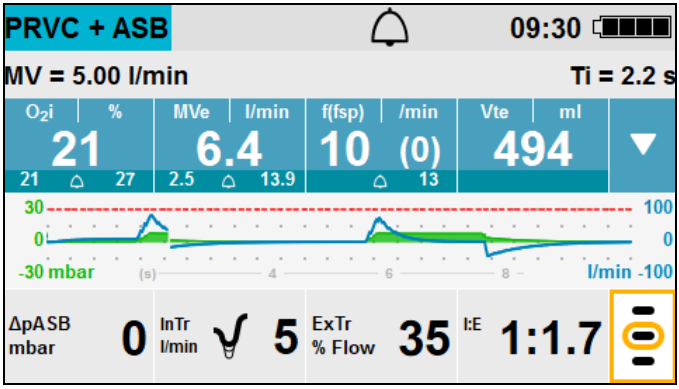
6.6 Changing ventilation parameters

Prerequisite

- The device is switched on (see "6.2 Switching on the device", page 77).
- Ventilation has been started (see "6.4 Starting ventilation", page 79).



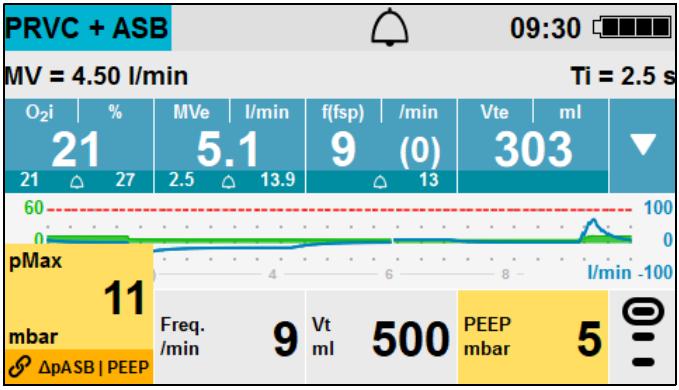
1. Select the ventilation parameter you want to change using the navigation knob.
2. Change the ventilation parameter.
3. Confirm the value.



4. If necessary: Switch level of the parameter view to set additional parameters.

WM 67891a 2024-08

The ventilation parameters can only be set in meaningful combinations. The dependencies are displayed by the 🔗 symbol during setting:



The following parameters are mutually dependent:

- pMax/PEEP:
  The minimum difference between pMax and PEEP is 5 mbar.
  pMax ≥ PEEP + 5 mbar
- pMax/ΔpASB:
  The minimum difference between PEEP + ΔpASB and pMax is 1 mbar if ΔpPS ≥ 5 mbar.
  ΔpASB < 5 mbar: pMax ≥ PEEP + 5 mbar
  ΔpASB ≥ 5 mbar: pMax ≥ PEEP + ΔpASB + 1 mbar
- Frequency/Vti:
  The product of Freq.× Vti results in inspiratory minute volume MVi.
  MVi = Freq. × Vti
- The frequency Freq. and tidal volume Vt ventilation parameters can only be set in meaningful combinations. Combinations resulting in a minute volume below 1.5 l/min or above 20 l/min (BTPS) cannot be set.
  1.5 l/min ≤ Freq. × Vt ≤ 20 l/min
- I:E = Ti/Te
  Ti ≥ 500 ms (parameter Freq. and I:E)
  Te ≥ 500 ms (parameter Freq. and I:E)

WM 67891a 2024-08

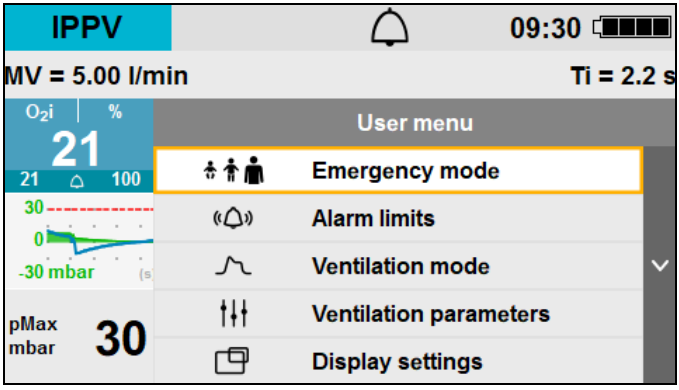
- Ti < Vt/(8 l/min) (parameter Freq., Vt and I:E)
- pMax/pInsp:
  The minimum difference between pMax and pInsp is 1 mbar, when pMax < 60 mbar.
  pMax < 60 mbar: pMax ≥ pInsp +1 mbar
  pMax = 60 mbar: pMax ≥ pInsp
- pInsp/PEEP
  pInsp ≥ PEEP +3 mbar

6.7 Changing patient group

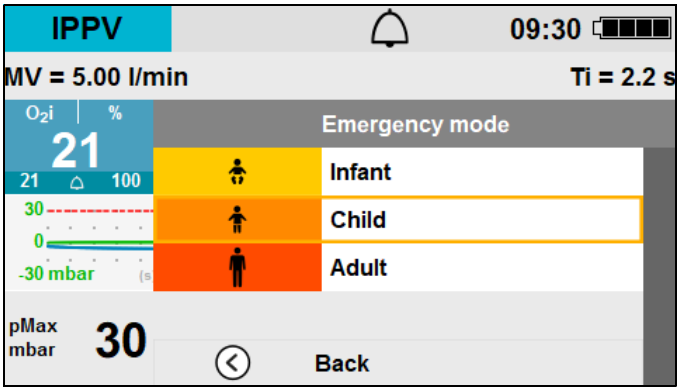
Prerequisite

- The device is switched on (see "6.2 Switching on the device", page 77).
- Ventilation has been started (see "6.4 Starting ventilation", page 79).

1. Briefly press the menu button .
   The user menu opens.



2. Select **Emergency mode**.



3. Select and confirm a different patient group.

Result The patient group has been changed.
The device switches to the preset ventilation mode for the selected patient group and starts ventilation.

6.8 Changing alarm limits

You can set the upper and lower limit values as of which the device is to trigger an alarm. The difference between the upper and lower alarm limit is at least one set value.

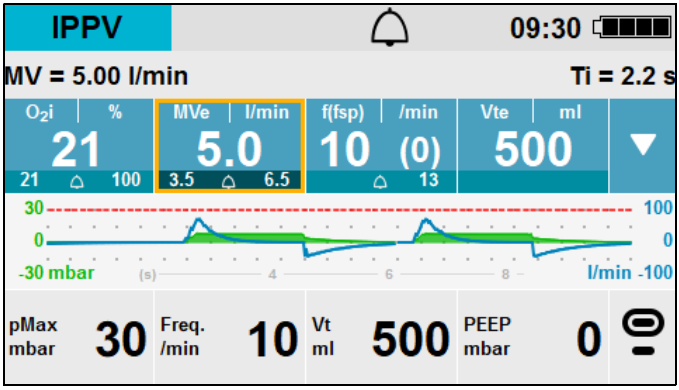
There are 3 ways to change alarm limits:

- Select measured value and change the alarm limit directly (see 6.8.1, p. 90)
- Access the **Alarm limits** submenu with the alarm mute button (see 6.8.2, p. 92)
- Change alarm limits in the user menu (see 8.3.2, p. 132)

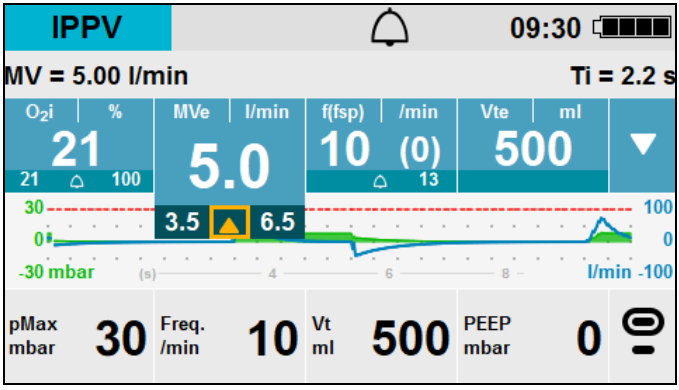
Prerequisite Ventilation has been started (see "6.4 Starting ventilation", page 79).

WM 67891a 2024-08

6.8.1 Changing the alarm limit of a measured value directly

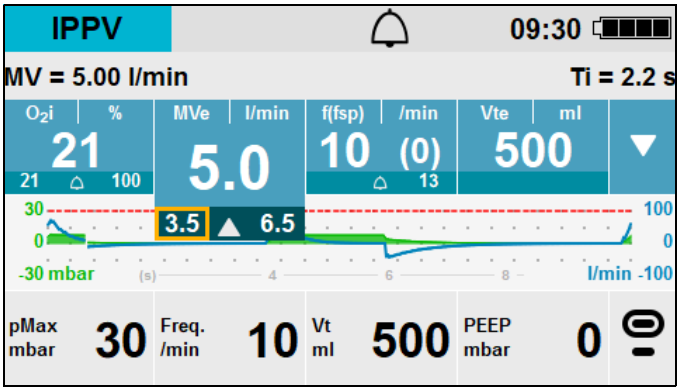


1. Select measured value using the navigation knob.
2. Press the navigation knob.

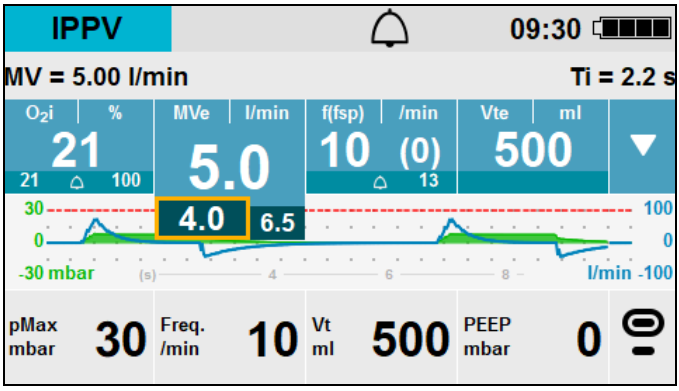


3. Turn the navigation knob to select the lower or upper alarm limit.

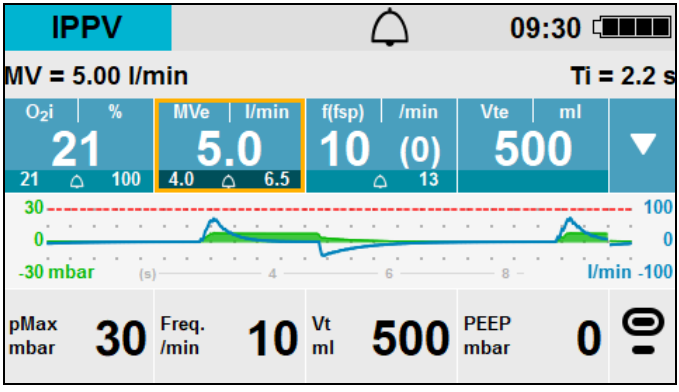
WM 67891a 2024-08



4. Change alarm limit.



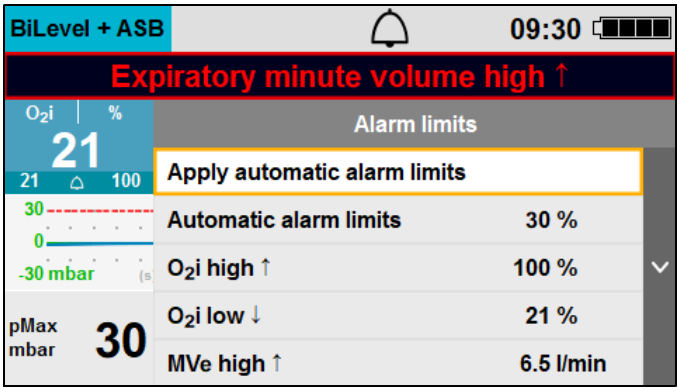
5. Confirm the value.



Result The changed alarm limit is active immediately.

6.8.2 Accessing the alarm limits with the alarm mute button

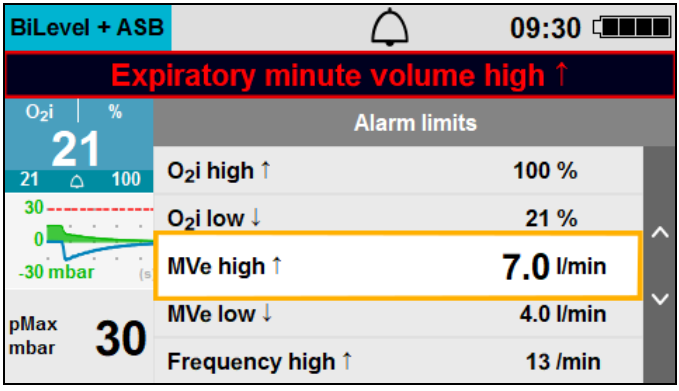
1. Press and hold the alarm mute button for 2 s.
   The **Alarm limits** submenu opens.



2. Select **Apply automatic alarm limits**.

   or

   Select and change an individual alarm limit.



3. Confirm the value.

Result The changed alarm limits are active immediately.

WM 67891a 2024-08

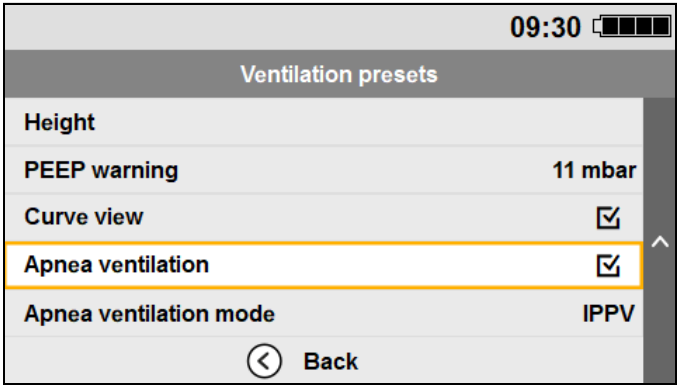
6.9 Activating apnea ventilation

For the CPAP, CPAP + ASB, CPAP + PS ventilation modes (only available in selected countries), you can specify that the device should switch to a ventilation mode with mandatory ventilation if the patient does not show spontaneous breathing. IPPV or BiLevel + ASB are (optionally) available as apnea ventilation modes.

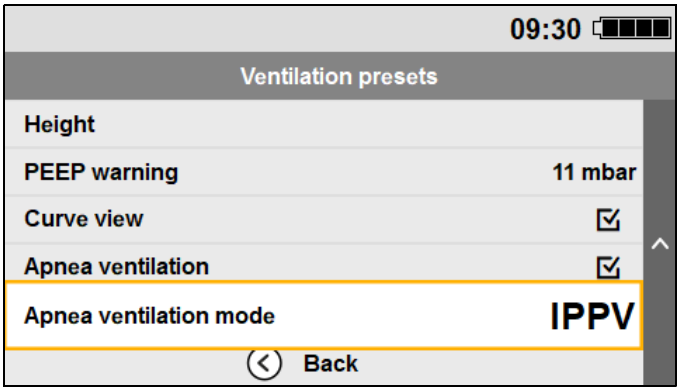
6.9.1 Presetting the ventilation mode for apnea ventilation in the operator menu

Prerequisite The operator menu is activated (see "9.1 Activating operator menu", page 139).

1. Select the **Ventilation presets** menu item.



2. Activate **Apnea ventilation**.



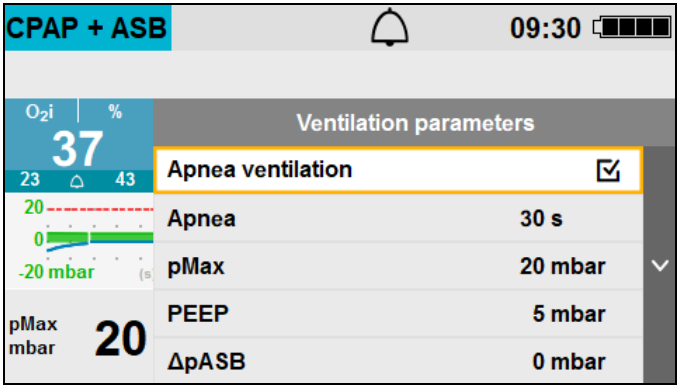
3. Select **Apnea ventilation mode**.

6.9.2 Activating or deactivating apnea ventilation during ventilation

In the user menu, you can set whether or not the device should switch to the set apnea ventilation mode in the event of apnea.

Prerequisite Ventilation in CPAP, CPAP + ASB or CPAP + PS mode has been started.

1. Briefly press the menu button .
   The user menu opens.
2. Select the **Ventilation parameters** menu item.



3. Activate or deactivate apnea ventilation.

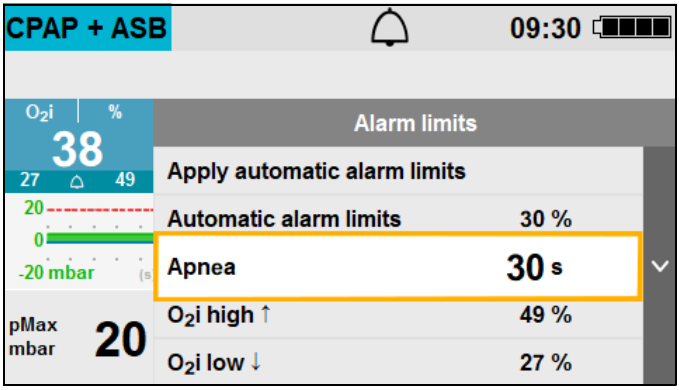
WM 67891a 2024-08

6.9.3 Setting the alarm limit for the apnea alarm

In the user menu under both menu item **Alarm limits** and menu item **Ventilation parameters**, you can set the time span after which the device should issue an alarm in the event of apnea and switch to the set apnea ventilation mode.

Prerequisite Ventilation in CPAP, CPAP + ASB or CPAP + PS mode has been started.

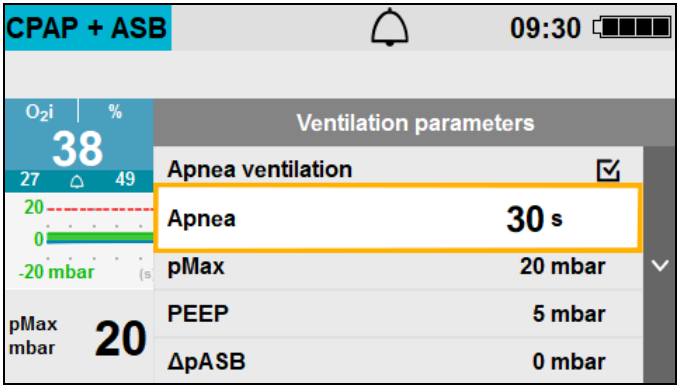
1. Briefly press the menu button .
   The user menu opens.



2. Select the **Alarm limits** menu item.

   or

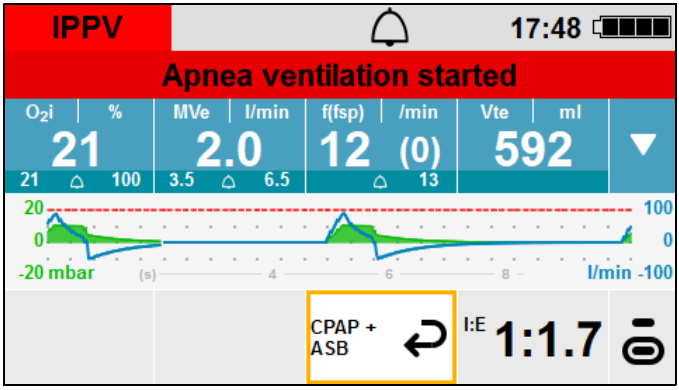
   Select the **Ventilation parameters** menu item.



3. Set apnea alarm.

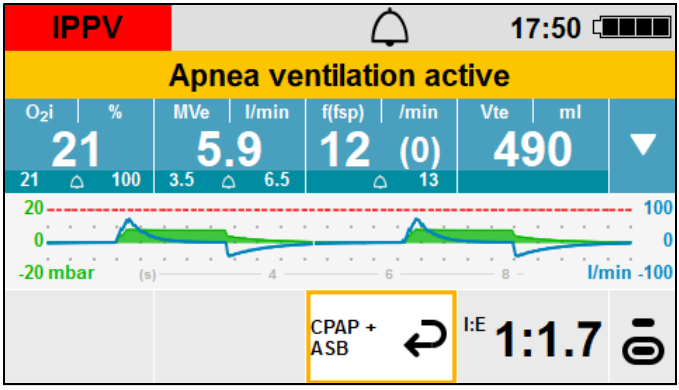
WM 67891a 2024-08

Result In the event of apnea, the device issues an alarm and switches to the set apnea ventilation mode. The alarm message **Apnea ventilation started** is displayed for 20 s.



6.9.4 Ending apnea ventilation

The alarm message **Apnea ventilation active** is displayed when apnea ventilation is active.



You have the following options:

- Continue ventilation in apnea ventilation mode. The alarm stops if settings are changed.
- Select the ↩ button and return to the ventilation mode displayed.

WM 67891a 2024-08

6.10 Supplying oxygen

⚠ CAUTION

Therapy disrupted by supply of excessively high flow!
If the flow exceeds the maximum permitted value of 15 l/min, the pressure relief valve might unintentionally open during inspiration and place the therapy at risk. This may injure the patient.
⇒ Feed in oxygen only at a maximum flow of 15 l/min.

6.10.1 Setting oxygen concentration

⚠ CAUTION

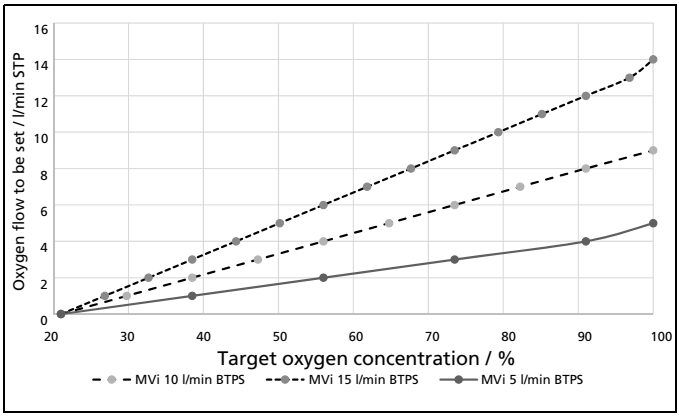
Inadequate oxygen concentration due to leaks during ventilation!
Leaks during ventilation may lead to the concentration of oxygen administered in the respiratory gas being reduced. This may injure the patient.
⇒ Check that the mask or tracheal tube is correctly positioned.
⇒ Note measured value O_2i for assessing ventilation. Also correct oxygen supply if necessary.
⇒ Use suitable monitoring (e.g. SpO_2).

Prerequisite

- The oxygen supply is connected (see "4.4 Connecting the oxygen supply", page 60).
- The type of supply gas (O_2 100 % or O_2 93 %) is set in the operator menu (see "9.3 Device settings", page 141).
- The device is switched on (see "6.2 Switching on the device", page 77).
- Ventilation has been started (see "6.4 Starting ventilation", page 79).

If you want an oxygen concentration of 100 %, use the minute volume administered as a guide.

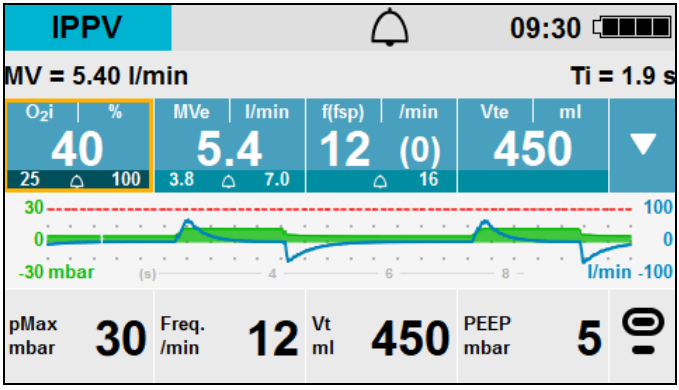
WM 67891a 2024-08



Example:
If you are also supplying oxygen at 5 l/min at a displayed minute volume of 5 l/min, this will result in an inspiratory oxygen concentration of 100 %.

If you want a lower concentration, set a lower flow on the oxygen supply until the device displays the desired oxygen concentration.

1. Set the flow at the oxygen supply.
   The device indicates the measured oxygen concentration in the display.



2. Read off the oxygen concentration from the display.
3. If necessary: Adjust the oxygen concentration.

Result The oxygen concentration has been set.

WM 67891a 2024-08

After starting up, the device calculates oxygen concentration for the first 30 s based on the ventilation parameters and flow set. After 30 s, the device displays the actual measured value.

6.10.2 Calculating operating time

1. Calculate the fill level of the oxygen cylinder (oxygen reserve):

Oxygen reserve = volume of oxygen cylinder x pressure in oxygen cylinder		
Example		
Volume of oxygen cylinder	10 l	2 l
Pressure in oxygen cylinder	200 bar	200 bar
Fill level of oxygen cylinder (oxygen reserve)	**2000 l**	**400 l**

2. Calculate operating time in accordance with the table below:

Operating times of commercially-available oxygen cylinders		
$\text{Time (min)} = \frac{\text{Oxygen reserve (l)}}{\text{Flow}\left(\frac{\text{l}}{\text{min}}\right)}$		
Set oxygen flow (l/min)	**Operating time of oxygen cylinder (hh:mm)**	
	2 l volume	**10 l volume**
0.5	13:20	66:40
1	06:40	33:20
1.5	04:26	22:13
2	03:20	16:40
3	02:13	11:06
5	01:20	08:20
6	01:06	06:40
9	00:44	05:33
12	00:33	03:42
15	00:26	02:13

Result Operating time has been calculated.

6.11 Switching off the device

1. Press and hold the On/Off button ⏻ for at least 2 s.
2. Shut off the oxygen supply.

Result The device is completely switched off.

6.12 Disconnecting the oxygen supply

1. Close the oxygen cylinder valve.
2. Disconnect the oxygen inlet tube from the device.
3. Close the oxygen inlet with cap.
4. If necessary: Replace the empty oxygen cylinder.

6.13 After use

1. Disconnect the breathing circuit from the ventilation mask or tracheal tube.
2. Disconnect the breathing circuit from the device.
3. If necessary: Change the hygiene filter (see "12.4 Replacing the hygiene filter", page 194).
4. Hygienically reprocess the device and accessories (see "7 Hygienic reprocessing", page 101).
5. If necessary: Replace the ventilation mask or tracheal tube.
6. If necessary: Replace the disposable breathing circuit.
7. If necessary: Stow the accessories on the portable unit.
8. If necessary: Place the device and accessories in storage (see "13 Storage", page 202).

WM 67891a 2024-08

7 Hygienic reprocessing

The following sections set out the procedures necessary for hygienic reprocessing. Where relevant, the description of the reprocessing methods is divided into the following areas:

- Device, accessories, and other parts
- Reusable measuring circuit
- Reusable breathing circuit

Read this chapter in full before starting hygienic reprocessing. If you have any questions about hygienic reprocessing, please contact the manufacturer WEINMANN Emergency.

It is preferable to perform mechanical cleaning and disinfection instead of manual cleaning and disinfection for parts which can be cleaned and disinfected mechanically.

⚠ WARNING

Disrupted and failed therapy due to incorrect use of disposables!
Reusing and reprocessing disposables may induce unpredictable reactions as a result of aging, embrittlement, wear, thermal loading, and chemical action. This may put the functionality and safety of the device at risk, and cause the patient or user serious or life-threatening injury.
⇒ Do not reuse disposables.
⇒ Do not subject disposables to hygienic reprocessing.

⚠ WARNING

Risk of infection resulting from no hygienic reprocessing!
Use of a device and accessories which have not been subjected to hygienic reprocessing may infect the patient.
⇒ Subject the device and accessories to hygienic reprocessing after every use.

WM 67891a 2024-08

⚠ WARNING

Risk of infection due to poor preparation of hygienic reprocessing!

Poor preparation before hygienic reprocessing may reduce the efficacy of reprocessing. This may infect the patient.

⇒ Remove the device from the portable unit before reprocessing it.

⇒ Remove the protective transport bag.

⇒ Remove all accessories from the device.

⇒ Before reprocessing, dismantle all parts of the breathing circuit (see "7.2.1 Disassembling the reusable breathing circuit", page 106).

⇒ Ensure the hygiene filter is inserted in the device when carrying out hygienic reprocessing.

⇒ If the hygiene filter is contaminated or needs replacing: Remove the hygiene filter.

⚠ WARNING

Disrupted or failed therapy due to incorrect reprocessing!

Incorrect reprocessing may lead to material changes and, as a consequence, to loss of function or malfunctions.

⇒ Carry out hygienic reprocessing in accordance with the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).

⇒ Only use recommended cleaning agents and disinfectants.

⇒ Thoroughly rinse all parts of the breathing circuit with water of potable quality after cleaning and disinfecting.

⇒ Do not exceed the maximum number of reprocessing cycles for the reusable breathing circuit.

⇒ Once the maximum number of reprocessing cycles for the reusable breathing circuit has been reached, replace it.

⚠ WARNING

Loss of mechanical or electrical safety due to incorrect reprocessing!

Incorrect reprocessing may lead to material changes and, as a consequence, to the mechanical and electrical properties of the device being impaired.

⇒ Carry out hygienic reprocessing in accordance with the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).

⇒ Only use recommended cleaning agents and disinfectants.

⇒ Subject the device and accessories to a visual inspection for external damage following every hygienic reprocessing operation.

WM 67891a 2024-08

⚠ WARNING

Risk of infection resulting from poor hygienic reprocessing!
Use of unsuitable processes or unsuitable cleaning agents and disinfectants may reduce the efficacy of reprocessing. This may infect the patient.
⇒ Subject the device and accessories to hygienic reprocessing after every use.
⇒ Carry out hygienic reprocessing in accordance with the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
⇒ Only use recommended cleaning agents and disinfectants.

⚠ WARNING

Disrupted or failed therapy due to poor checks following reprocessing!
Poor checks following reprocessing may result in defects going undetected. This may lead to malfunctions and failure of the device and its accessories.
⇒ Subject the device and its accessories to a visual inspection for external damage after every hygienic reprocessing operation.
⇒ Perform a full function check after every hygienic reprocessing operation.

⚠ WARNING

Infection of the user or of the next patient resulting from incorrect handling of a contaminated hygiene filter!
A contaminated hygiene filter might cause the patient or user serious or life-threatening injury.
⇒ Always wear suitable personal protective equipment when removing a contaminated hygiene filter.
⇒ Dispose of a contaminated hygiene filter when carrying out hygienic reprocessing, and do not reuse it.

⚠ WARNING

Disrupted or failed therapy due to moisture in the device or breathing circuit!
Moisture in the device or its accessories may lead to malfunctions and failure of the device and its accessories.
⇒ Allow the device and its accessories to dry completely following any reprocessing step.
⇒ Only use disinfection by immersion on parts suitable for this process.
⇒ When cleaning and disinfecting the filter compartment, only moisten it, do not wet it.

WM 67891a 2024-08

⚠ WARNING

Risk of injury due to residues or decomposition products of disinfectants or cleaning agents in the breathing circuit!
Incorrect reprocessing may lead to hazardous residues of cleaning agents and disinfectants or to hazardous decomposition products in the respiratory gas.
⇒ Use only recommended methods and recommended cleaning agents and disinfectants.
⇒ Observe the maximum number of reprocessing cycles for the breathing circuit.
⇒ Once the maximum number of reprocessing cycles for the breathing circuit has been reached, replace it.
⇒ Thoroughly rinse all parts of the breathing circuit with water of potable quality after cleaning and disinfecting.
⇒ Check all parts of the breathing circuit visually after every hygienic reprocessing operation for residues of cleaning agents or disinfectants.

⚠ CAUTION

Risk of injury from cleaning agents and disinfectants!
If the skin or eyes come into contact with cleaning agents and disinfectants during reprocessing, this may lead to injuries.
⇒ Wear suitable personal protective equipment during reprocessing.
⇒ Follow the safety data sheets for cleaning agents and disinfectants.

NOTICE

Material damage as a result of mechanical reprocessing!
Mechanical reprocessing in a washer-disinfector may damage or destroy parts not approved for these methods.
⇒ Subject only approved parts to mechanical reprocessing (see "7.8 Cleaning and disinfection plan", page 124).

WM 67891a 2024-08

7.1 Hygienic reprocessing intervals

Part	Interval		
	After every use	**At least 1 × weekly**	**After a filter change due to infection transport or exceeding filter service life (at least every 6 months)**
All parts	✓	✓	–
Filter compartment	–	–	✓

7.2 Preparing for hygienic reprocessing

Prerequisite

- The device is switched off (see "6.11 Switching off the device", page 100).
- The device is disconnected from the patient.

1. Disconnect the device from the power supply.
2. Separate the protective transport bag from the portable unit.
3. Remove the breathing circuit and connection lines from the device.
4. Separate the device from the portable unit. Follow the instructions for use of the portable unit.
5. Disassemble the reusable breathing circuit into its constituent parts (see "7.2.1 Disassembling the reusable breathing circuit", page 106).
6. If present: Remove the adapter for disposable breathing circuit from the device (see "7.2.2 Disassembling the adapter for disposable breathing circuit", page 108).
7. If necessary: Remove potentially contaminated hygiene filter using suitable personal protective equipment and dispose of it properly.

WM 67891a 2024-08

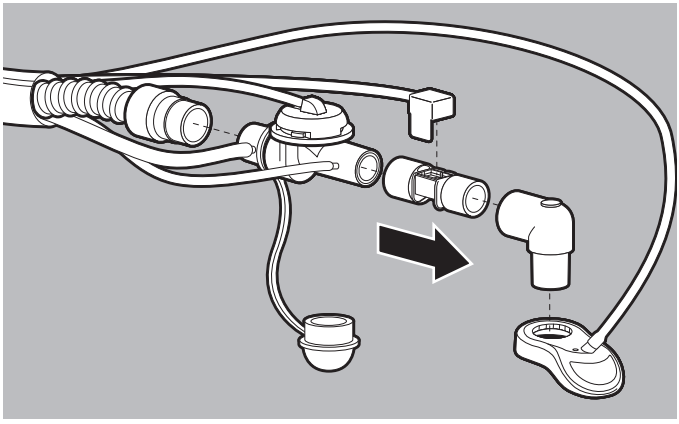
8. Dispose of disposables properly.

Result All parts have been prepared for hygienic reprocessing.

7.2.1 Disassembling the reusable breathing circuit

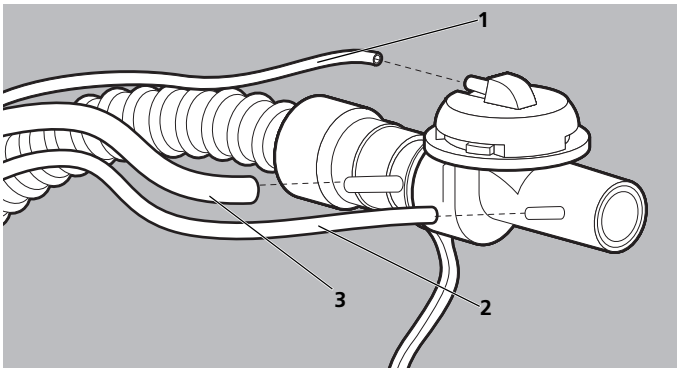
Prerequisite The device is disconnected from the breathing circuit.

1. Disconnect all the hoses of the reusable measuring circuit from the adapter for reusable breathing circuit.
2. Open the protective sleeve completely.
3. Open the hook and loop fasteners in the protective sleeve.
4. Detach the protective cap from the patient end of the reusable breathing circuit.
5. Detach the MEDUtrigger connection line from the patient end of the reusable breathing circuit.



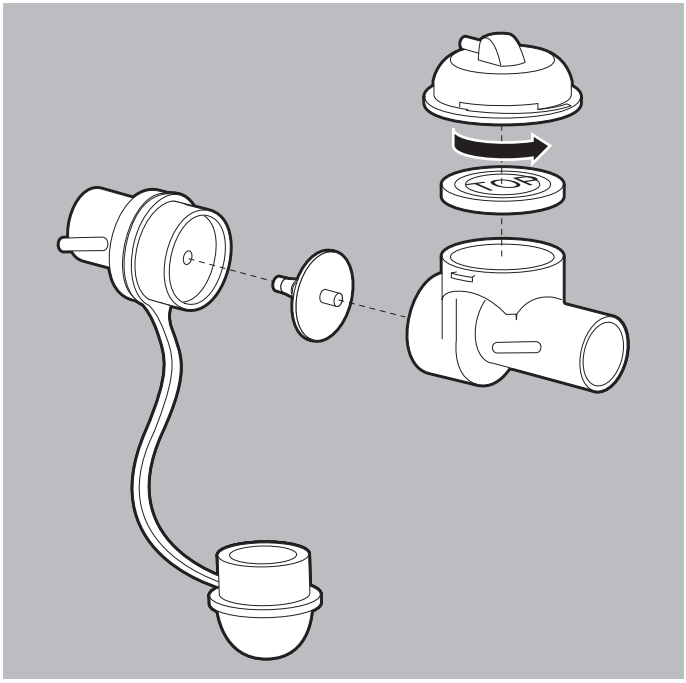
6. If present: Disconnect FlowLine-FlowCheck with MEDUtrigger connection line from the FlowCheck sensor.
7. Disconnect the patient valve from the ventilation hose.
8. If present: Remove the FlowCheck sensor from the patient valve.
9. Loosen the elbow.

WM 67891a 2024-08



10. Detach all tubes from the patient valve:

- PEEP control tube (**1**)
- Pressure measuring tube (**2**)
- Flexible oxygen tube (**3**)



11. Remove the patient valve.

WM 67891a 2024-08

12. Detach the band of the protective cap from the holder for check valve diaphragm.

Result The reusable breathing circuit has been disassembled.

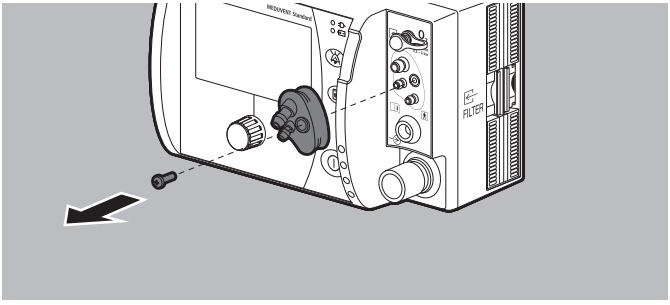
7.2.2 Disassembling the adapter for disposable breathing circuit

Required tools Phillips screwdriver, size PH1

If the device is operated with a disposable breathing circuit, the adapter for disposable breathing circuit must be removed from the device before reprocessing.

Prerequisite The disposable breathing circuit has been removed from the device and disposed of properly.

1. Remove the protective cap for connection terminal from the adapter for disposable breathing circuit.



2. Loosen the screw on the adapter for disposable breathing circuit.
3. Remove the adapter for disposable breathing circuit from the device.

Result The adapter for disposable breathing circuit has been disassembled.

WM 67891a 2024-08

7.3 Reprocessing parts mechanically

7.3.1 Reprocessing parts mechanically in a washer-disinfector

Prerequisite

- The washer-disinfector complies with the DIN EN ISO 15883 series of standards.
- The parts have been prepared for hygienic reprocessing (see "7.2 Preparing for hygienic reprocessing", page 105).

1. For parts approved for mechanical cleaning and disinfection, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. For parts requiring initial manual cleaning, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
3. Place the parts in a washer-disinfector.
   Please note:
   - Observe the exposure time specified in the cleaning and disinfection plan.
   - Connect tubes to the washer-disinfector.
   - It must be possible for the flow to pass fully through all parts and lumina.
   - The water must be able to drain off.
4. Add cleaning agent in accordance with the instructions for use of the washer-disinfector.
5. If necessary: Add neutralizer in accordance with the instructions for use of the washer-disinfector.

WM 67891a 2024-08

6. Start the mechanical reprocessing program in accordance with the following process, e.g. Program 12 of the Miele G 7836 CD washer-disinfector.

Step	Process	Temperature	Exposure time	Cleaning agent/ disinfectant
1	Prewash	Cold water	1 min	–
2	Main wash	55 °C	10 min	neodisher® MediClean forte (Dr. Weigert): 0.5 %
3	Neutralize	Cold water	2 min	–
4	Rinse	Cold water	3 min	–
5	Thermal disinfection	90 °C	5 min	Fully demineral-ized water
6	Dry	100 °C	25 min	–

7. Subject parts to a visual inspection for soiling, residues and residual moisture.
8. If visible soiling remains: Repeat mechanical cleaning and disinfection.

Result The parts have been mechanically cleaned and disinfected.

7.3.2 Mechanically reprocessing the protective sleeve and hook and loop strap with clip

1. Open the protective sleeve completely.
2. Detach the hook and loop strap with clip from the breathing circuit.
3. For the cleaning agents and disinfectants, dosage and exposure time, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
4. Wash the protective sleeve according to EN 16616 at 60 °C in a washing machine or industrial washer.
   Please note: The manufacturer's instructions must be followed.
5. Subject parts to a visual inspection for soiling, residues and residual moisture.

WM 67891a 2024-08

6. If visible soiling remains: Repeat mechanical cleaning and disinfection.
7. Allow the protective sleeve and hook and loop strap with clip to dry completely.

Result The protective sleeve has been disinfected.

7.4 Cleaning parts manually

It is preferable to perform mechanical cleaning and disinfection instead of manual cleaning and disinfection for parts which can be cleaned and disinfected mechanically.

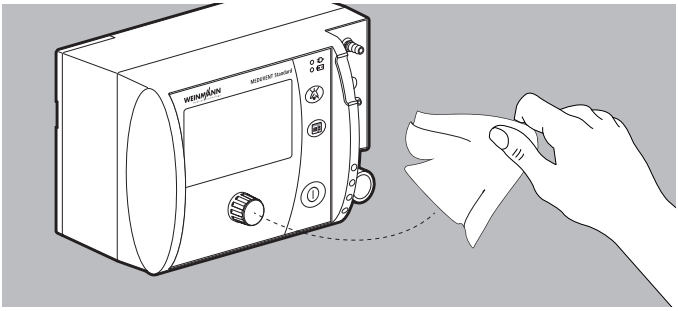
7.4.1 Cleaning device and accessories manually

Prerequisite Hygienic reprocessing is prepared (see "7.2 Preparing for hygienic reprocessing", page 105).

1. For parts approved for manual cleaning, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. For the cleaning agents, dosage and exposure time for the individual parts, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
3. Prepare the cleaning solution.
4. To remove visible soiling: Wet a commercially-available soft brush suitable for plastic with cleaning solution. Brush off parts for at least 1 min.

   Please note:
   Keep uneven surfaces and grooves (e.g. top and bottom of the MEDUtrigger, navigation knob, ventilation hose connection) moist throughout exposure time, and brush off particularly thoroughly.
5. Moisten disposable cloths with cleaning solution in line with the manufacturer's specification.

WM 67891a 2024-08



6. If the cleaning and disinfection plan stipulates that parts have to be wiped down: Wipe down parts using a clean, lint-free disposable cloth moistened with cleaning solution.

   Please note:

   - Use a fresh wipe for every cleaning process.
   - Carefully wipe down all surfaces.
   - All surfaces and grooves must be wetted with cleaning solution.
   - Wipe over uneven surfaces and grooves, in particular, again.
   - If the hygiene filter is in the device: Wipe down the accessible surface of the hygiene filter.
   - When replacing the filter: Wipe out the filter compartment.

7. Observe the exposure time specified in the cleaning and disinfection plan.
8. Subject the parts to a visual inspection for residues and residual soiling.
9. If visible soiling is still present: Repeat manual cleaning.
10. Remove any cleaning agent residues with a damp cloth.
11. Wipe the MEDUtrigger dry with a dry cloth.
12. Allow all parts to dry completely.

Result Parts have been cleaned manually.

WM 67891a 2024-08

7.4.2 Cleaning the reusable measuring circuit manually

Prerequisite

- The reusable measuring circuit has been disconnected from the reusable breathing circuit and from the device (see "7.2.1 Disassembling the reusable breathing circuit", page 106).
- The pressure measuring tube, PEEP control tube and flexible oxygen tube have been disconnected from the adapter for reusable breathing circuit.

1. For the cleaning agents, dosage and exposure time, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. Prepare the cleaning solution.
3. Brush off hoses/tubes on the inside and outside using a special lumen brush.
4. Connect a sterile disposable syringe (20 ml) to an end of the PEEP control tube.
5. Draw the cleaning solution through the PEEP control tube into the disposable syringe until both are completely full.
6. Disconnect the disposable syringe from the PEEP control tube.
7. Likewise, use the disposable syringe to fill the pressure measuring tube and the flexible oxygen tube with cleaning solution.
8. Immerse parts in the cleaning solution.

   Please note:

   - All cavities must be filled.
   - There must be no air bubbles.
   - All surfaces must be wetted completely.
   - Swirl parts around in the cleaning solution so as to wet all surfaces and cavities completely.
9. Observe the exposure time specified in the cleaning and disinfection plan.

WM 67891a 2024-08

10. Remove the parts from the cleaning solution and rinse them outside for 10 s with running water of potable quality.
11. Using the disposable syringe, rinse the insides of the pressure measuring tube, PEEP control tube and flexible oxygen tube at least 8 times with water of potable quality.

    Please note: Flush only in one direction.
12. Remove the parts from the water and rinse them inside and outside for 10 s each with running water of potable quality.
13. Subject the reusable measuring circuit to a visual inspection for residues and residual soiling.
14. If visible soiling is still present: Repeat manual cleaning.
15. Allow the reusable measuring circuit to dry completely.

    If necessary: Dry the tubes with medical compressed air or medical oxygen.

Result The reusable measuring circuit has been cleaned manually.

7.4.3 Cleaning the reusable breathing circuit manually

Manual cleaning of the reusable measuring circuit is described separately (see "7.4.2 Cleaning the reusable measuring circuit manually", page 113).

Prerequisite
- Hygienic reprocessing is prepared (see "7.2 Preparing for hygienic reprocessing", page 105).
- The reusable breathing circuit has been disassembled (see "7.2.1 Disassembling the reusable breathing circuit", page 106).

1. For parts approved for manual cleaning, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. For the cleaning agents, dosage and exposure time, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
3. Prepare the cleaning solution.

WM 67891a 2024-08

4. Brush the inside and outside of the parts for at least 1 min with a special lumen brush wetted with cleaning agent.
5. Immerse parts in the cleaning solution.
6. Swirl parts around in the cleaning solution so as to wet all surfaces and cavities completely (at least 3 times, until there are no more air bubbles).

   Please note:

   - All cavities must be filled.
   - All surfaces must be wetted.
7. Observe the exposure time specified in the cleaning and disinfection plan.
8. Remove the parts from the cleaning solution and allow them to drip dry.
9. Soak the parts in water of potable quality for 5 min.
10. Swirl the parts in water to completely wet all surfaces and cavities.

    Please note:

    - All cavities must be filled.
    - There must be no air bubbles.
    - All surfaces must be wetted.
11. Remove the parts from the water and rinse them inside and outside for 10 s each with running water of potable quality.
12. Subject the parts to a visual inspection for residues and residual soiling.
13. If visible soiling is still present: Repeat manual cleaning.
14. Allow the parts to dry completely.

    If necessary: Dry the tubes with medical compressed air or medical oxygen.

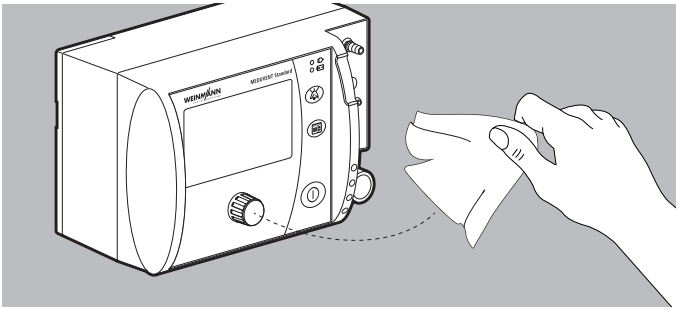
Result The reusable breathing circuit has been cleaned manually.

WM 67891a 2024-08

7.5 Disinfecting parts by wiping

Prerequisite The parts have been cleaned manually and look clean (see "7.4 Cleaning parts manually", page 111).

1. For parts approved for disinfection by wiping, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. For the cleaning agents, dosage and exposure time for the individual parts, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).



3. Disinfect parts by wiping (see "7.8 Cleaning and disinfection plan", page 124).

   Please note:

   - Wet uneven surfaces and grooves (e.g. top and bottom MEDUtrigger, navigation knob, ventilation hose connection) adequately with disinfectant.
   - If the hygiene filter is in the device: Disinfect the accessible surface of the hygiene filter by wiping.
   - When replacing the filter: Disinfect the filter compartment by wiping.
4. Check the parts for residues and residual soiling.
5. If visible soiling remains: Repeat disinfection by wiping.
6. Allow the parts to dry completely.

Result The parts have been disinfected by wiping.

WM 67891a 2024-08

7.6 Disinfecting parts by immersion

7.6.1 Disinfecting the reusable measuring circuit by immersion

Prerequisite

- The reusable measuring circuit has been disconnected from the reusable breathing circuit (see "7.2.1 Disassembling the reusable breathing circuit", page 106).
- The pressure measuring tube, PEEP control tube and flexible oxygen tube have been disconnected from the adapter for reusable breathing circuit.
- The reusable measuring circuit has been cleaned manually (see "7.4.2 Cleaning the reusable measuring circuit manually", page 113).

1. For the disinfectants, dosage and exposure time for the individual parts, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. Prepare the solution for disinfection by immersion.
3. Connect a sterile disposable syringe (20 ml) to an end of the PEEP control tube.
4. Draw the solution for disinfection by immersion through the PEEP control tube into the disposable syringe until both are completely full.
5. Disconnect the disposable syringe from the PEEP control tube.
6. Likewise, use the disposable syringe to fill the pressure measuring tube and the flexible oxygen tube with the solution for disinfection by immersion.
7. Immerse parts in the solution for disinfection by immersion.

   Please note:

   - All cavities must be filled.
   - There must be no air bubbles.
   - All surfaces must be wetted completely.
   - Swirl parts around in the solution for disinfection by immersion so as to wet all surfaces and cavities completely.

WM 67891a 2024-08

8. Observe the exposure time specified in the cleaning and disinfection plan.
9. Remove the parts from the disinfection solution and rinse from the outside for 10 s with running water of potable quality.
10. Using the disposable syringe, rinse the insides of the pressure measuring tube, PEEP control tube and flexible oxygen tube at least 8 times with water of potable quality.

    Please note: Flush only in one direction.
11. Subject tubes to a visual inspection for residues.
12. If residues remain: Repeat cleaning and disinfection.
13. Allow the tubes to dry completely.

    If necessary: Dry the tubes with medical compressed air or medical oxygen.

Result The reusable measuring circuit has been disinfected by immersion.

7.6.2 Disinfecting the reusable breathing circuit by immersion

Disinfection of the reusable measuring circuit by means of immersion is described separately (see "7.6.1 Disinfecting the reusable measuring circuit by immersion", page 117).

Prerequisite The parts of the reusable breathing circuit intended for disinfection by immersion have been cleaned manually (see "7.4.3 Cleaning the reusable breathing circuit manually", page 114).

1. For parts approved for disinfection by immersion, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
2. For the disinfectants, dosage and exposure time for the individual parts, refer to the cleaning and disinfection plan (see "7.8 Cleaning and disinfection plan", page 124).
3. Prepare the solution for disinfection by immersion.
4. Brush the inside and outside of the parts for at least 1 min with a special lumen brush wetted with solution for disinfection by immersion.

WM 67891a 2024-08

5. Immerse parts in the solution for disinfection by immersion.
6. Swirl parts around in the disinfection solution so as to wet all surfaces and cavities completely (at least 3 times, until there are no more air bubbles).

   Please note:

   - All cavities must be filled.
   - All surfaces must be wetted.
7. Observe the exposure time specified in the cleaning and disinfection plan.
8. Remove the parts from the solution for disinfection by immersion and allow them to drip dry.
9. Soak the parts in water of potable quality for 5 min.
10. Swirl the parts in water to completely wet all surfaces and cavities.

    Please note:

    - All cavities must be filled.
    - There must be no air bubbles.
    - All surfaces must be wetted.
11. Remove the parts from the water and rinse them inside and outside for 10 s each with running water of potable quality.
12. Check the parts for residues.
13. If residues remain: Repeat cleaning and disinfection.
14. Allow the parts to dry completely.

    If necessary: Dry the tubes with medical compressed air or medical oxygen.

Result The reusable breathing circuit has been disinfected by immersion.

WM 67891a 2024-08

7.7 Preparing parts for reuse

Prerequisite The parts have been subjected to hygienic reprocessing according to the cleaning and disinfection plan.

1. Check all parts for damage resulting from use (e.g. cracks or cable breaks).
2. Replace damaged parts.
3. Assemble the reusable breathing circuit (see "7.7.1 Assembling the reusable breathing circuit", page 121).
4. Install the accessories.
5. Reconnect the power supply (see "4.2 Connecting a power supply", page 51).
6. Perform a function check (see "5 Function check", page 66).
7. Place parts in storage in accordance with the storage conditions (see "16 Technical data", page 210).

Result The parts are ready for use again.

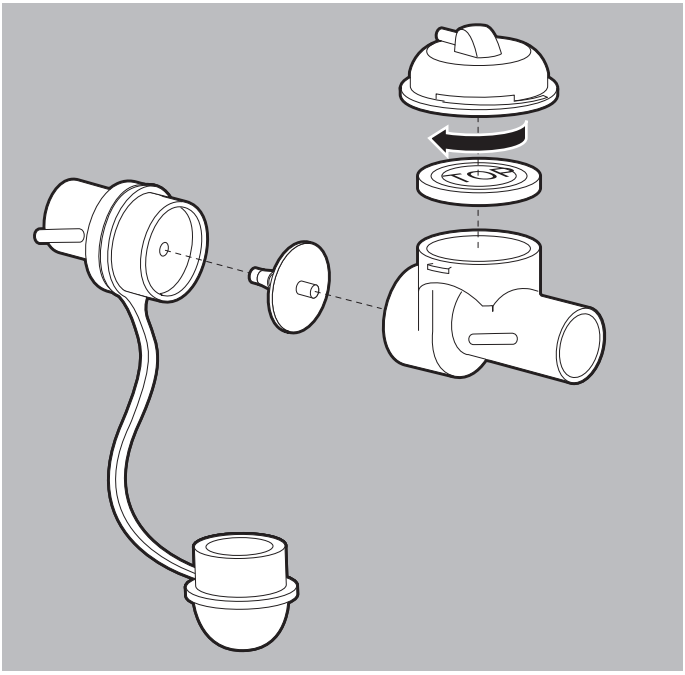
WM 67891a 2024-08

7.7.1 Assembling the reusable breathing circuit

The illustrations in this subchapter show all the possible parts of the reusable breathing circuit. Depending on type, your reusable breathing circuit might not include some parts.

Prerequisite

- The reusable breathing circuit has been disassembled.
- The reusable breathing circuit has been hygienically reprocessed.

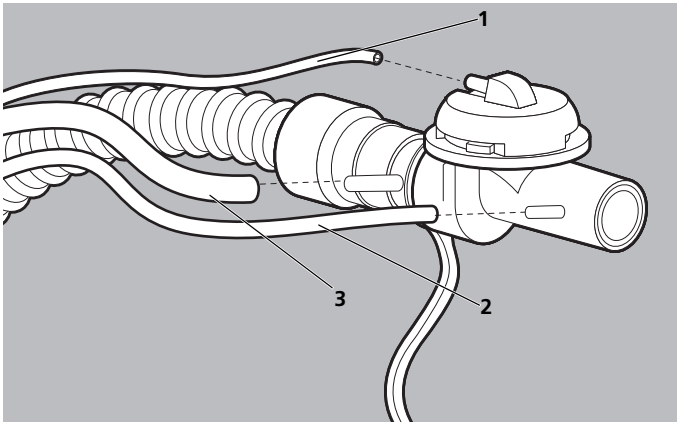


1. Attach the band of the protective cap to the holder for check valve diaphragm.
2. Fit the patient valve.

   Please note:

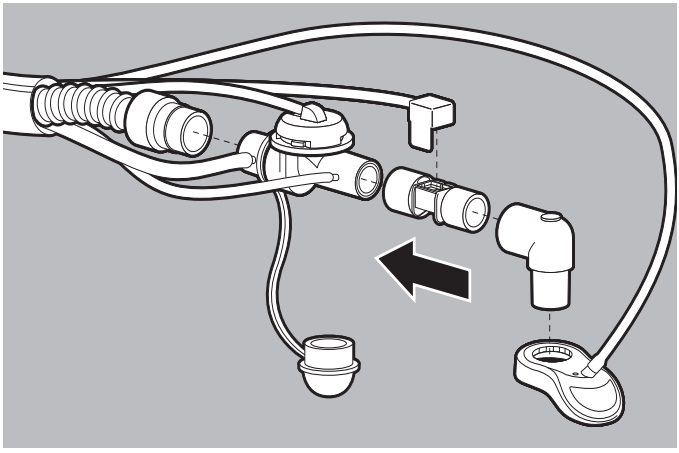
   - The side of the PEEP control diaphragm marked "TOP" must be facing up toward the control cover.
   - The arrow on the control cover must be pointing toward the patient.

WM 67891a 2024-08



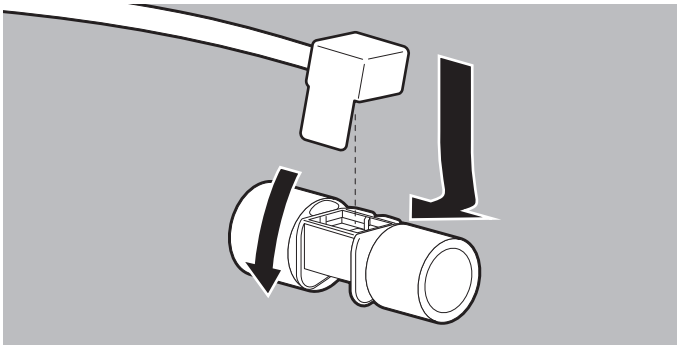
3. Connect all the tubes of the reusable measuring circuit to the patient valve:
   - PEEP control tube **1** (slimmest tube)
   - Pressure measuring tube **2** (medium tube)
   - Flexible oxygen tube **3** (thickest tube)

   Please note: The tubes must be firmly attached to the patient valve.



4. Connect the patient valve to the ventilation hose.
5. If present: Connect the FlowCheck sensor to the patient valve.
6. Connect the elbow.

WM 67891a 2024-08



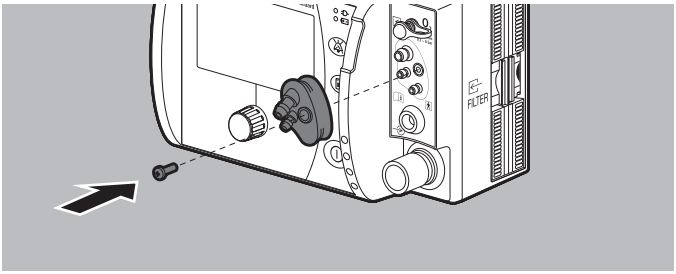
7. If present: Hook the FlowCheck sensor connector onto the FlowCheck sensor and press down until you hear it click into place.
8. Connect all the hoses of the reusable measuring circuit to the adapter for reusable breathing circuit.
9. Place all the tubes of the measuring circuit and the connection line in the protective sleeve.
10. Close the hook and loop fasteners in the protective sleeve to secure all the tubes and the connection line .
11. Close the zip fastener of the protective sleeve.
12. Close off the patient end of the reusable breathing circuit with the protective cap.

Result The reusable breathing circuit has been assembled.

WM 67891a 2024-08

7.7.2 Fitting the adapter for disposable breathing circuit

1. Fit the adapter for disposable breathing circuit on the measuring circuit connector.



2. Secure the adapter for disposable breathing circuit using the screw supplied.
3. Put the protective cap on the adapter for disposable breathing circuit.

Result The adapter for disposable breathing circuit has been fitted.

7.8 Cleaning and disinfection plan

It is preferable to perform mechanical cleaning and disinfection instead of manual cleaning and disinfection for parts which can be cleaned and disinfected mechanically.

7.8.1 Definition of the levels of disinfection

Level of disinfection	Description
High-level disinfection	A germicidal process with a sterilizing agent under non-sterile conditions. The process kills all forms of microbial life apart from a large number of bacterial spores.
Intermediate-level disinfection	A germicidal process using a disinfectant which destroys viruses, mycobacteria, molds and vegetative bacteria, but not bacterial spores.
Low-level disinfection	A germicidal process using a disinfectant which destroys some molds, vegetative forms of bacteria and lipid viruses.

WM 67891a 2024-08

7.8.2 Device and accessories

<table>
<tr><th>Part</th><th>Level of disinfection</th><th>Manual cleaning</th><th>Disinfection by wiping</th><th>Disinfection by immersion</th><th>Mechanical reprocessing</th></tr>
<tr><td>Device (with hygiene filter inserted)</td><td rowspan="4">Intermediate-level disinfection</td><td rowspan="5">Wipe down with X-Wipes (Bode) and neodisher® MediClean forte (Dr. Weigert). Dosage: 10 ml/l Duration: Wipe down all surfaces at least 2 times until they look clean.</td><td>Wipe down with Incidin™ OxyWipe S (Ecolab), at least 8 times. Exposure time: 5 min</td><td rowspan="5">Not permitted</td><td rowspan="5">Not permitted</td></tr>
<tr><td>MEDUtrigger with connection line</td><td rowspan="2">Wipe down with Incidin™ OxyWipe S (Ecolab). Exposure time: 5 min</td></tr>
<tr><td>MEDUtrigger with FlowLine-FlowCheck connection line</td></tr>
<tr><td>Filter compartment</td><td>When replacing the filter: Wipe down with Incidin™ OxyWipe S (Ecolab).</td></tr>
<tr><td>Adapter cable for 12 V on-board power supply/circular connector</td><td rowspan="3">Cleaning adequate</td><td rowspan="3">Not necessary</td></tr>
<tr><td>Charging adapter</td></tr>
<tr><td>Power supply unit and charger 100 W</td></tr>
<tr><td>Hygiene filter</td><td colspan="5" rowspan="2">Do not reprocess, dispose of properly (see 14, p. 203)</td></tr>
<tr><td>Oxygen inlet tube</td></tr>
<tr><td>Pressure reducer</td><td colspan="5" rowspan="5">Follow the manufacturer's instructions for use</td></tr>
<tr><td>Portable unit</td></tr>
<tr><td>Ventilation mask</td></tr>
<tr><td>Tracheal tube</td></tr>
<tr><td>Breathing system filter</td></tr>
</table>

WM 67891a 2024-08

7.8.3 Breathing circuits

Part	Level of disinfection	Manual cleaning	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing
Reusable breathing circuit					
Ventilation hose Patient valve Elbow	High-level disinfection	Immerse in neodisher® MediClean forte (Dr. Weigert) and clean. Dosage: 10 ml/l Duration: At least 10 min until all surfaces look clean.	Not permitted	Immerse in gigasept® FF (new) (Schülke). Dosage: 50 ml/l Exposure time: 15 min	Initial manual cleaning: Brush all parts thoroughly until they look clean. Cleaning: neodisher® MediClean forte (Dr. Weigert): 0.5 %, 55 °C, 10 min Thermal disinfection: 90 °C, 5 min (corresponds to A0 value 3000)
Protective cap FlowCheck sensor (reusable) Reusable measuring circuit comprising Pressure measuring tube Flexible oxygen tube PEEP control tube Adapter for reusable breathing circuit	High-level disinfection	Immerse in neodisher® MediClean forte (Dr. Weigert) and clean. Dosage: 10 ml/l Duration: At least 10 min until all surfaces look clean.	Not permitted	Immerse in gigasept® FF (new) (Schülke). Dosage: 50 ml/l Exposure time: 15 min	Cleaning: neodisher® MediClean forte (Dr. Weigert): 0.5 %, 55 °C, 10 min Thermal disinfection: 90 °C, 5 min (corresponds to A0 value 3000)

WM 67891a 2024-08

Part	Level of disinfection	Manual cleaning	Disinfection by wiping	Disinfection by immersion	Mechanical reprocessing
Protective sleeve	Intermediate-level disinfection	Not permitted	Not permitted	Not permitted	Cleaning and disinfection at 60 °C in an industrial washing machine Cleaning agent: Derval SOLO (RKI) (Kreussler) Dosage: 2 ml/l Disinfectant: Ottalin PERACET (Kreussler) Dosage: 2 ml/l Exposure time: cleaning 10 min disinfection 30 min
Hook and loop strap with clip					
Disposable breathing circuit					
Disposable breathing circuit	Do not reprocess, dispose of properly (see 14, p. 203)				
Adapter for disposable breathing circuit	High-level disinfection	Immerse in neodisher® MediClean forte (Dr. Weigert) and clean. Dosage: 10 ml/l Duration: At least 10 min until all surfaces look clean.	Not permitted	Immerse in gigasept® FF (new) (Schülke) Dosage: 50 ml/l Exposure time: 15 min	Cleaning: neodisher® MediClean forte (Dr. Weigert): 0.5 %, 55 °C, 10 min Thermal disinfection: 90 °C, 5 min (corresponds to A0 value 3000)

WM 67891a 2024-08

Reprocessing cycles for reusable parts

Part	Maximum reprocessing cycles
Reusable breathing circuit	
Ventilation hose	50
Patient valve	
Elbow	
Protective cap	
Protective sleeve	
FlowCheck sensor (reusable)	
Reusable measuring circuit	
Pressure measuring tube	50
Flexible oxygen tube	
PEEP control tube	
Adapter for reusable breathing circuit	
Adapter for disposable breathing circuit	50
Connection lines	
MEDUtrigger connection line	400
MEDUtrigger with FlowLine-FlowCheck connection line	

WM 67891a 2024-08

8 User menu

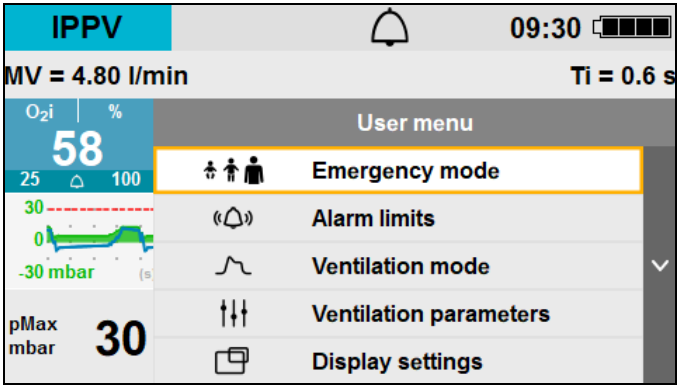
The user menu contains functions and settings which affect the current session, and which are not saved permanently as device presets (except date and time settings).

8.1 Navigating the user menu

Prerequisite

- The device is switched on (see "6.2 Switching on the device", page 77).
- Ventilation has been started (see "6.4 Starting ventilation", page 79).

1. Briefly press the menu button .
   The user menu opens.

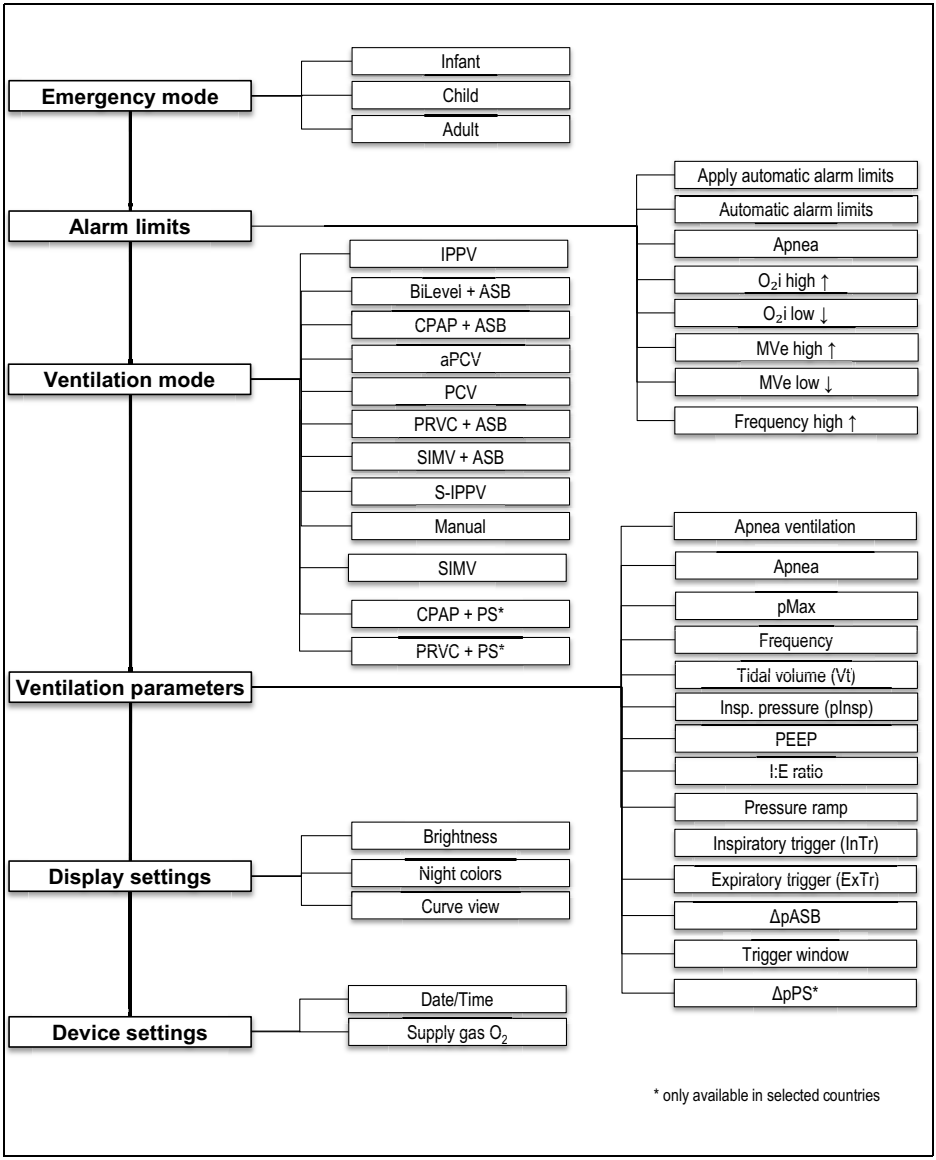


2. Select the setting with the navigation knob and confirm.
3. Change the setting with the navigation knob and confirm.
4. To exit the menu: Select **Back** or press the menu button .
   The user menu closes automatically after 5 s with no input.

Result Settings are made and apply to the current session.

WM 67891a 2024-08

8.2 User menu structure



8-1 User menu

WM 67891a 2024-08

8.3 Settings in the user menu

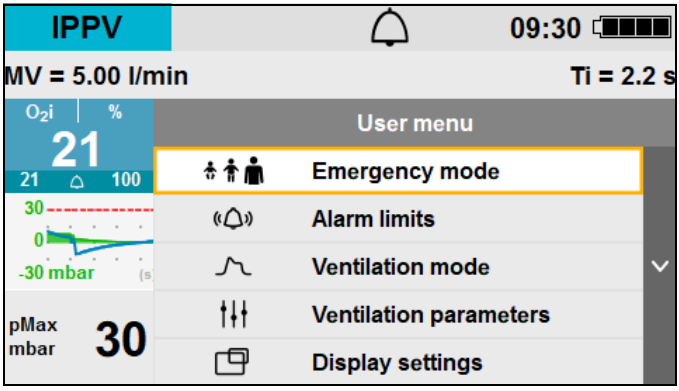
Prerequisite

- The device is switched on (see "6.2 Switching on the device", page 77).
- Ventilation has been started (see "6.4 Starting ventilation", page 79).

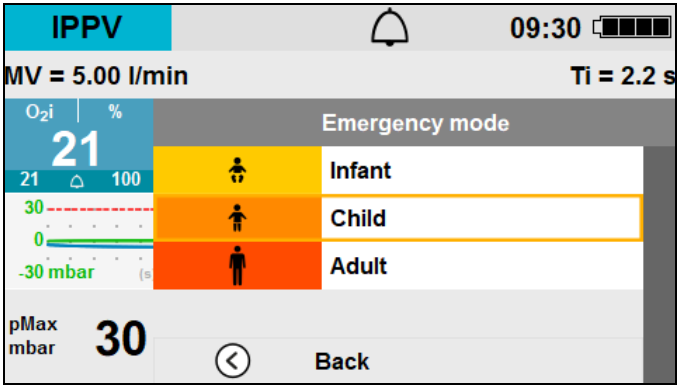
8.3.1 Emergency mode

In the **Emergency mode** submenu, you can change the patient group during ventilation.

1. Briefly press the menu button (). The user menu opens.



2. Select **Emergency mode** with the navigation knob and confirm.



3. Select patient group:

WM 67891a 2024-08

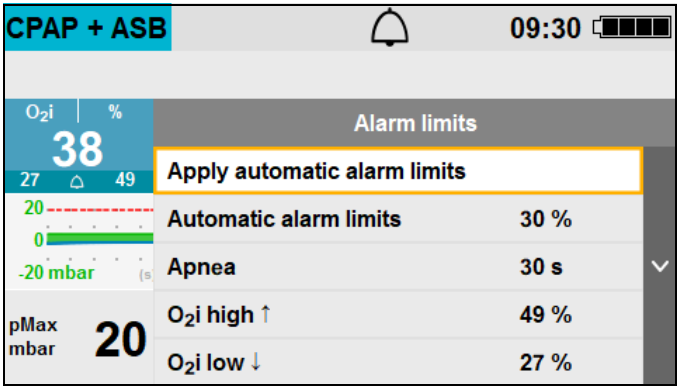
- **Infant**
- **Child**
- **Adult**

Result The ventilation parameters of the set ventilation mode are adapted to match the patient group selected.

8.3.2 Alarm limits

⚠ 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.



Alarm limits submenu	
Alarm	**Setting range**
Apply automatic alarm limits	The device automatically sets the respiratory physiology alarm limits. The automatic limit value can be set to 10 %, 20 % or 30 % above or below the measured value at the time of activation. At the start of ventilation, the alarm limits are set to 30 %.
Automatic alarm limits	10 %, 20 %, 30 %
Apnea	4 s to 60 s (only with ventilation modes CPAP, CPAP + ASB, CPAP + PS (only available in selected countries))

WM 67891a 2024-08

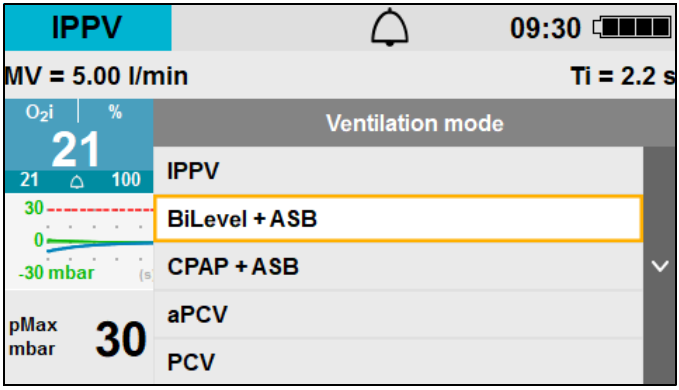
Alarm limits submenu	
Alarm	**Setting range**
O_2i high ↑	22 % to 100 %
O_2i low ↓	21 % to 95 %
MVe high ↑	3.6 l/min to 160 l/min
MVe low ↓	0.1 l/min to 110 l/min
Frequency high ↑	5/min to 140/min

8.3.3 Ventilation mode

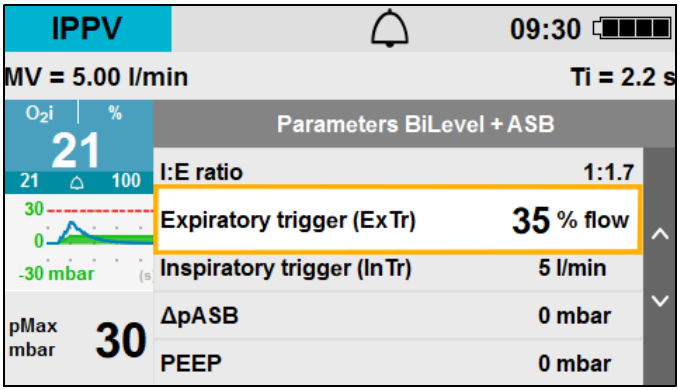
In the **Ventilation mode** submenu, you can change the ventilation mode during ventilation (see "10 Ventilation modes", page 155).

The ventilation modes available depend on which options have been enabled and activated. Not all ventilation modes are available in all countries.

You can adjust the ventilation parameters before you start the new ventilation mode.



1. Select ventilation mode.

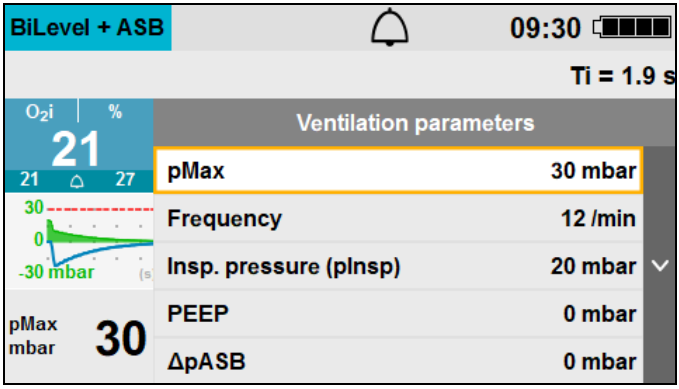


2. To start the ventilation mode with the values displayed:
   Select **Start**.
   or
   set ventilation parameters and select **Start**.

Result The ventilation mode has been changed.

8.3.4 Ventilation parameters

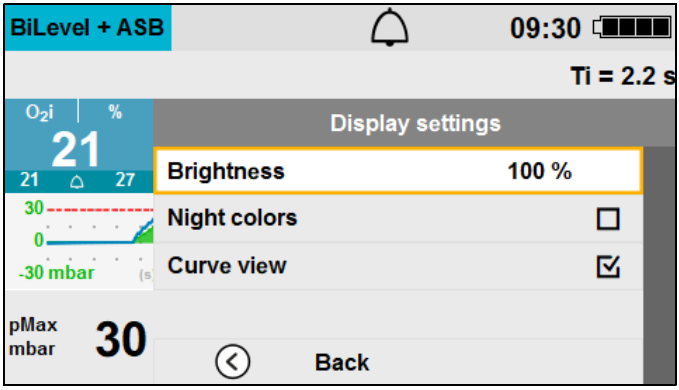
In the **Ventilation parameters** submenu, you can change the ventilation parameters of the selected ventilation mode (see "10.3.1 Ventilation parameters", page 157).



WM 67891a 2024-08

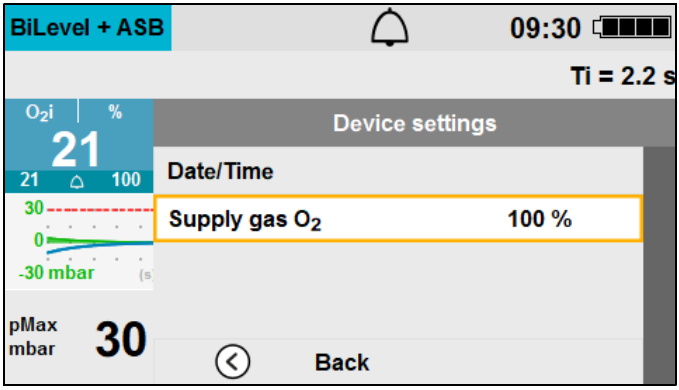
8.3.5 Display settings

In the **Display settings** submenu, you can change the appearance of the display during ventilation.



Display settings submenu		
Setting		**Setting range**
Brightness		10 % to 100 %
Night colors	Checkbox activated: Display appears in night color mode	
Curve view	Checkbox activated: Curve view	
	Checkbox deactivated: Bar graph view	

8.3.6 Device settings

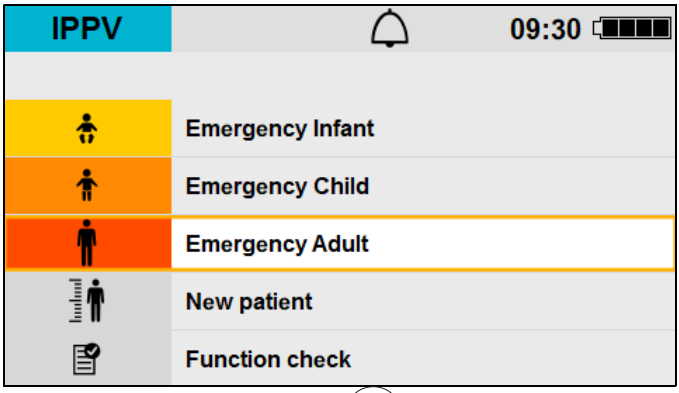


Device settings submenu		
Setting		**Setting range**
Date/Time	Year	2017 to 2037
	Month	1 to 12
	Day	1 to 31
	Hour	0 to 23
	Minute	0 to 59
Supply gas O_2		100 % 93 %

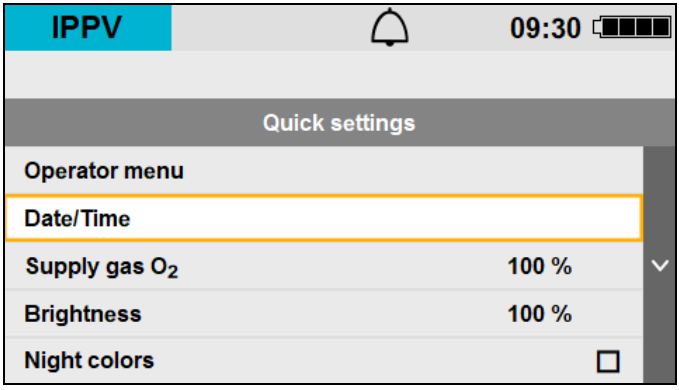
WM 67891a 2024-08

8.4 Accessing quick settings from the start menu

If you access the user menu from the start menu, you can make basic settings for the session.



1. Briefly press the menu button .
   The context menu **Quick settings** opens.



2. Navigate to the desired menu item and activate it using the navigation knob.
3. To exit the menu: Select **Back** or press the menu button .

   The menu closes automatically after 5 s with no input.

WM 67891a 2024-08

Quick settings from the start menu		
Setting		**Setting range**
Date/Time	Year	2017 to 2037
	Month	1 to 12
	Day	1 to 31
	Hour	0 to 23
	Minute	0 to 59
Brightness		10 % to 100 %
Supply gas O_2		100 % 93 %
Night colors	Checkbox activated: Display appears in night color mode	

WM 67891a 2024-08

9 Operator menu

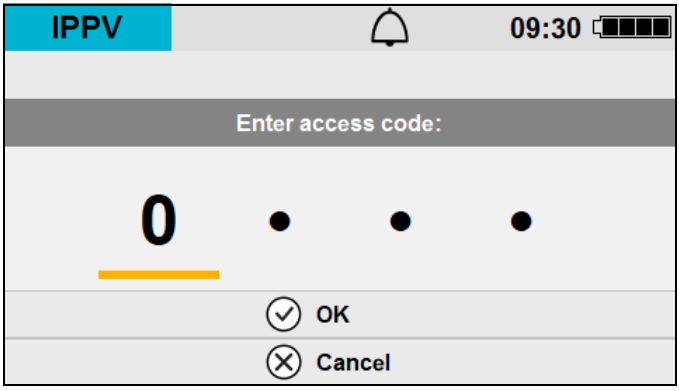
The operator menu contains device presets which are permanently stored.

9.1 Activating operator menu

Prerequisite

- The device is switched on (see "6.2 Switching on the device", page 77).
- The start screen is displayed.

1. Press and hold the menu button for 2 s.



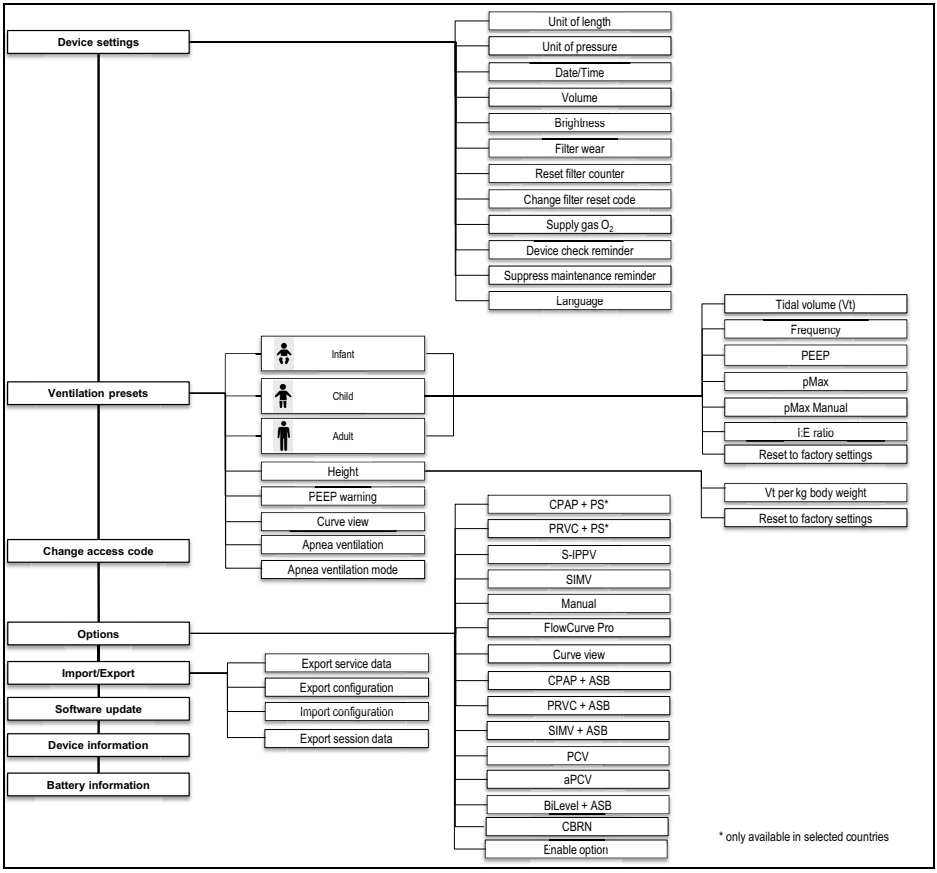
2. Enter the access code with the navigation knob and confirm.

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

Result The operator menu has been activated and settings can be made.

WM 67891a 2024-08

9.2 Operator menu structure



9-1 Operator menu

WM 67891a 2024-08

9.3 Device settings

Parameter		Possible values	Description	Factory setting
Unit of length		cm Inch	Here you can set the unit of length.	cm
Unit of pressure		mbar cmH_2O hPa	Here you can set the unit of pressure.	mbar
Date/Time	Year	2017 to 2037	Here you can set the date and time.	–
	Month	1 to 12		
	Day	1 to 31		
	Hour	0 to 23		
	Minute	0 to 59		
Volume		100 % 50 %	Here you can set the volume of the alarm tones.	100 %
Brightness		10 % to 100 %	Here you can set the brightness of the display.	100 %
Filter wear		Normal High Very high	Here you can select the pollution severity (e.g. by dust) for the hygiene filter.	Normal
Reset filter counter		✓	Here you can reset the filter counter.	–
Change filter reset code		Any	Here you can change the code required to reset the filter counter.	0000
Supply gas O_2		100 % 93 %	Here you can set the supply gas type.	100 %

WM 67891a 2024-08

Parameter		Possible values	Description	Factory setting
Device check reminder		✓	Here you can activate the device check reminder (in Germany: Technical Safety Check („Sicherheitstechnische Kontrolle“ in accordance with § 11 of the German regulation MPBetreibV).	Activated
Suppress maintenance reminder		Yes Cancel	The maintenance reminder can be suppressed once, for 180 days from the scheduled maintenance date. You cannot cancel this suppression. If the maintenance reminder is suppressed, the device behaves as if it were not due for maintenance. Even if the reminder is suppressed, maintenance is required (see 12.1, p. 191).	–
Language		The languages available in the device are displayed here.	Here you can set the language of the display texts.	–

WM 67891a 2024-08

9.4 Ventilation presets

Parameter (IPPV mode)		Possible values	Description	Factory setting
Infant	Tidal volume (Vt)	50 ml - 2000 ml	Here you can preset the tidal volume.	60 ml
	Frequency	5 /min - 40 /min	Here you can preset the ventilation frequency.	30 /min
	PEEP	0 mbar - 20 mbar	Here you can preset the positive end-expiratory pressure.	0 mbar
	pMax	10 mbar - 60 mbar	Here you can preset the maximum inspiratory pressure.	20 mbar
	pMax Manual	20 mbar - 60 mbar	Here you can preset the maximum inspiratory pressure in Manual mode.	20 mbar
	I:E ratio		Here you can preset the ratio of inspiration to expiration. The setting options for I:E depend on the combination of ventilation frequency and tidal volume.	1:3.0
	Reset to factory settings	–	Here you can reset the settings for this patient group to their factory settings.	–
Child	Tidal volume (Vt)	50 ml - 2000 ml	Here you can preset the tidal volume.	200 ml
	Frequency	5 /min - 40 /min	Here you can preset the ventilation frequency.	20 /min
	PEEP	0 mbar - 20 mbar	Here you can preset the positive end-expiratory pressure.	0 mbar
	pMax	10 mbar - 60 mbar	Here you can preset the maximum inspiratory pressure.	25 mbar
	pMax Manual	10 mbar - 60 mbar	Here you can preset the maximum inspiratory pressure in Manual mode.	20 mbar
	I:E ratio		Here you can preset the ratio of inspiration to expiration. The setting options for I:E depend on the combination of ventilation frequency and tidal volume.	1:1.7
	Reset to factory settings	–	Here you can reset the settings for this patient group to their factory settings.	–

WM 67891a 2024-08

Parameter (IPPV mode)		Possible values	Description	Factory setting
Adult	Tidal volume (Vt)	50 ml - 2000 ml	Here you can preset the tidal volume.	500 ml
	Frequency	5 /min - 40 /min	Here you can preset the ventilation frequency.	10 /min
	PEEP	0 mbar - 20 mbar	Here you can preset the positive end-expiratory pressure.	0 mbar
	pMax	10 mbar - 60 mbar	Here you can preset the maximum inspiratory pressure.	30 mbar
	pMax Manual	20 mbar - 60 mbar	Here you can preset the maximum inspiratory pressure in Manual mode.	20 mbar
	I:E ratio		Here you can preset the ratio of inspiration to expiration. The setting options for I:E depend on the combination of ventilation frequency and tidal volume.	1:1.7
	Reset to factory settings	–	Here you can reset the settings for this patient group to their factory settings.	–
Height	Vt per kg body weight	4 ml/kg - 10 ml/kg	Here you can preset the tidal volume per kg body weight for calculating the "New patient" settings.	7 ml/kg
	Reset to factory settings	–	Here you can reset the tidal volume per kilogram body weight to the factory setting.	–
PEEP warning		1 mbar - 21 mbar	Here you can preset the PEEP at which the device generates a warning.	11 mbar

WM 67891a 2024-08

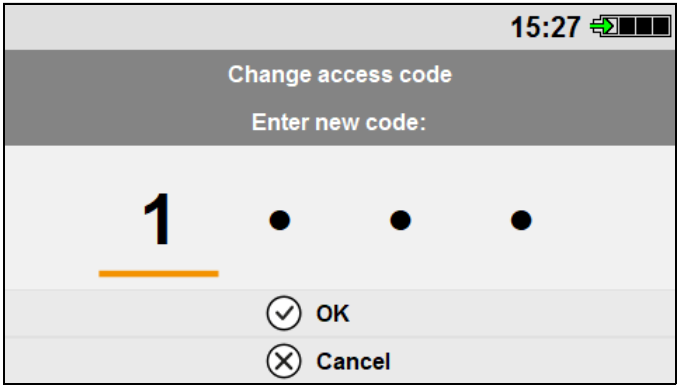
Parameter (IPPV mode)	Possible values	Description	Factory setting
Curve view	–	Here you can preset whether the ventilation should start in the curve view or the bar graph view.	Activated
Apnea ventilation	–	Here you can activate or deactivate apnea ventilation for the CPAP, CPAP + ASB and CPAP + PS ventilation modes. If apnea ventilation is activated, the device automatically switches to apnea ventilation mode after the set apnea time. This setting can also be made in the user menu during ventilation.	Deactivated
Apnea ventilation mode	IPPV BiLevel + ASB	If the BiLevel + ASB mode is enabled and activated in the operator menu, you can choose between the IPPV and BiLevel + ASB modes as apnea ventilation mode.	IPPV

WM 67891a 2024-08

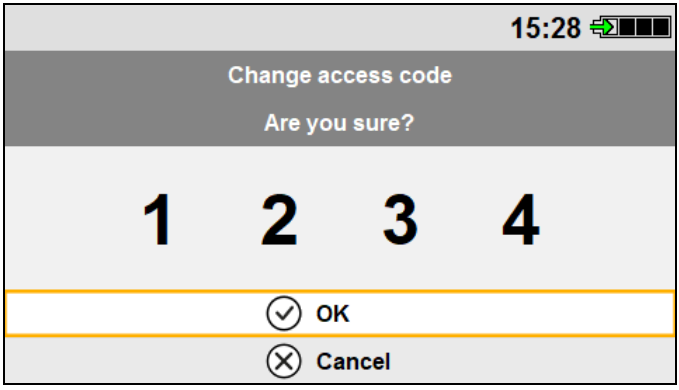
9.5 Changing the access code

Prerequisite The operator menu is activated (see "9.1 Activating operator menu", page 139).

1. Select the **Change access code** menu item.



2. Enter the new access code with the navigation knob and confirm with **OK**.



3. Click **OK** to confirm that you really want to change the access code.

Result The access code for activating the operator menu has been changed.

WM 67891a 2024-08

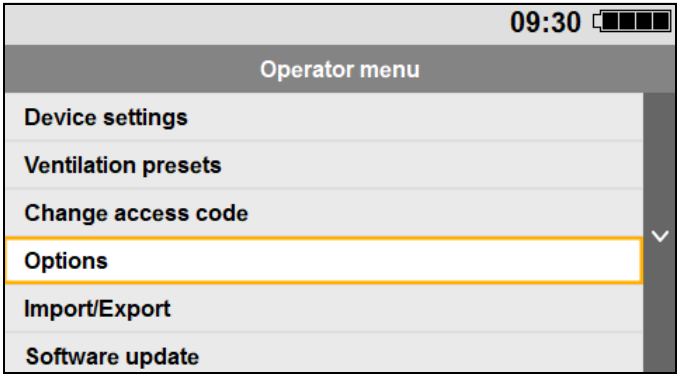
9.6 Options

As the operator, you can enable new options and activate or deactivate the enabled options.

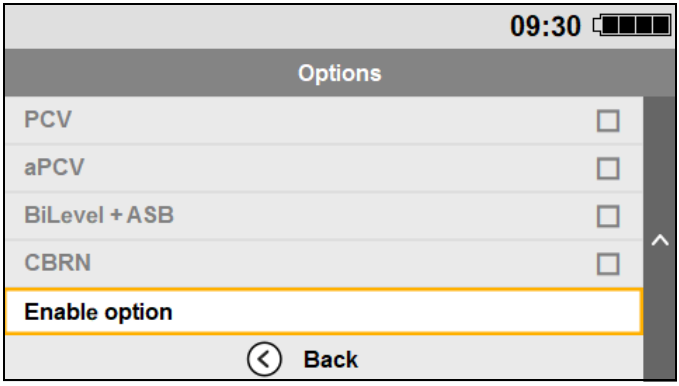
9.6.1 Enabling options

Prerequisite

- The operator menu is activated (see "9.1 Activating operator menu", page 139).
- The latest software version has been installed on the device (see "9.8 Software update", page 151).

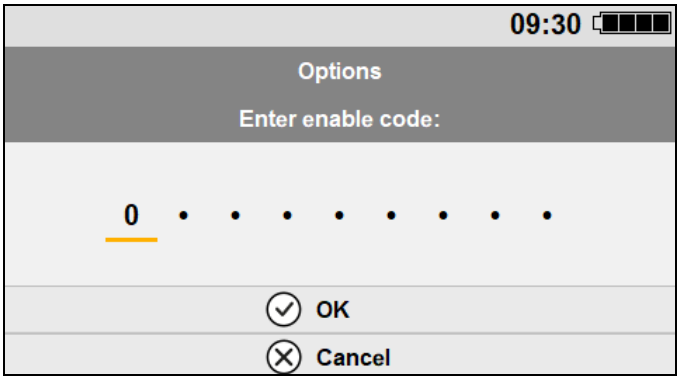


1. Select the **Options** menu item.

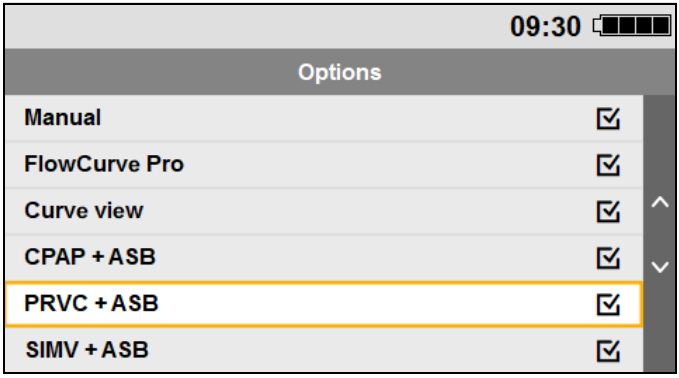


2. Select the **Enable option** menu item.

WM 67891a 2024-08



3. Enter the enable code using the navigation knob.
4. Confirm the enable code with **OK**.
   The display shows the enabled option in the Options menu item of the operator menu.



5. If necessary: Activate or deactivate the option.
6. To exit the operator menu, select **Back**.

WM 67891a 2024-08

9.6.2 Description of options

The options that must be enabled and activated for a ventilation mode are described in chapter Ventilation modes (see 10.4, p. 160).

Options	Description
S-IPPV	Allows the volume-controlled S-IPPV ventilation mode (see 10.4.10, p. 176).
SIMV	Allows the volume-controlled SIMV ventilation mode (see 10.4.8, p. 173).
Manual	Allows the volume-controlled Manual ventilation mode (see 10.4.11, p. 178).
FlowCurve Pro	Enables flow measurement with the FlowCheck sensor, the curve view and the following ventilation modes with Assisted Spontaneous Breathing (+ ASB).
Curve view	Enabled with the FlowCurve Pro option. Enables the following curves to be displayed: • Pressure • Flow
CPAP + ASB	Enabled with the FlowCurve Pro option. Allows the pressure-controlled CPAP + ASB ventilation mode (see 10.4.4, p. 165).
PRVC + ASB	Curve view must be activated. Allows the pressure-controlled PRVC + ASB ventilation mode (see 10.4.7, p. 171).
SIMV + ASB	Enabled with the FlowCurve Pro option. Allows the volume-controlled SIMV + ASB ventilation mode (see 10.4.9, p. 174).
PCV	Enabled with the pressure-controlled ventilation modes option. Allows the pressure-controlled PCV ventilation mode.
aPCV	Enabled with the pressure-controlled ventilation modes option. Allows the pressure-controlled aPCV ventilation mode.
BiLevel + ASB	Enabled with the pressure-controlled ventilation modes option. Allows the pressure-controlled BiLevel + ASB ventilation mode.
CBRN	Enables the use of a CBRN filter.

WM 67891a 2024-08

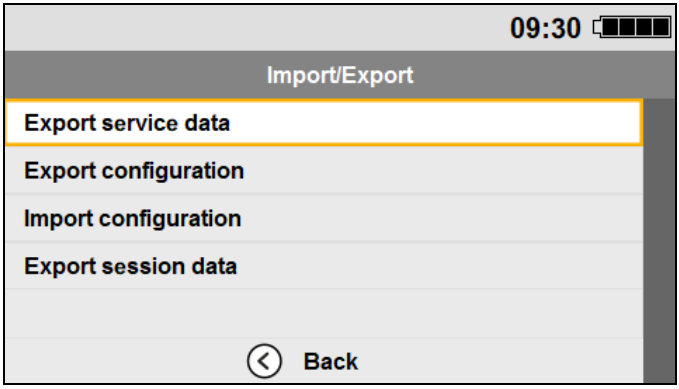
Only available in selected countries:	
CPAP + PS	Allows the pressure-controlled CPAP + PS ventilation mode (see 10.4.12, p. 180).
PRVC + PS	Allows the pressure-controlled PRVC + PS ventilation mode (see 10.4.13, p. 182).

9.7 Importing/exporting data

Prerequisite

- There is an SD card in the device (see "4.5.1 Inserting the SD card", page 63).
- The operator menu is activated (see "9.1 Activating operator menu", page 139).

1. Select the **Import/Export** menu item.



2. Use the navigation knob to select one of the following actions:
   - **Export service data**
     The device saves existing service data and function check results to the SD card (see "16.10 Service data", page 229).
   - **Export configuration**
     The device saves the current configuration to the SD card.
   - **Import configuration**
     The device imports a configuration from the SD card and applies the configuration.

WM 67891a 2024-08

- **Export session data**
  The device copies the internally saved session data to the SD card (see "16.10.3 Recorded session data", page 230).

Result Data has been imported/exported. The device places a green check mark against the executed action ✔.

9.8 Software update

9.8.1 Performing a software update

Prerequisite

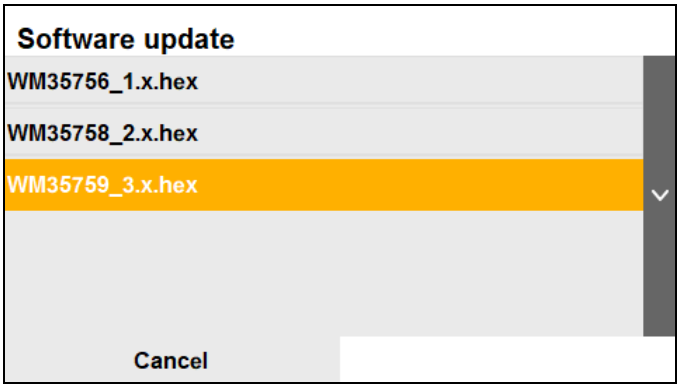
- The device is connected to line power.
- The operator menu is activated (see "9.1 Activating operator menu", page 139).

NOTICE

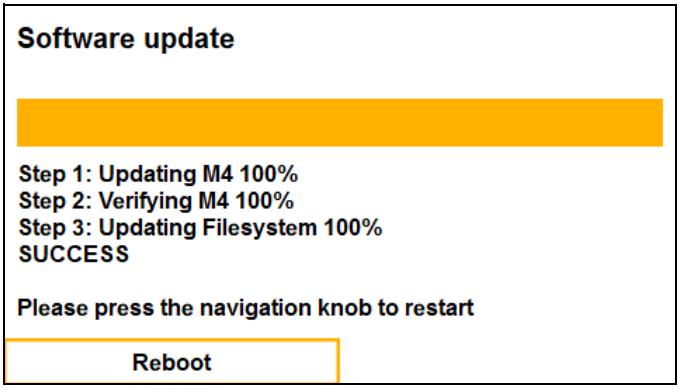
Material damage resulting from malfunctions during updating of the device software!
Moving the device and/or pressing buttons during the update process may cancel the update and damage the device.
⇒ Do not turn the device off during the update.
⇒ Do not disconnect the device from line power during the update.
⇒ Do not move the device during the update.
⇒ Do not press any buttons on the device during the update.
⇒ Do not remove the SD card during the update.

1. If the software is available as a ZIP file: Unzip the zip file. The software is in the unzipped folder in the form of a file called **WM#####-x.x.hex**. The file name of the hex file corresponds to the article number of the software and the software version.
2. Save the file on the SD card.
   Please note: The software update file must not be in a folder.
3. Insert the SD card (see "4.5.1 Inserting the SD card", page 63).
4. Select the menu item **Software update** in the operator menu. The files on the SD card are displayed.

WM 67891a 2024-08



5. Select the latest software version **WM#####-x.x.hex** using the navigation knob.
6. Press the navigation knob to start the software update.
   The device updates the software in several steps. When the procedure is complete, the message **SUCCESS** appears on the display.



7. Press the navigation knob to restart the device.
   The device restarts. The start menu appears on the display.
8. Perform a function check (see "5 Function check", page 66).

Result The software update has been carried out.

WM 67891a 2024-08

After the software update, information on it is saved in the update.txt file on the SD card. You can use a word processing program to open the file as well as to print it out and sign it.

```
Softwareupdate durchgeführt / software update performed:
Datum / date: 2019-05-15 21:30:37
Seriennummer / serial number: 89
Updatedatei / update file: WM35756-X.XX.hex


Unterschrift / signature:
```

9.9 Device information

Parameter		Description
Serial numbers	Device	Here you can find out the device serial number. This is located on the device information label.
	Mainboard	Here you can find out the mainboard serial number.
	Blower	Here you can find out the blower serial number.
Device ID	Device ID	Here you can find out the device ID. This is required to procure optional functions.
Counters	Days until next device check	Here you can find out the number of days remaining until the next device check is due.
	Days until next maintenance	Here you can find out the number of days remaining until the next maintenance is due.
	Last passed function check	Here you can find out the last time a function check was passed.
Version number	Software version	Here you can find out which software version is currently installed on the device.

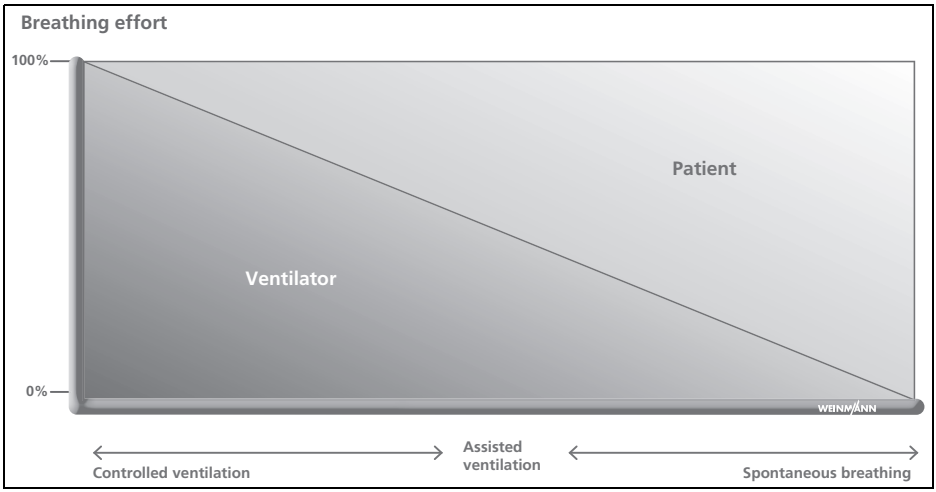
9.10 Battery information

Parameter		Description
Battery data	Serial number	Here you can find out the serial number of the rechargeable battery.
	Date of manufacture	Here you can find out the date of manufacture of the rechargeable battery.
	Temperature	Here you can find out the temperature of the rechargeable battery.
	Charging cycles	Here you can find out how many charging cycles the rechargeable battery has already completed.
	Full charge capacity	Here you can find out the capacity of the rechargeable battery when fully charged.
	Remaining charge	Here you can find out the remaining charge of the rechargeable battery.
	Relative state of charge	Here you can find out the relative state of charge of the rechargeable battery in %.
	Battery voltage	Here you can find out the battery voltage measured by the rechargeable battery itself.
	Cell voltage 1	Here you can find out the voltage of the first internal battery cell.
	Cell voltage 2	Here you can find out the voltage of the second internal battery cell.
	Cell voltage 3	Here you can find out the voltage of the third internal battery cell.
	Battery current	Here you can find out the current value for battery current.
	Maximum error	Here you can find out the rechargeable battery's own estimate of the accuracy of capacity calculation.
	Status word	Here different states of the rechargeable battery are displayed in encoded form.
Device data	Battery voltage	Here the battery voltage measured by the device is displayed.
	Line voltage	Here the line voltage measured by the device is displayed.

WM 67891a 2024-08

10 Ventilation modes

10.1 Classification of ventilation modes



The following ventilation modes are possible with the device:

Control parameters	Controlled ventilation	Assisted ventilation	Spontaneous breathing
Pressure	PCV	aPCV BiLevel + ASB PRVC + ASB	CPAP CPAP + ASB
Volume	IPPV	S-IPPV SIMV SIMV + ASB	Manual

Depending on the enabled options, different ventilation modes are available in the device (see "9.6.2 Description of options", page 149).

WM 67891a 2024-08

10.2 Trigger options

The following trigger options are available in the individual ventilation modes:

Ventilation mode	Inspiratory trigger	Expiratory trigger	Trigger window for mandatory mechanical breaths	ASB breath
IPPV	No	No	No	No
BiLevel + ASB	Yes	Yes	20 % of Te	Yes
CPAP + ASB	Yes	Yes	No	Yes
aPCV	Yes	No	Adjustable 0 % to 100 % of Te	No
PCV	No	No	No	No
PRVC + ASB	Yes	Yes	20 % of Te	Yes
SIMV + ASB	Yes	Yes	20 % of Te	Yes
S-IPPV	Yes (Adjustable with FlowCurve Pro option)	No	100 % of Te	No
CPAP	No	No	No	No
SIMV	Yes	No	20 % of Te	No
Only available in selected countries:				
CPAP + PS	Yes	No	No	No
PRVC + PS	Yes	No	20 % of Te	No

WM 67891a 2024-08

10.3 Ventilation parameters and measured values

The ventilation parameters and measured values displayed depend on the selected ventilation mode.

Unit of pressure: The unit (mbar, cmH_2O, hPa) can be specified in the device settings (see "9.3 Device settings", page 141).

10.3.1 Ventilation parameters

Ventilation parameter	Unit	Description
Press. ramp	3 levels	Speed of pressure rise
ExTr	% flow	Expiratory trigger (setting with units)
Freq.	1/min	Ventilation rate
I:E	–	Ratio of inspiration to expiration
InTr	l/min	Inspiratory trigger (setting with units)
PEEP	mbar	Positive end-expiratory pressure
pInsp	mbar	Inspiratory pressure
pMax	mbar	Maximum ventilation pressure
Trigger	% Te	Trigger window
Vt	ml	Tidal volume (breath volume)
ΔpASB	mbar	Pressure support (relative to the set PEEP)
Only ventilation modes CPAP + PS and PRVC + PS (only available in selected countries)		
InTr (Level)	3 levels	Inspiratory trigger (3-level setting)
ΔpPS	mbar	Pressure support

- If the FlowCurve Pro option is not activated:
  If the set PEEP value is > 0 mbar, the patient must generate a negative pressure of at least -1.2 mbar below the set PEEP value through their spontaneous breathing effort in order to initiate an inspiratory trigger of the device.

WM 67891a 2024-08

- If the FlowCurve Pro option is not activated:
  If no PEEP value is set (PEEP value = 0), the patient must generate a negative pressure of at least -0.8 mbar to initiate an inspiratory trigger. When using assisted ventilation modes, ensure that the patient is making sufficient efforts to breathe. If this is not the case, the trigger sensitivity can be increased by setting a PEEP value > 2 mbar. If the patient is still unable to initiate a trigger, the mandatory frequency must be set high enough to ensure that the patient receives adequate ventilation.
- If the FlowCurve Pro option is activated, you can set the inspiratory trigger independently of PEEP.
- The ventilation parameters are mutually interdependent. Example: pMax is always greater than the PEEP value (see "6.6 Changing ventilation parameters", page 86).

10.3.2 Measured values

Measured value	Unit	Description
f(fsp)	1/min	• f indicates the total respiratory rate per minute. • (fsp) indicates the number of spontaneous breaths per minute.
MVe	l/min	Indicates the expiratory minute volume.
MVi	l/min	Indicates the inspiratory minute volume.
O_2i	%	Displays the oxygen concentration delivered.
pMean	mbar	Mean pressure: Displays the mean pressure across all measured pressure values during a ventilation cycle.
pPeak	mbar	Peak pressure: Displays the maximum pressure during a ventilation cycle.
pPlat	mbar	Plateau pressure: Displays the pressure during the plateau time of the ventilation cycle.

WM 67891a 2024-08

Measured value	Unit	Description
Vleak	% Vti	Leakage: Displays the leakage. If a test lung is connected, the Vleak value may be displayed as a false positive. Cause: The measurement of the device is calibrated to air with BTPS values. The leakage values displayed are caused by the dry air in the test lung.
Vte	ml	Indicates the expiratory tidal volume.

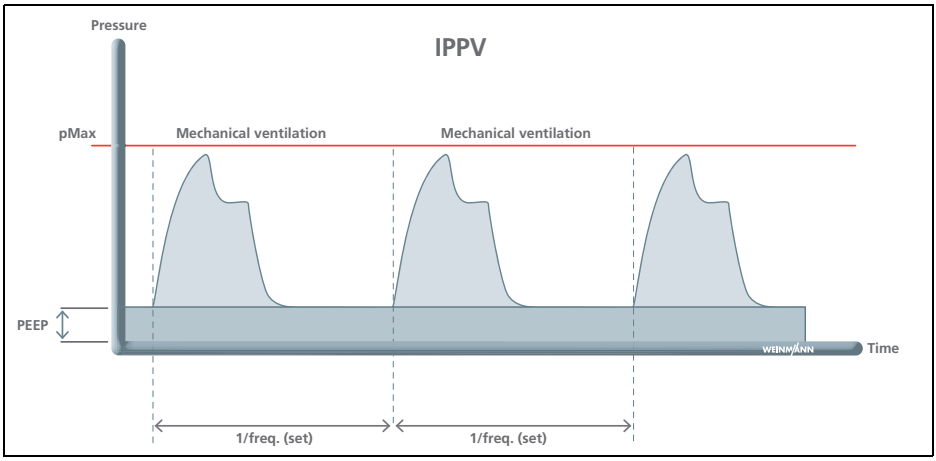
WM 67891a 2024-08

10.4 Description of the ventilation modes

10.4.1 IPPV

Description	
Abbreviation	IPPV
Long form	Intermittent Positive Pressure Ventilation
Type	Volume-controlled
Prerequisite	None
Ventilation parameters	**Measured values**
• pMax • Freq. • Vt • PEEP • I:E	• O_2i • MVi • f(fsp) • pMean With FlowCurve Pro option: • O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak

WM 67891a 2024-08

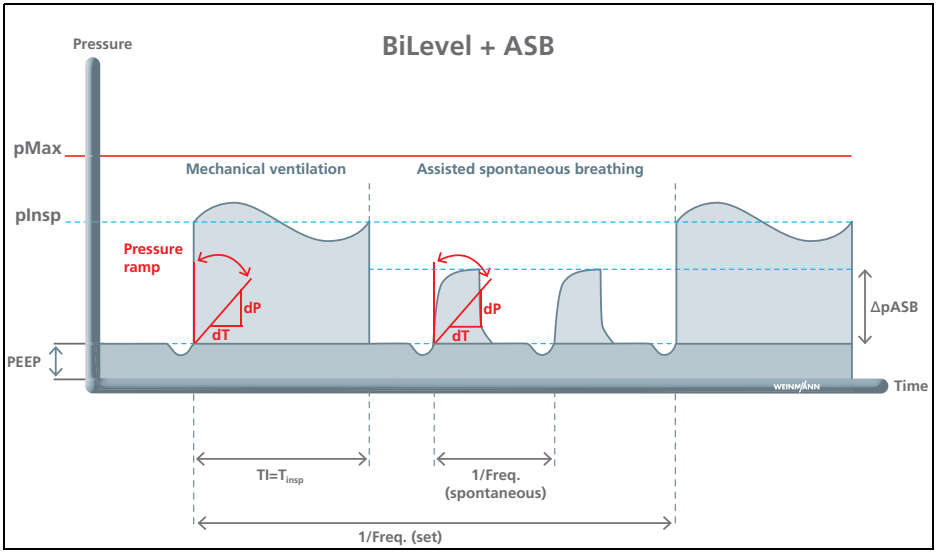


IPPV mode is used for mandatory, volume-controlled ventilation at a fixed tidal volume. This mode is used on patients who have no spontaneous breathing. However, a spontaneously breathing patient can breathe deeply and freely during expiration. The set maximum pressure limit (pMax) ensures the safety of the patient.

WM 67891a 2024-08

10.4.2 BiLevel + ASB (optional)

Description	
Abbreviation	BiLevel + ASB
Long form	Ventilation at two pressure levels + Assisted Spontaneous Breathing
Type	Pressure-controlled
Prerequisites	• FlowCurve Pro option has been activated. • Curve view option has been activated. • Pressure-controlled ventilation modes option: BiLevel + ASB has been activated.
Ventilation parameter	**Measured values**
• pMax • Freq. • pInsp • PEEP • ΔpASB • InTr • ExTr • I:E • Press. ramp	• O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak



WM 67891a 2024-08

BiLevel + ASB mode is used for pressure-controlled ventilation combined with free spontaneous respiration at pressure levels pInsp and PEEP during the entire ventilation cycle and adjustable pressure support at PEEP level. This mode is used on patients who have no spontaneous respiration or on spontaneously breathing patients. The patient can trigger a mandatory, pressure-controlled mechanical breath during a predetermined trigger time window. The trigger time window is 20 % of the expiratory time Te before the anticipated mandatory mechanical breath. For the rest of the time, the patient can breathe spontaneously or breathe spontaneously with the aid of pressure support. The tidal volume and minute volume are determined by the set pInsp, lung compliance, and the set inspiratory time Ti.

10.4.3 CPAP

⚠ WARNING

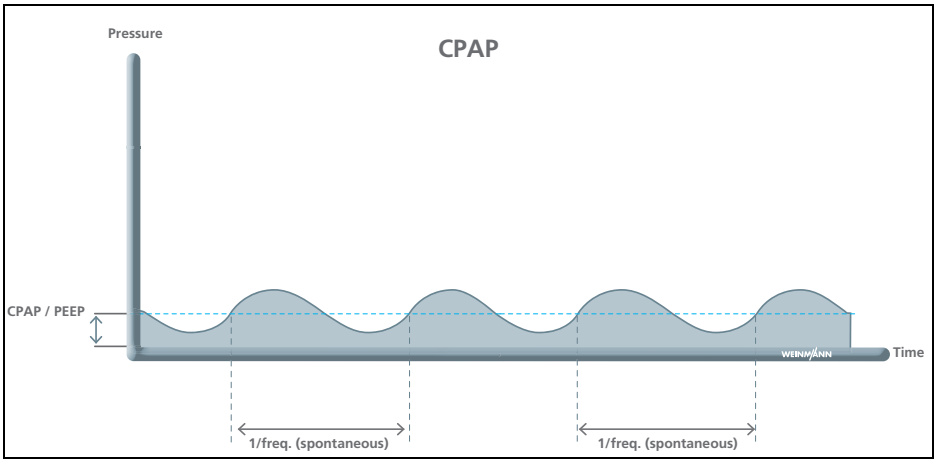
Hazardous therapy as a result of an unsuitable ventilation mode!

In the CPAP ventilation mode, patients do not receive any mandatory mechanical breaths. In patients with inadequate spontaneous breathing or respiratory arrest, use of this mode might lead to hypoventilation, and cause the patient serious or life-threatening injury.

⇒ Use CPAP mode only on patients with adequate spontaneous breathing.

⇒ Continuously monitor the patient and device during ventilation.

Description	
Abbreviation	CPAP
Long form	Continuous Positive Airway Pressure
Type	Pressure-controlled
Prerequisite	None
Ventilation parameters	**Measured values**
PEEP	• O_2i • MVi • f(fsp) • pMean



The CPAP/PEEP setting increases the lower pressure level during spontaneous breathing. This results in an increase in the functional residual capacity of spontaneously breathing patients. The patient is able to breathe spontaneously without any restriction at the set pressure level. Pressure is generally set at the end of expiration (PEEP).

If ventilation is started via **New patient** with the CPAP ventilation mode, pMax is automatically reduced to 20 mbar.

WM 67891a 2024-08

10.4.4 CPAP + ASB (optional)

⚠ WARNING

Hazardous therapy as a result of an unsuitable ventilation mode!

In the CPAP + ASB ventilation mode, patients do not receive any mandatory mechanical breaths. In patients with inadequate spontaneous breathing or respiratory arrest, use of this mode might lead to hypoventilation, and cause the patient serious or life-threatening injury.

⇒ Use CPAP + ASB mode only on patients with adequate spontaneous breathing.

⇒ Continuously monitor the patient and device during ventilation.

⚠ WARNING

Risk of asphyxia as a result of aspiration!

Mask ventilation at excessive ventilation pressures may lead to gastric insufflation and aspiration of stomach contents. This may cause serious or life-threatening injury to the patient.

⇒ Avoid high pressures during mask ventilation.

⚠ CAUTION

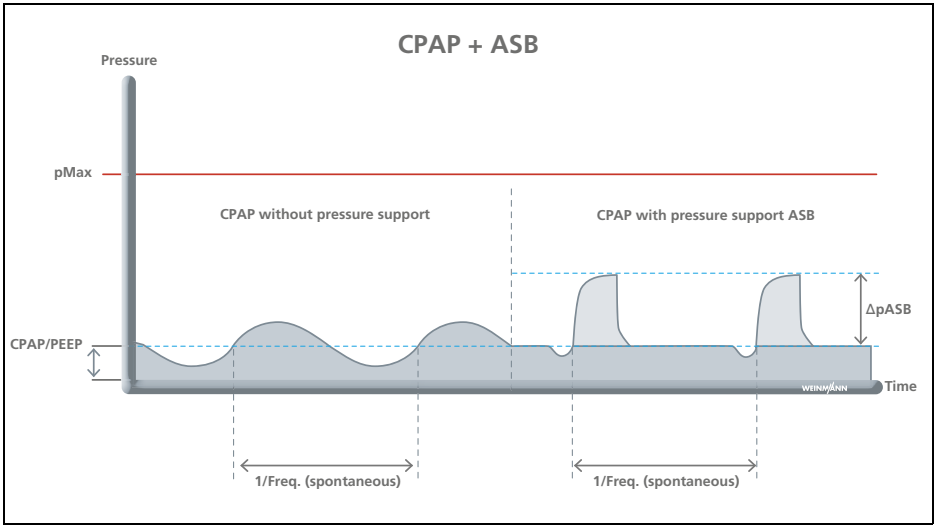
Risk of injury from autotriggering!

Automatic triggering of the inspiratory trigger by artifacts (autotriggers) can lead to the patient hyperventilating.

⇒ Reduce the sensitivity of the inspiratory trigger in the event of autotriggers.

WM 67891a 2024-08

Description	
Abbreviation	CPAP + ASB
Long form	Continuous Positive Airway Pressure + Assisted Spontaneous Breathing
Type	Pressure-controlled
Prerequisite	FlowCurve Pro option has been activated.
Ventilation parameters	**Measured values**
• pMax • PEEP • ΔpASB • InTr • ExTr • Press. ramp	• O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak



CPAP + ASB mode can be separated into its individual elements:

- The CPAP/PEEP set value is used to increase the pressure level of breathing in order to raise the functional residual capacity (FRC) of spontaneously breathing patients.

WM 67891a 2024-08

- The ASB function is used for pressure support of insufficient or exhausted spontaneous breathing. Proximal flow measurement enables optimum triggering and leakage compensation. The patient is able to breathe spontaneously without any restriction, but is supported in his or her breathing effort by the device.

If ventilation is started via **New patient** with the CPAP + ASB ventilation mode, pMax is automatically reduced to 20 mbar.

Pressure is generally set at the end of expiration (PEEP). If necessary, pressure support (ΔpASB) can also be switched on. Ventilation can be individually adapted to the patient with the aid of the inspiratory trigger. The inspiratory trigger indicates the sensitivity for triggering of pressure support. The expiratory trigger* determines when the device cancels pressure support. This allows the administered volume and inspiration time to be set indirectly. The set maximum pressure limit (pMax) ensures the safety of the patient.

*Corresponds to a permanently set value of 35 % of maximum inspiratory flow.

WM 67891a 2024-08

10.4.5 aPCV (optional)

⚠ WARNING

Risk of hyperventilation!
When using the aPCV mode, the CO_2 concentration in the patient's blood may decrease and injure the patient.
⇒ Continuously monitor airway pressure and respiratory volume.
⇒ Monitor the patient continuously.

⚠ WARNING

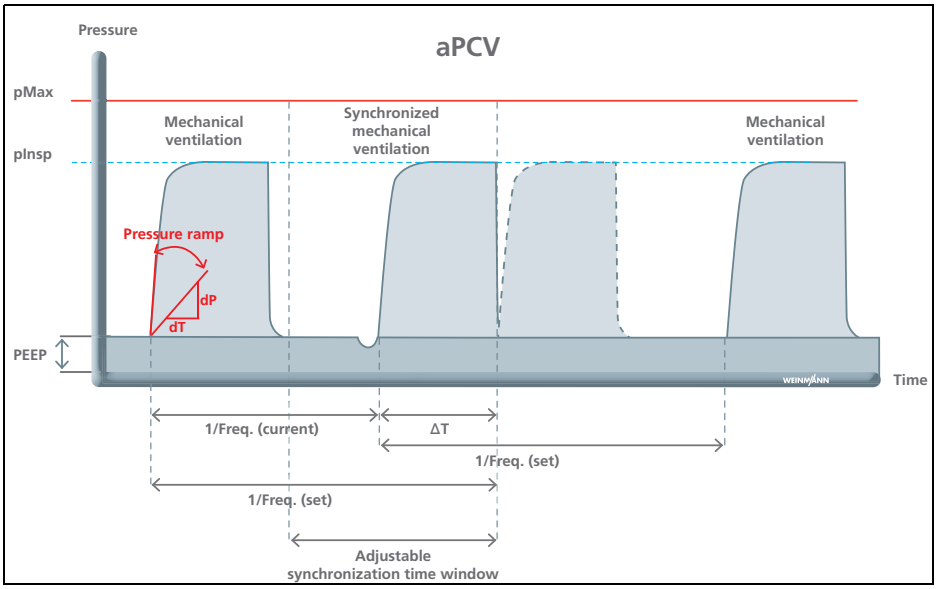
Risk of air trapping!
When using aPCV mode, air might get trapped in the patient's lung. This leads to reduced gas exchange and can injure the patient.
⇒ Continuously monitor airway pressure and respiratory volume.
⇒ Adjust the pressure limit.
⇒ Monitor the patient continuously.

⚠ WARNING

Risk of intrinsic PEEP!
If the expiration phase is too short, pressure might rise slowly at the end of it and injure the patient.
⇒ Continuously monitor airway pressure and respiratory volume.
⇒ Adjust the pressure limit.
⇒ Monitor the patient continuously.

Description	
Abbreviation	aPCV
Long form	Assisted Pressure Controlled Ventilation
Type	Pressure-controlled
Prerequisite	• FlowCurve Pro option has been activated. • Curve view option has been activated. • Pressure-controlled ventilation modes option: aPCV has been activated.
Ventilation parameter	**Measured values**
• pMax • Freq. • pInsp • PEEP • InTr • Trigger window • I:E • Press. ramp	• O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak

WM 67891a 2024-08

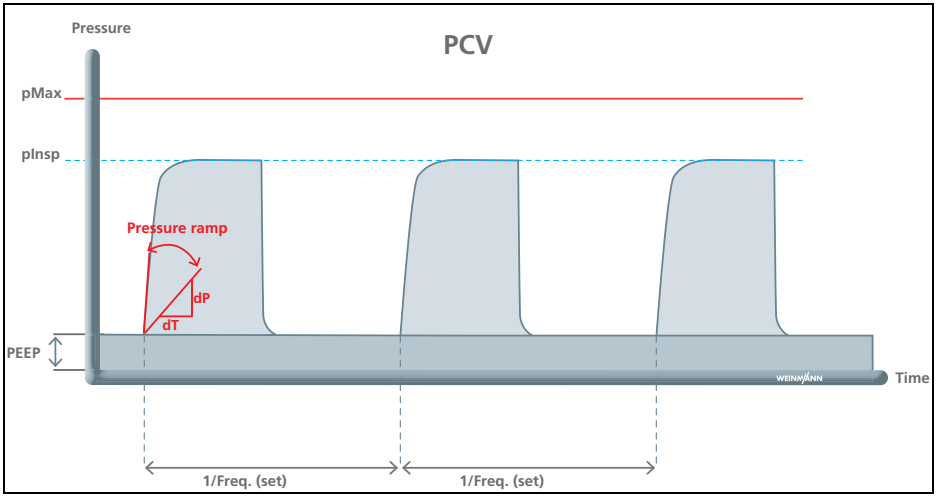


aPCV mode is used for assisted pressure-controlled ventilation at a fixed mandatory ventilation rate. In case of spontaneous respiration, the patient has the possibility of increasing the rate and consequently the minute volume. If the patient displays a spontaneous respiratory effort within a specified time window of the expiration, the mandatory mechanical breath is synchronized with the patient's respiration. The time window or trigger window can be set in % of Te before the next anticipated mandatory mechanical breath. If the patient displays a spontaneous respiratory effort outside of the set trigger time window, no mandatory mechanical breath is triggered.

WM 67891a 2024-08

10.4.6 PCV (optional)

Description	
Abbreviation	PCV
Long form	Pressure Controlled Ventilation
Type	Pressure-controlled
Prerequisites	• FlowCurve Pro option has been activated. • Curve view option has been activated. • Pressure-controlled ventilation modes option: PCV has been activated.
Ventilation parameter	**Measured values**
• pMax • Freq. • pInsp • PEEP • Press. ramp • I:E	• O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak



WM 67891a 2024-08

The PCV mode is used for mandatory pressure-controlled ventilation with fixed pressure levels and with a fixed set ventilation frequency. This mode is used on patients who have no spontaneous breathing. However, a spontaneously breathing patient can breathe deeply and freely during expiration. The set maximum ventilation pressure (pMax) ensures the safety of the patient.

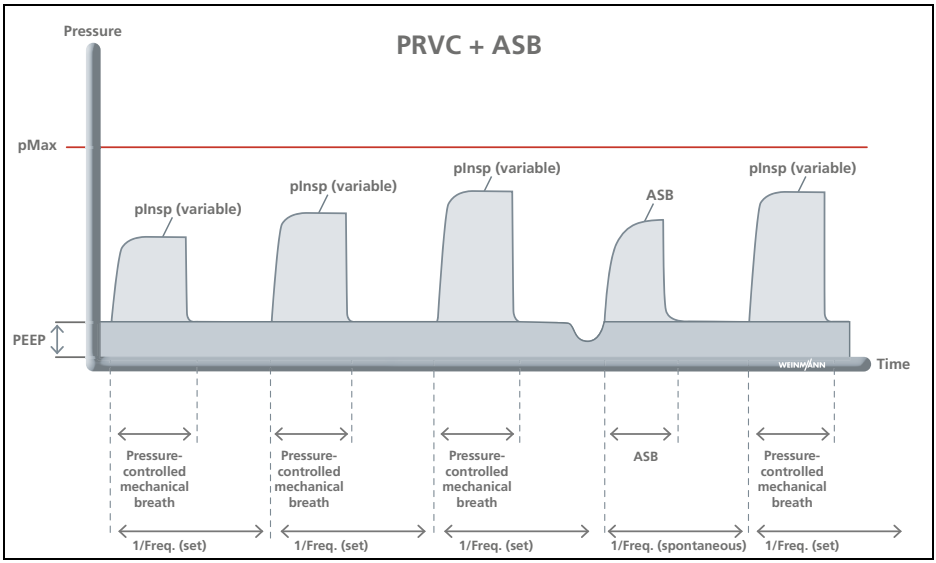
10.4.7 PRVC + ASB (optional)

⚠ CAUTION

Risk of injury from autotriggering!
Automatic triggering of the inspiratory trigger by artifacts (autotriggers) can lead to the patient hyperventilating.
⇒ Reduce the sensitivity of the inspiratory trigger in the event of autotriggers.

Description	
Abbreviation	PRVC + ASB
Long form	Pressure Regulated Volume Controlled Ventilation + Assisted Spontaneous Breathing
Type	Pressure-controlled
Prerequisite	• FlowCurve Pro option has been activated. • Pressure-controlled ventilation modes option has been activated.
Ventilation parameter	**Measured values**
• pMax • Freq. • Vt • PEEP • ΔpASB • InTr • ExTr • I:E • Press. ramp	• O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak

WM 67891a 2024-08



PRVC + ASB mode combines the benefits of pressure-controlled and volume-controlled ventilation. The set tidal volume is administered with the minimum ventilation pressure possible. Ventilation starts at low ventilation pressures(pInsp) and reaches target volume after a few mechanical breaths. In the phase between mandatory mechanical breaths, the patient can breathe spontaneously at CPAP level or trigger pressure support (ASB). If triggers are triggered within the trigger window (20 % before the mandatory breath), the mandatory breath is synchronized.

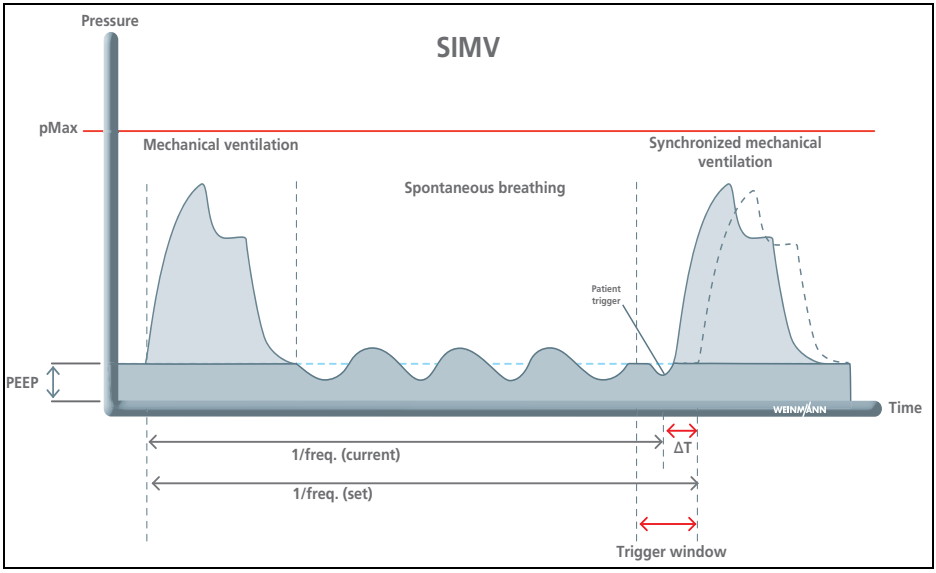
Proximal flow measurement can be used to precisely measure the administered volumes and adjust the ventilation pressure according to the situation. If lung parameters change during ventilation, the device alters inspiratory pressure pInsp in order to achieve the set tidal volume again and thereby automatically compensate for changes in the patient. Measuring the volume administered is improved by compensating hose compliance. This enables precise control of the required tidal volume, in particular at low tidal volumes under high airway pressures. The set maximum pressure limit (pMax) ensures the safety of the patient. For safety reasons, the maximum inspiratory pressure (pInsp) is at the level of the pressure limit (pMax).

WM 67891a 2024-08

If the volume achieved deviates from the set tidal volume, the device triggers the medium-priority alarm **Vt not achievable**.

10.4.8 SIMV (optional)

Description	
Abbreviation	SIMV
Long form	Synchronized Intermittent Mandatory Ventilation
Type	Volume-controlled
Prerequisite	SIMV option has been activated.
Ventilation parameters	**Measured values**
• pMax • Freq. • Vt • PEEP • InTr • I:E	• O_2i • MVi • f(fsp) • pMean

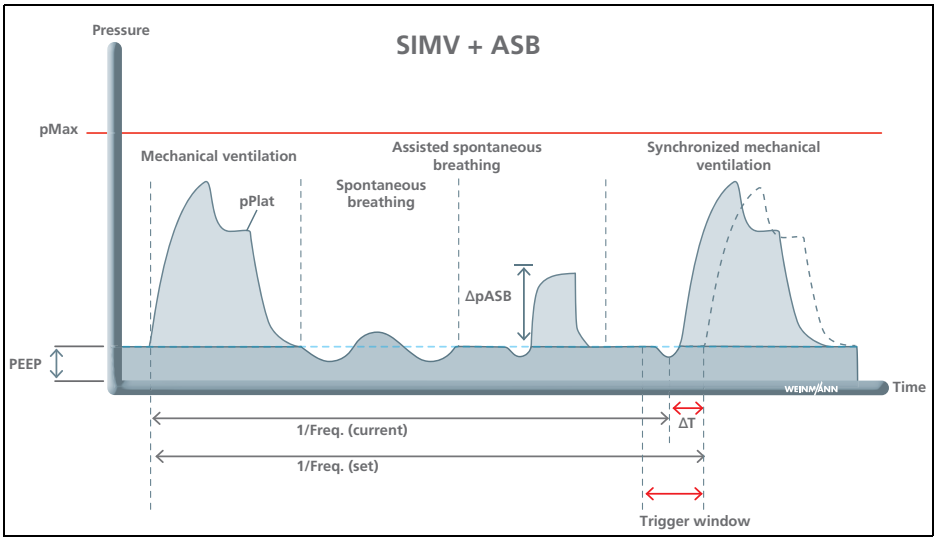


The SIMV mode is used for volume-controlled ventilation at a fixed mandatory minute volume. The patient can breathe spontaneously between mandatory mechanical breaths, thereby increasing minute volume. Ventilation can be individually adapted to the patient with the aid of the inspiratory trigger. During spontaneous breathing, the mandatory mechanical breath is synchronized with the patient's breathing. The mandatory minute volume and mandatory respiratory rate remain unchanged in this instance. The set maximum pressure limit (pMax) ensures the safety of the patient.

10.4.9 SIMV + ASB (optional)

Description	
Abbreviation	SIMV + ASB
Long form	Synchronized Intermittent Mandatory Ventilation + Assisted Spontaneous Breathing
Type	Volume-controlled
Prerequisite	FlowCurve Pro option has been activated.
Ventilation parameters	**Measured values**
• pMax • Freq. • Vt • PEEP • ΔpASB • InTr • ExTr • I:E	• O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak

WM 67891a 2024-08



SIMV + ASB mode is used for volume-controlled ventilation at a fixed mandatory minute volume. The patient can breathe spontaneously between mandatory mechanical breaths, thereby increasing minute volume. During spontaneous breathing, the mandatory mechanical breath is synchronized with the patient's breathing. The mandatory minute volume and mandatory respiratory rate remain unchanged in this instance. Once the maximum ventilation pressure (pMax) has been reached, the device maintains the pMax until the end of the inspiratory time and then switches to expiration. It is therefore possible that the set tidal volume will not be fully applied if the maximum ventilation pressure (pMax) has been reached during inspiration. The patient can trigger a mandatory, pressure-controlled mechanical breath during a predetermined trigger time window. The trigger time window is available in the final 20 % of expiratory time Te. For the rest of the time, the patient can breathe spontaneously or breathe spontaneously with the aid of pressure support (see "10.4.4 CPAP + ASB (optional)", page 165).

WM 67891a 2024-08

10.4.10 S-IPPV (optional)

⚠ WARNING

Risk of hyperventilation!
When using S-IPPV mode, the CO_2 concentration in the patient's blood might decrease and expose the patient to the risk of serious or life-threatening injury.
⇒ Continuously monitor airway pressure and respiratory volume.
⇒ Monitor the patient continuously.

⚠ WARNING

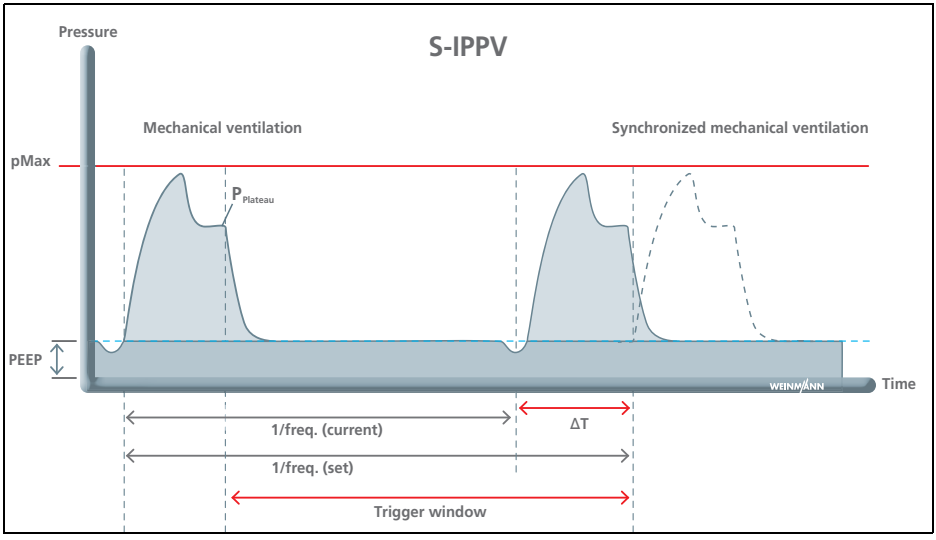
Risk of air trapping!
When using S-IPPV mode, air might get trapped in the patient's lung and result in reduced gas exchange. This may cause serious or life-threatening injury to the patient.
⇒ Continuously monitor airway pressure and respiratory volume.
⇒ Adjust the pressure limit.
⇒ Monitor the patient continuously.

⚠ WARNING

Risk of intrinsic PEEP!
If the expiration phase is too short, pressure might rise slowly at the end of it. This may cause serious or life-threatening injury to the patient.
⇒ Continuously monitor airway pressure and respiratory volume.
⇒ Set the pressure limit correctly.
⇒ Monitor the patient continuously.

WM 67891a 2024-08

Description	
Abbreviation	S-IPPV
Long form	Synchronized Intermittent Positive Pressure Ventilation
Type	Volume-controlled
Prerequisite	S-IPPV option has been activated.
Ventilation parameters	**Measured values**
• pMax • Freq. • Vt • PEEP • InTr • I:E	• O_2i • MVi • f(fsp) • pMean With FlowCurve Pro option: • O_2i • MVe • f(fsp) • Vte • pPeak • pPlat • pMean • Vleak



WM 67891a 2024-08

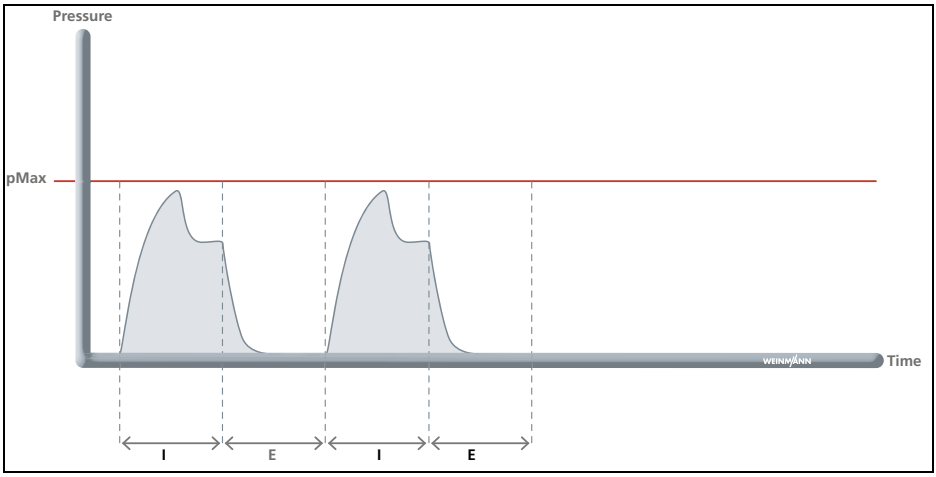
S-IPPV mode is used for volume-controlled ventilation at a variable mandatory minute volume. Throughout the entire expiratory phase, a trigger is active which enables the patient to trigger a new mechanical breath. This means the patient is able to increase his or her respiratory rate – and thus minute volume – as needed. As a rule, this mode is used on patients who have inadequate spontaneous breathing. Ventilation can be individually adjusted to match the patient with the aid of the inspiratory triggers.

Ventilation in S-IPPV mode is the same as ventilation in IPPV mode, except that synchronization with the patient's attempts to inhale is possible. Since the setting for respiratory rate is lower, the patient can trigger mandatory mechanical breaths spontaneously.
A trigger window extending throughout the expiratory time is available for this synchronization.

10.4.11 Manual

Description	
Abbreviation	Manual
Long form	Manual mode
Type	Volume-controlled
Prerequisite	MEDUtrigger is connected
Ventilation parameters	**Measured values**
• pMax • Vt	• Supply value for 100 % oxygen • O_2i • MVi • MVe (with FlowCurve Pro option)
The setting loaded when you change to Manual mode is specified in the presets for the patient group in the operator menu.	

WM 67891a 2024-08



Manual mode is used to support cardiopulmonary resuscitation (according to the resuscitation guidelines), rapid sequence induction (RSI) or manual ventilation in place of a bag-valve mask. In the ventilation phase, mechanical breaths are administered at a defined volume and pressure limit (manually) using the trigger button of the MEDUtrigger. In this process, the I:E ratio is always 1:1. PEEP is 0 mbar and cannot be adjusted. The set pressure limit (pMax) ensures the safety of the patient. The basis for calculating the value of O_2 to be supplied is the algorithm 30:2. (In this case, 2 mechanical breaths are administered in quick succession with a subsequent pause in ventilation.)

For dispensing the maximum possible oxygen concentration in the inspiratory gas (O_2i) during resuscitation, a feed-in value is shown on the display. This value depends on the tidal volume, and indicates how much oxygen is to be supplied to the device.

If Manual mode is used to administer a regular frequency, we recommend basing the oxygen concentration setting on the MVi displayed.

In order to achieve the shortest-possible hands-off time during resuscitation, during CPR 30:2, keep the MEDUtrigger depressed during the ventilation pause until two inspirations have been delivered.
Press the trigger button again to trigger up to another 2 mechanical breaths.

10.4.12 CPAP + PS (optional)

The CPAP + PS mode is only available in selected countries.

⚠ WARNING

Hazardous therapy as a result of an unsuitable ventilation mode!
In the CPAP + PS ventilation mode, patients do not receive any mandatory mechanical breaths. In patients with inadequate spontaneous breathing or respiratory arrest, use of this mode might lead to hypoventilation, and cause the patient serious or life-threatening injury.
⇒ Use CPAP + PS mode only on patients with adequate spontaneous breathing.
⇒ Continuously monitor the patient and device during ventilation.

⚠ WARNING

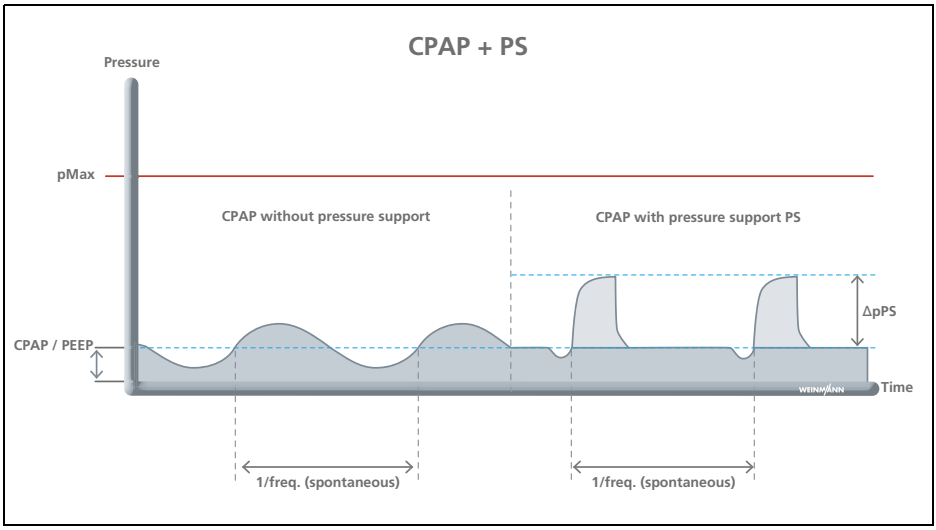
Risk of asphyxia as a result of aspiration!
Mask ventilation at excessive ventilation pressures may lead to gastric insufflation and aspiration of stomach contents. This may cause serious or life-threatening injury to the patient.
⇒ Avoid high pressures during mask ventilation.

⚠ CAUTION

Risk of injury from autotriggering!
Automatic triggering of the inspiratory trigger by artifacts (autotriggers) can lead to the patient hyperventilating.
⇒ Reduce the sensitivity of the inspiratory trigger in the event of autotriggers.

Description	
Abbreviation	CPAP + PS
Long form	Continuous Positive Airway Pressure + Pressure Support
Type	Pressure-controlled
Prerequisite	CPAP + PS option has been activated.
Ventilation parameters	**Measured values**
• pMax • ΔpPS • PEEP • InTr	• O_2i • MVi • f(fsp) • pMean

WM 67891a 2024-08



CPAP + PS mode can be separated into its individual elements:

- The CPAP/PEEP set value is used to increase the pressure level of breathing in order to raise the functional residual capacity (FRC) of spontaneously breathing patients.
- The PS function is used for pressure support of insufficient or exhausted spontaneous breathing. The patient is able to breathe spontaneously without any restriction, but is supported in his or her breathing effort by the device.

If ventilation is started via **New patient** with the CPAP + PS ventilation mode, pMax is automatically reduced to 20 mbar.

Pressure is generally set at the end of expiration (PEEP). If necessary, pressure support (ΔpPS) can also be switched on. Ventilation can be individually adapted to the patient with the aid of the inspiratory trigger. The inspiratory trigger indicates the sensitivity for triggering of pressure support. The expiratory trigger* determines when the device cancels pressure support. This allows the administered volume and inspiration time to be set indirectly. The set maximum pressure limit (pMax) ensures the safety of the patient.

*Corresponds to a permanently set value of 35 % of maximum inspiratory flow.

WM 67891a 2024-08

10.4.13 PRVC + PS (optional)

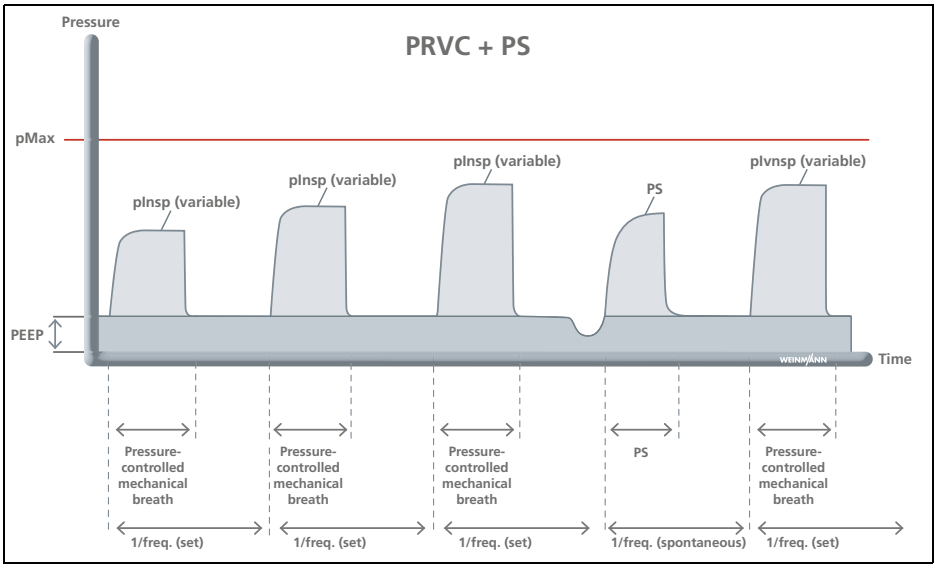
The PRVC + PS mode is only available in selected countries.

⚠ CAUTION

Risk of injury from autotriggering!
Automatic triggering of the inspiratory trigger by artifacts (autotriggers) can lead to the patient hyperventilating.
⇒ Reduce the sensitivity of the inspiratory trigger in the event of autotriggers.

Description	
Abbreviation	PRVC + PS
Long form	Pressure Regulated Volume Controlled Ventilation + Pressure Support
Type	Pressure-controlled
Prerequisite	PRVC + PS option has been activated.
Ventilation parameters	**Measured values**
• pMax • Freq. • Vt • InTr • ΔpPS • PEEP • I:E	• O_2i • MVi • f(fsp) • pMean

WM 67891a 2024-08



PRVC + PS mode combines the benefits of pressure-controlled and volume-controlled ventilation. The set tidal volume is administered with the minimum ventilation pressure possible. Ventilation starts at low ventilation pressures pInsp and reaches target volume after a few mechanical breaths. In the phase between mandatory mechanical breaths, the patient can breathe spontaneously at CPAP level or trigger pressure support (PS). If triggers are triggered within the trigger window (20 % before the mandatory breath), the mandatory breath is synchronized.

The volumes administered are measured and ventilation pressure adapted according to the situation. If lung parameters change during ventilation, the device alters the inspiratory pressure pInsp in order to achieve the set tidal volume again and thereby automatically compensate for changes in the patient. Measuring the volume administered is improved by compensating hose compliance. This enables precise control of the required tidal volume, in particular at low tidal volumes under high airway pressures. The set maximum pressure limit (pMax) ensures the safety of the patient. For safety reasons, the maximum inspiratory pressure (pInsp) is at the level of the pressure limit (pMax).

If the volume achieved deviates from the set tidal volume, the device triggers the medium-priority alarm **Vt not achievable**.

WM 67891a 2024-08

10.5 Equivalence table

The following table is used to match the ventilation modes of MEDUVENT Standard with the systematic codes for ventilation modes in EN ISO 19223:2021

Ventilation mode MEDUVENT Standard	**Systematic code in accordance with EN ISO 19223:2021**	**Comments**
IPPV	CMV-vtPC	–
aPCV	A/C-PC	–
PCV	CMV-PC	–
PRVC + PS	SIMV-vtPC\PS	–
SIMV	SIMV-vtPC\PS	With MEDUVENT Standard, spontaneous breathing efforts directly before the synchronization window are not aborted when the start of the synchronization window is reached.
S-IPPV	A/C-vtPC	–
CPAP	CSV	–
CPAP + PS	CSV-PS	–
BiLevel + ASB	SIMV-PC\PS	In the + ASB ventilation modes, triggering is based on the higher quality proximal flow measurement.
CPAP + ASB	CSV-PS	
PRVC + ASB	SIMV-vtPC\PS	
SIMV + ASB	SIMV-vtPC\PS	
S-IPPV with activated FlowCurve Pro option	A/C-vtPC\PS	

WM 67891a 2024-08

11 Alarms and faults

Alarms are shown in the alarm line of the display in the form of text. The text is displayed with a particular background color as a function of alarm priority:

Alarm color	Priority	Meaning
Red	High priority	High-priority alarms warn of imminent fatal or irreversible patient injuries or of device faults.
Yellow	Medium priority	Medium-priority alarms warn of immediate reversible patient injuries or of minor device faults.
Turquoise	Low priority	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 responds 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 priority: The device displays the alarms in rotation.
- Technical alarms predominate. They cannot be muted. Technical alarms are generated if no ventilation by the device is possible.

WM 67891a 2024-08

11.1 Alarm messages

11.1.1 High-priority alarms (red)

Alarm	Cause	Remedy
Airway pressure high ↑	Obstruction of the patient's airways	Clear the patient's airways.
	Tracheal tube incorrectly positioned	Position tracheal tube correctly.
	pMax set too low	Adapt pMax.
	Tubes kinked or trapped	Route tubes so that they are not kinked or trapped.
Airway pressure low ↓	Breathing circuit leaking	Replace breathing circuit.
	Breathing circuit not correctly connected	Connect breathing circuit correctly.
	Tracheal tube incorrectly positioned	Position tracheal tube correctly.
	Tubes kinked or trapped	Route tubes so that they are not kinked or trapped.
	Ventilation settings incorrect	Adapt the ventilation settings to the patient.
	Mask not positioned correctly or leaking	Ensure mask seals properly or replace it.
Apnea	No spontaneous breathing of the patient in the defined time window	Check the patient's condition. Select mandatory ventilation mode.
Apnea ventilation started (only with CPAP, CPAP + ASB, in selected countries CPAP + PS)	Prerequisite: Apnea ventilation is activated. No spontaneous breathing in the defined time window. The device indicates that it has switched to the selected apnea ventilation mode.	The alarm message is displayed for 20 s. Check the patient's condition. Check the set ventilation mode.
Battery defective (device on battery power without connection to line power)	Battery defective	Run device on rechargeable battery without line power until it switches off. Fully recharge battery. If the device continues to display the alarm: Replace rechargeable battery.

WM 67891a 2024-08

Alarm	Cause	Remedy
Battery empty	Rechargeable battery state of charge low	Connect device to line power and charge rechargeable battery. Keep alternative means of ventilation at the ready.
Check breathing circuit and device filter	Tubes incorrectly connected, kinked or defective	Check breathing circuit.
	Hygiene filter blocked	Check and replace hygiene filter.
Device temperature high ↑	Device temperature > 70 °C	Operate device within permitted temperature range (see "16 Technical data", page 210).
Device temperature low ↓	Device temperature < -20 °C	
Expiratory minute volume high ↑	Upper limit value exceeded	Adapt the ventilation settings to the patient.
Expiratory minute volume low ↓	Lower limit value undershot	
MEDUtrigger disconnected	MEDUtrigger removed from device during manual ventilation	Reconnect MEDUtrigger to device.
Oxygen inlet flow high ↑	Flow setting higher than permitted	Reduce flow setting to a value below 15 l/min.
Patient disconnected	No patient connected	Connect patient to device.
	Mask not positioned correctly or leaking	Ensure mask seals properly or replace it.
PEEP high ↑	Obstruction of the patient's airways	Clear the patient's airways.
	Tracheal tube incorrectly positioned	Position tracheal tube correctly.
	Tubes kinked or trapped	Route tubes so that they are not kinked or trapped.
	Patient valve defective	Replace patient valve.
	Ventilation settings incorrect	Adjust ventilation settings.
Vt low ↓ / Stenosis	Obstruction of the patient's airways	Clear the patient's airways.
	Tracheal tube incorrectly positioned	Position tracheal tube correctly.
	Tubes kinked or trapped	Route tubes so that they are not kinked or trapped.
	Patient valve defective	Replace patient valve.
	Hygiene filter blocked	Check and replace hygiene filter.

WM 67891a 2024-08

11.1.2 Medium-priority alarms (yellow)

Alarm	Cause	Remedy
Apnea ventilation active (only with CPAP, CPAP + ASB, in selected countries CPAP + PS)	No spontaneous breathing in the defined time window. Device has switched to apnea ventilation mode.	Check the patient's condition. Check the set ventilation mode. The alarm stops if settings are changed.
Battery defective (device connected to line power)	Battery defective	Run device on rechargeable battery without line power until it switches off. Fully recharge battery. If the device continues to display the alarm: Replace rechargeable battery.
	Rechargeable battery not inserted, or not inserted correctly	Insert rechargeable battery correctly.
Battery weak	Rechargeable battery state of charge low	Connect device to line power and charge rechargeable battery.
Check battery	Wrong rechargeable battery inserted	Insert approved rechargeable battery.
Check the FlowCheck connection line	FlowLine-FlowCheck connection line with MEDUtrigger is not connected to the device.	Reconnect FlowLine-FlowCheck connection line with MEDUtrigger to the device.
	FlowLine-FlowCheck connection line with MEDUtrigger defective	Replace FlowLine-FlowCheck connection line with MEDUtrigger.
Check the FlowCheck sensor connection	Connection line is not connected to the FlowCheck sensor.	Reconnect connection line to the FlowCheck sensor.
	FlowCheck sensor defective	Replace FlowCheck sensor.
Frequency high ↑	Patient's respiratory rate too high	Check the patient's condition. Check limit value settings for plausibility.
	Inspiratory trigger triggered by artifacts (autotriggers)	Check mask for leaks. Reduce the sensitivity of the inspiratory trigger.
Oxygen concentration high ↑	Upper limit value exceeded	Reduce flow setting.
Oxygen concentration low ↓	Lower limit value undershot	Adapt flow setting.
Oxygen inlet flow higher than necessary	Flow setting higher than necessary	Reduce flow setting in steps. Rule of thumb for 100 % oxygen: Flow = MVi.
Oxygen inlet leakage	Oxygen inlet is not sealed and no oxygen is being supplied.	Seal oxygen inlet with protective cap for oxygen inlet or supply oxygen.

WM 67891a 2024-08

Service required	Device defective	Have the device repaired.
Vt not achievable	Implausible ventilation parameters	Adjust ventilation parameters.
	pMax set too low	Modify setting for pMax.

11.1.3 Low-priority alarms (turquoise)

Alarm	Cause	Remedy
Battery operation	Line power supply too weak or line power outage	The alarm appears: • When you take the portable unit out of the wall mounting. • When you are running the device on the power supply unit and charger, and a line power outage occurs. In both cases the alarm goes out after 10 s.
Set date and time	No power supply due to battery replacement	Set date and time correctly.

11.2 Faults

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

Fault	Cause	Remedy
Alarm output too quiet	Sound volume set too low	In the operator menu, set the volume to 100 %.
No audio alarm output	Loudspeaker or alarm light defective	Have the device repaired.
Alarm light not lit		
Display too dark	Brightness of display set too low	Increase brightness of display in operator menu.
Device cannot be switched on	Battery empty	Charge battery.
	Battery empty and device not connected to line power	Check power supply.
	Device defective	Have the device repaired.
Device cannot be switched off	Operating error	Press and hold the On/Off button ⏻ for at least 2 s.

WM 67891a 2024-08

Fault	Cause	Remedy
Software update not working	Update file or SD card defective	Perform the software update with a different SD card. If the update still cannot be completed successfully, have the device repaired.
Battery status indicator flickering between red and green	Battery deeply discharged	Charge battery in the device for 24 h.
Option functionality not available	Option deactivated in operator menu	Activate option in operator menu.
	Option not enabled in operator menu	Enable option in operator menu using option code.
Energy failure/device failure: • Black screen • Alarm light flashing • Audio alarm output	Battery empty and device not connected to line power	Check power supply.
	Device defective	Switch the device off and have it repaired.
Device malfunction (yellow screen)	Temporary device malfunction	Switch device off and back on again. Perform a function check (see 5, p. 66).
		Press the menu button to call up the operator menu directly and export the service data (see 9.7, p. 150).
	Device defective	Switch the device off and have it repaired.

WM 67891a 2024-08

12 Maintenance

⚠ WARNING

Disrupted or failed therapy due to lack of maintenance!
If maintenance intervals are not observed, malfunctions may occur. This may cause serious or life-threatening injury to the patient.
⇒ Observe the maintenance schedule according to the instructions for use and the displays on the device.
⇒ Observe the maintenance schedule even for devices and accessories in storage.

NOTICE

Reduction in rechargeable battery capacity due to aging!
The rechargeable battery is subject to a natural aging process, resulting in a decrease in capacity. This might result in premature failure of the power supply.
⇒ Note that the range of the rechargeable battery will gradually decrease due to aging.
⇒ Pay attention to the battery wear indicator in the function check.
⇒ If battery life has expired, replace the rechargeable battery.

12.1 Intervals

Item	Interval	Maintenance by
Device	Maintenance every 4 years	WEINMANN Emergency or other authorized technicians
	Safety check every 2 years	
Rechargeable battery	If the rechargeable battery is stored inside the device, charge every 6 months. If the rechargeable battery is stored outside the device, charge every 12 months. Have the rechargeable battery replaced during the 4-year maintenance. The device indicates a necessary battery replacement during the function check.	Operator/WEINMANN Emergency or other authorized technicians

WM 67891a 2024-08

Item	Interval	Maintenance by
Reusable breathing circuit	Maintenance every 2 years Replace after 50 reprocessing cycles.	User/operator (see "12.3 Maintaining the reusable breathing circuit", page 194)
Disposable breathing circuit	Maintenance-free	
Further accessories and other parts	Other intervals may apply. Please refer to the instructions for use. Additional information for Germany: In accordance with the Technical Safety Check provision of MPBetreibV § 11 [German regulation concerning the operators of medical devices] which applies under German law, we as the manufacturer recommend that all parts for use of MEDUVENT Standard that are connected with the same likewise be subject to a Technical Safety Check at the same interval as the device.	User/operator
Hygiene filter	Change hygiene filter: • When prompted in the function check **or** • At least every 6 months **or** • After every infection transport of a ventilated patient	User/operator (see "12.4 Replacing the hygiene filter", page 194)

WM 67891a 2024-08

12.2 Maintenance reminder

⚠ WARNING

Disrupted or failed therapy due to lack of maintenance!
The maintenance reminder can be suppressed by the operator once for 180 days. No maintenance notices will be displayed during this period. If maintenance intervals are not observed, malfunctions may occur. This may cause serious or life-threatening injury to the patient.
⇒ Observe the maintenance intervals in accordance with the instructions for use.

The service symbol flashes in the start screen to indicate one of the following conditions:

- Maintenance interval has expired
- Interval for device Technical Safety Check („Sicherheitstechnische Kontrolle" in accordance with § 11 of the German regulation MPBetreibV) has expired
- Battery life has expired

If maintenance or a Technical Safety Check is due, you can suppress the maintenance reminder once within a maintenance cycle for a maximum of 180 days from the due date. The device then behaves as if it were not due for maintenance.

Suppression of the maintenance reminder cannot be canceled within the maintenance cycle. Once the 180 days have elapsed, the maintenance reminder is active until the next service, and cannot be deactivated again.

Maintenance intervals must be observed even if the maintenance reminder has been suppressed.

WM 67891a 2024-08

12.3 Maintaining the reusable breathing circuit

Prerequisite The reusable breathing circuit has been disassembled (see "7.2.1 Disassembling the reusable breathing circuit", page 106).

1. Check all parts of the reusable breathing circuit for external damage, and to ensure that labeling is complete.
2. If necessary: Replace damaged or incorrectly labeled parts.
3. Replace PEEP control diaphragm and check valve diaphragm (maintenance kit WM 17937).
4. Assemble the reusable breathing circuit (see "7.7.1 Assembling the reusable breathing circuit", page 121).
5. Punch the scheduled time for the next maintenance into the service label (maintenance kit WM 17937).
6. Attach the service label to the device end of the ventilation hose.
7. Perform a function check (see "5 Function check", page 66).

Result The reusable breathing circuit has been maintained and is ready for use.

12.4 Replacing the hygiene filter

⚠ WARNING

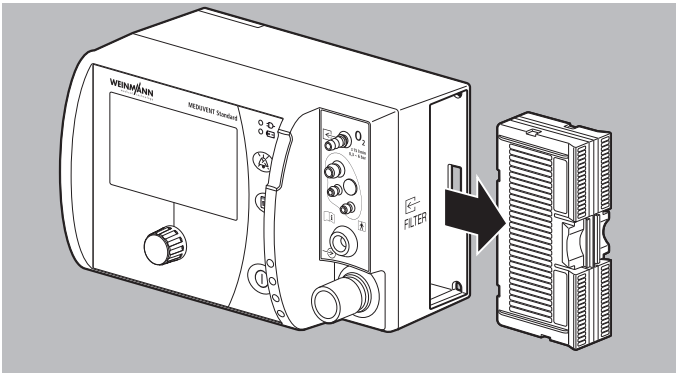
Risk of injury due to contaminated or damaged hygiene filter!
A hygiene filter which is damaged or has been contaminated by a prior infection transport might cause the patient and the user serious or life-threatening injury.
⇒ Check the hygiene filter and filter fleece for external signs of damage and do not use if damaged.
⇒ Replace damaged hygiene filter.
⇒ Replace hygiene filter after every infection transport.

WM 67891a 2024-08

⚠ WARNING

Infection of the user or of the next patient resulting from incorrect handling of a contaminated hygiene filter!
A contaminated hygiene filter might cause the patient or user serious or life-threatening injury.
⇒ Always wear suitable personal protective equipment when removing a contaminated hygiene filter.
⇒ Dispose of a contaminated hygiene filter when carrying out hygienic reprocessing, and do not reuse it.

12.4.1 Removing the hygiene filter



1. Press together and hold the tabs of the locking mechanism.
2. Pull the hygiene filter out of the device's filter compartment.
3. Disinfect the filter compartment by wiping.

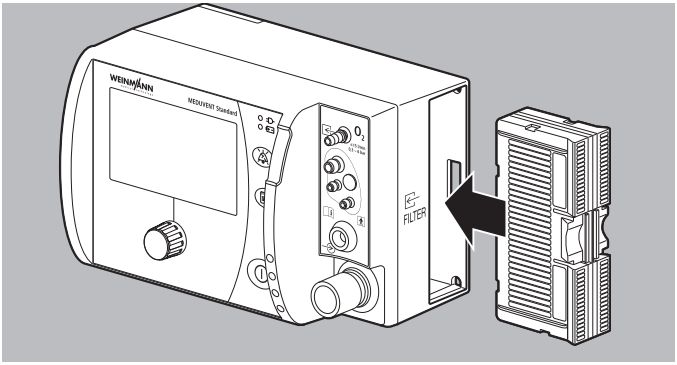
Result The hygiene filter has been removed.

12.4.2 Inserting the hygiene filter

⚠ WARNING

Risk of contamination or infection resulting from impaired filter properties!
Soiling, foreign bodies or damage in the filter compartment or on the hygiene filter might mean that the filter insert is not correctly positioned. As a result, the system will not be leak-tight, and contamination or infection might occur which might cause the patient or user serious or life-threatening injury.
⇒ Check the filter compartment and the hygiene filter for soiling, foreign bodies and damage.

WM 67891a 2024-08



1. Push the hygiene filter into the filter compartment until the hygiene filter audibly clicks into place and is flush with the device.
2. Perform a function check (see "5 Function check", page 66).
3. Reset the filter counter during the function check.

Result The hygiene filter has been inserted.

12.5 Replacing the rechargeable battery

⚠ WARNING

Failure of therapy resulting from operation of device without rechargeable battery!
The device is not intended for operation without the rechargeable battery. A missing, discharged or defective rechargeable battery will prevent uninterrupted operation of the device in the event of failure of the external power supply. This may cause serious or life-threatening injury to the patient.
⇒ Always operate the device with the battery charged.

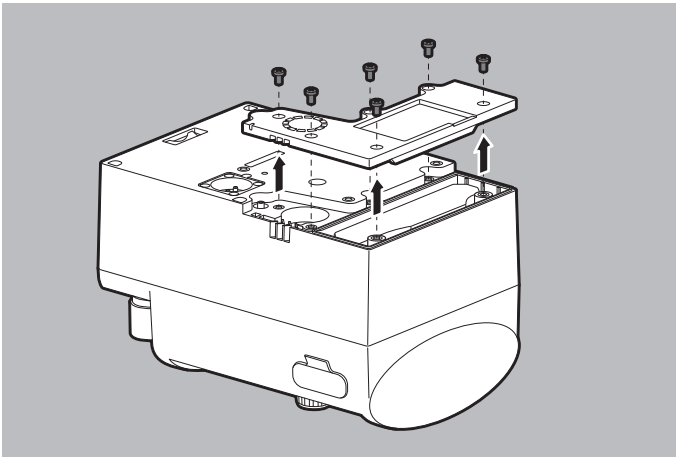
You as the operator can replace the rechargeable battery yourself.

Required tools Phillips screwdriver, size PH1

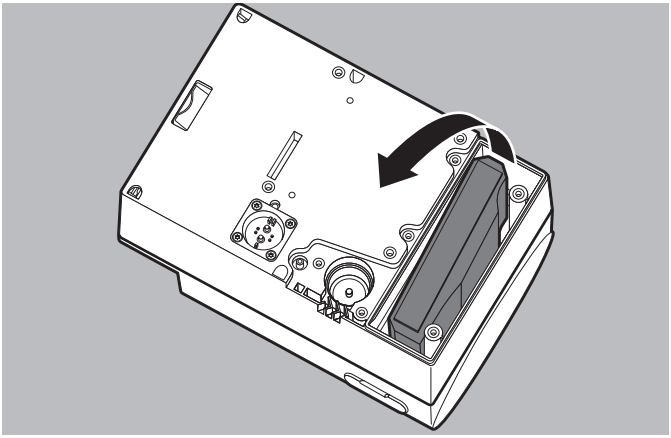
12.5.1 Removing the rechargeable battery

Prerequisite
- The device has been disconnected from the power supply.
- The device has been removed from the portable unit in accordance with the instructions for use of the portable unit.

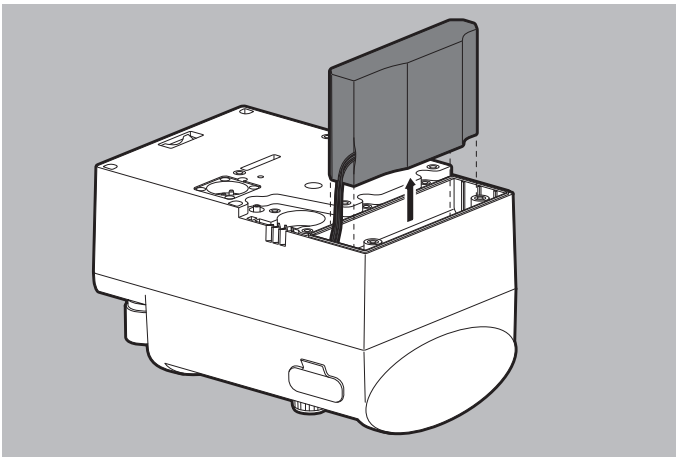
WM 67891a 2024-08



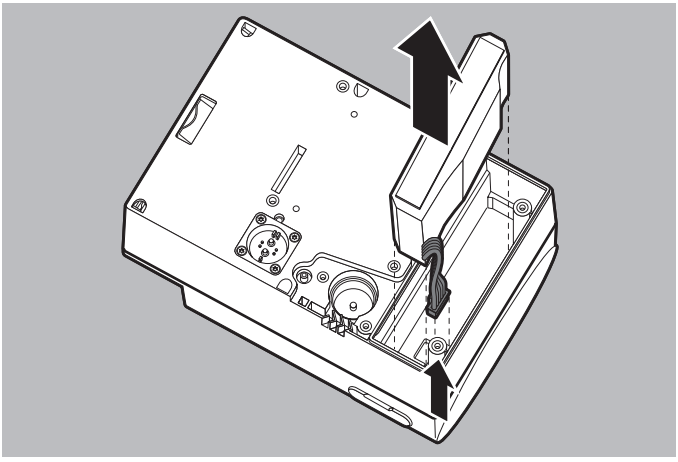
1. Loosen the 6 screws of the battery compartment cover on the back of the device.
2. Remove the 6 screws.
3. Remove the battery compartment cover.



4. Tilt the battery at one end and carefully pull it up and out of the housing.



5. Remove the battery from the device.

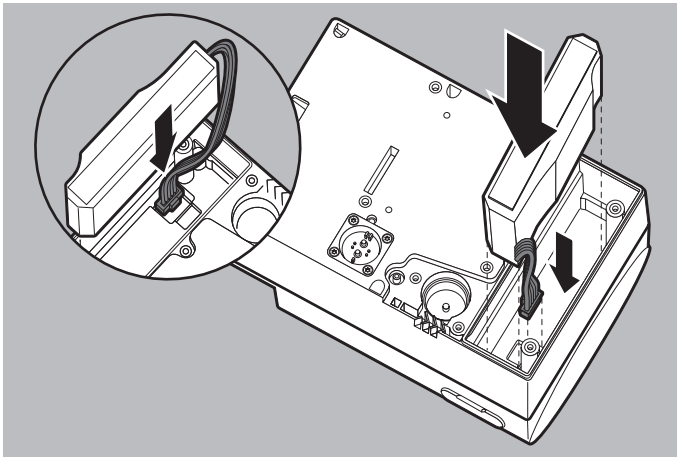


6. Unplug the battery's electrical connector.

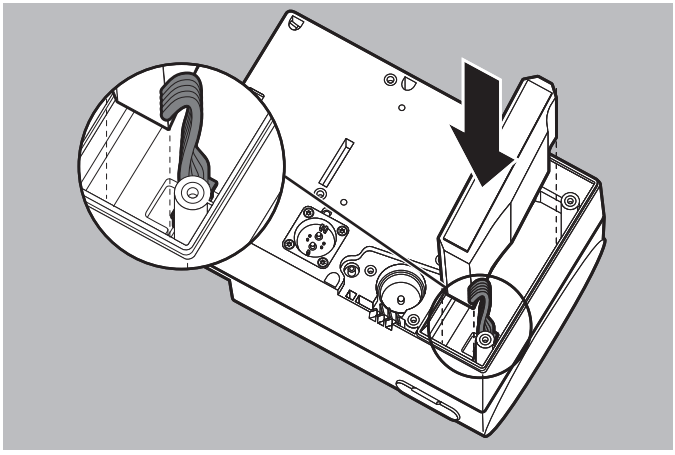
Result The rechargeable battery has been removed.

WM 67891a 2024-08

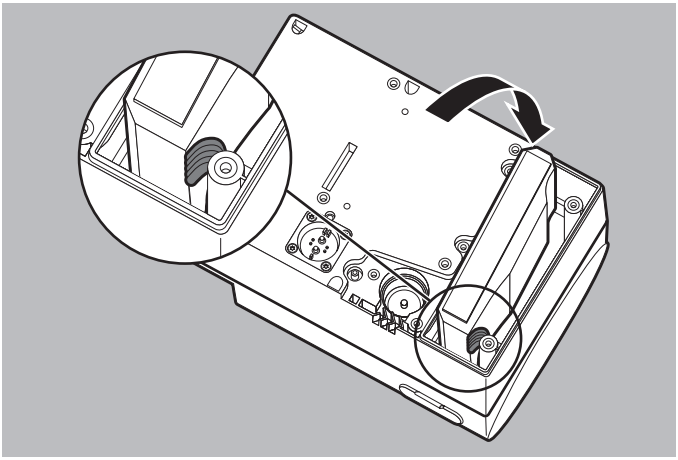
12.5.2 Installing the rechargeable battery



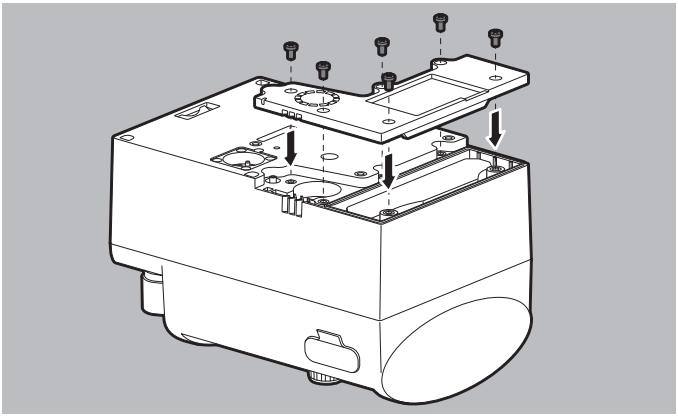
1. Attach the battery's electrical connector. To do so, plug the battery connector into the socket. The connector engages.



2. Position the battery so that the cable is facing the socket.
3. Make the battery cable into a loop.



4. Insert the battery. To do this, guide the battery cable along between the housing and the battery.
5. Push the battery down in the battery compartment until the battery is flush with the housing.



6. Fit the battery compartment cover.
7. Tighten the 6 screws on the battery compartment cover.
8. Reset the date and time in the operator menu (see "9 Operator menu", page 139).

Result The rechargeable battery has been installed.

WM 67891a 2024-08

12.6 Sending in parts

⚠ WARNING

Risk of infection during maintenance work due to contaminated parts!
The device, accessories and other parts may be contaminated and infect the technicians with bacteria and viruses. Parts sent in which are clearly contaminated will be disposed of at the cost of the sender by WEINMANN Emergency or by technicians authorized by WEINMANN Emergency.
⇒ Clean and disinfect parts required for maintenance measures.
⇒ Do not send in parts which are potentially contaminated.

1. Dismantle parts.
2. Clean and disinfect parts (see "7 Hygienic reprocessing", page 101).
3. Send parts to WEINMANN Emergency, or to a technician specifically authorized by WEINMANN Emergency.

WM 67891a 2024-08

13 Storage

⚠ WARNING

Disrupted or failed therapy due to defective or nonoperational device, defective accessories or defective other parts following incorrect storage!
Incorrect storage may damage the device, accessories, and other parts and lead to disruption or failure of therapy. This may cause serious or life-threatening injury to the patient.
⇒ Observe storage conditions and storage times (see "16 Technical data", page 210).
⇒ Store the device, accessories, and other parts in a dry location.
⇒ Following storage at extreme ambient conditions outside ambient operating conditions: Store the device, accessories, and other parts at room temperature for at least 12 h before starting to use them.
⇒ Protect the device, accessories, and other parts from UV light and direct sunlight.

NOTICE

Damage to the rechargeable battery due to incorrect storage!
Storing the rechargeable battery for a prolonged period of time without recharging might result in rapid shutdown of, and irreparable damage to, the rechargeable battery.
⇒ Observe the storage conditions and the instructions regarding the rechargeable battery (see "16.2 Rechargeable battery", page 217).

1. Switch off the device (see "6.11 Switching off the device", page 100).
2. If necessary: Disconnect the device from line power.
3. Hygienically reprocess the device and accessories (see "7 Hygienic reprocessing", page 101).
4. Store the device and accessories in a dry location.

Result The device and accessories are stored in a dry location.

WM 67891a 2024-08

14 Disposal

14.1 Electronic waste

NOTICE

Environmental hazard from electronic waste!
Electronic waste poses an environmental hazard, and must be subjected to proper disposal.
⇒ Do not dispose of electronic waste in domestic waste.

Do not dispose of the product in domestic waste. Use a licensed, certified electronic waste management contractor for proper disposal. You can find out the 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
- Power supply unit and charger

14.2 Rechargeable battery

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

14.3 Plastics

Dispose of plastics in a proper manner applicable to plastics at the end of their useful lives.

14.4 Hygiene filter

Dispose of the hygiene filter in a proper manner.

WM 67891a 2024-08

14.5 Contaminated parts

Do not dispose of contaminated parts in domestic waste. Use a licensed, certified specialist waste management contractor to dispose of contaminated parts properly.

WM 67891a 2024-08

15 Scope of supply

15.1 Version supplied (example)

This subchapter describes just one version supplied. Functions, accessories, and other parts depend on the version purchased, and are not available in every case.

Medical devices and accessories are marked with a UDI-DI. Other parts do not have a UDI-DI. For parts made by other manufacturers (third-party products) you can request the UDI-DI from the manufacturer.

Designation	Supplementary information	UDI-DI	Article no.
MEDUVENT Standard, basic device	• With battery • For reuse on multiple patients	04054685276522	WM 35720
VENTcirc-MVS breathing circuit, 2 m	For reuse on multiple patients	04054685270827	WM 35850
MEDUtrigger, 2 m	For reuse on multiple patients	04054685137236	WM 28992
Testing bag for function check	–	–	WM 1454
Kit, CPAP/NIV ventilation masks with air cushion	For single use	–	WM 15807
HF-MVS hygiene filter	For reuse on multiple patients	04054685275464	WM 35730
Hook and loop strap with clip for breathing circuit	–	–	WM 28964
Kit, mounting elements	For LIFE-BASE	–	WM 17806
Oxygen inlet tube	• Third-party product • For single use	–	WM 35782
Instructions for use MEDUVENT Standard	–	–	WM 67891

15.2 Accessories and other parts

This subchapter describes accessories and other parts in accordance with the Medical Device Regulation (MDR). Accessories are marked with a UDI-DI. Other parts do not have a UDI-DI. For parts made by other manufacturers you can request the UDI-DI from the manufacturer.

WM 67891a 2024-08

Designation	Supplementary information	UDI-DI	Article no.
Breathing circuits			
VENTcirc-MVS breathing circuit, 2 m	For reuse on multiple patients	04054685270827	WM 35850
VENTcirc-MVS breathing circuit, 2 m	For single use	04054685270834	WM 35860
Set of 10, VENTcirc-MVS breathing circuit, 2 m	For single use	04054685277284	WM 17910
Set of 25, VENTcirc-MVS breathing circuit, 2 m	For single use	04054685277291	WM 17911
Set of 50, VENTcirc-MVS breathing circuit, 2 m	For single use	04054685277307	WM 17912
MEDUtrigger and FlowCheck sensor			
MEDUtrigger, 2 m	For reuse on multiple patients	04054685137236	WM 28992
MEDUtrigger with FlowLine-Flow-Check connection line, 2 m	For reuse on multiple patients	04054685007829	WM 32508
FlowCheck sensor	For reuse on multiple patients	04054685010638	WM 28835
Set of 5, FlowCheck sensor	For reuse on multiple patients	04054685009830	WM 17850
FlowCheck sensor	For single use	04054685276539	WM 29154
Other parts of the breathing circuit			
Measuring circuit for breathing circuit, 2 m	For reuse on multiple patients	–	WM 35851
Ventilation hose for reusable breathing circuit, 2 m	For reuse on multiple patients	–	WM 28421
Protective sleeve for breathing circuit, 2 m	For reuse on multiple patients	–	WM 28585
Patient valve, complete	For reuse on multiple patients	–	WM 35865
Adapter for reusable breathing circuit	For reuse on multiple patients	–	WM 35867
Adapter for disposable breathing circuit	For reuse on multiple patients	–	WM 17916
Breathing system filter	Third-party product	–	WM 22162

WM 67891a 2024-08

Designation	Supplementary information	UDI-DI	Article no.
Portable units			
LIFE-BASE portable unit	–	UDI-DI on request	Article no. on request
Options			
S-IPPV mode option	–	–	WM 35815
SIMV mode option	–	–	WM 35816
CPAP + PS mode option (only available in selected countries)	–	–	WM 35871
PRVC + PS mode option (only available in selected countries)	–	–	WM 35872
FlowCurve Pro option	–	–	WM 35887
Pressure-controlled ventilation modes option	Prerequisite for use: FlowCurve Pro option	–	WM 35885
CBRN option	–	–	WM 35888
Power supply			
Accu-Pack rechargeable battery	For MEDUVENT Standard	–	WM 35775
Power supply unit and charger 100 W	Third-party product		WM 28937
Charging adapter for power supply unit and charger or adapter cable for 12 V on-board power supply/circular connector	–	–	WM 28979
Adapter cable for 12 V on-board power supply/circular connector	–	–	WM 28356
Wall mounting for power supply unit and charger	For WM 28937	–	WM 15846
Testing bags/test lungs			
Testing bag for function check	–	–	WM 1454
EasyLung test lung for function check	Third-party product	–	WM 28625
Protective caps			
Protective cap for cone 22 mm	–	–	WM 28942
Protective cap for oxygen inlet	–	–	WM 35732

WM 67891a 2024-08

Designation	Supplementary information	UDI-DI	Article no.
Protective cap for connection terminal	–	–	WM 35857
Hygiene filter			
HF-MVS hygiene filter	For reuse on multiple patients	04054685275464	WM 35730
Set of 5, HF-MVS hygiene filter	For reuse on multiple patients	04054685279387	WM 17915
Miscellaneous			
Oxygen inlet tube	• Third-party product • For single use		WM 35782
SD card, 2 GB	–	–	WM 29791
Cap for navigation knob	–	–	WM 35803
Battery compartment cover	–	–	WM 17907
Seal for battery compartment cover	–	–	WM 35739
Masks from other manufacturers			
Premium CPAP/NIV ventilation mask, size S	For single use		WM 20717
Premium CPAP/NIV ventilation mask, size M	For single use		WM 20718
Premium CPAP/NIV ventilation mask, size L	For single use		WM 20719
Set of 10, Premium CPAP/NIV ventilation mask, size S	For single use		WM 17940
Set of 40, Premium CPAP/NIV ventilation mask, size S	For single use		WM 17941
Set of 10, Premium CPAP/NIV ventilation mask, size M	For single use		WM 17942
Set of 40, Premium CPAP/NIV ventilation mask, size M	For single use		WM 17943
Set of 10, Premium CPAP/NIV ventilation mask, size L	For single use		WM 17944
Set of 40, Premium CPAP/NIV ventilation mask, size L	For single use		WM 17945
CPAP/NIV ventilation mask with air cushion, size S	For single use		WM 20703

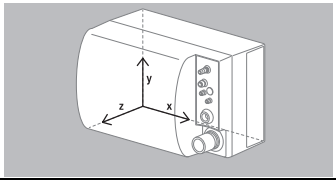
WM 67891a 2024-08

Designation	Supplementary information	UDI-DI	Article no.
CPAP/NIV ventilation mask with air cushion, size M	For single use		WM 20704
CPAP/NIV ventilation mask with air cushion, size L	For single use		WM 20705
Kit, CPAP/NIV ventilation masks with air cushion	For single use		WM 15807
Set of 25, CPAP/NIV ventilation mask with air cushion, size S, with retaining ring	For single use		WM 15831
Set of 25, CPAP/NIV ventilation mask with air cushion, size M, with retaining ring	For single use		WM 15832
Set of 25, CPAP/NIV ventilation mask with air cushion, size L, with retaining ring	For single use		WM 15833
Set of 50, CPAP/NIV ventilation mask with air cushion, size S, with retaining ring	For single use		WM 15834
Set of 50, CPAP/NIV ventilation mask with air cushion, size M, with retaining ring	For single use		WM 15835
Set of 50, CPAP/NIV ventilation mask with air cushion, size L, with retaining ring	For single use		WM 15836
Silicone CPAP/NIV ventilation mask, size S	For reuse on multiple patients		WM 20713
Silicone CPAP/NIV ventilation mask, size M	For reuse on multiple patients		WM 20714
Silicone CPAP/NIV ventilation mask, size L	For reuse on multiple patients		WM 20715
Kit, CPAP/NIV silicone ventilation masks	For reuse on multiple patients		WM 15808
Head strap – silicone	–		WM 20702
Retaining ring for silicone CPAP/NIV ventilation masks	–		WM 20701

WM 67891a 2024-08

16 Technical data

16.1 Device

Specification	Device
Dimensions (W x H x D)	206 mm × 137 mm × 130 mm
Weight: Without rechargeable battery With rechargeable battery	 1750 g 2100 g
Center of gravity	 x = 87 mm y = 69 mm z = 54 mm
Operation: Temperature range as per EN 60601-1-12 und EN 794-3 Relative humidity Air pressure Altitude above sea level	 -20 °C to +50 °C 15 % to 95 %, no condensation 540 hPa to 1100 hPa -500 m to 5000 m The maximum ambient temperature decreases with increasing altitude (from 2000 m altitude linearly down to max. 25 °C at 5000 m altitude).
Storage/transport: Temperature range up to 48 h longer than 48 h Relative humidity Air pressure Altitude above sea level	 -40 °C to +70 °C -20 °C to +40 °C (recommended: 0 °C to +25 °C) 15 % to 95 %, no condensation 540 hPa to 1100 hPa -500 m to 5000 m The maximum ambient temperature decreases with increasing altitude (from 2000 m altitude linearly down to max. 25 °C at 5000 m altitude).
Warm-up time from minimum storage temperature to standby at 20 °C	8 h
Cooling-down time from maximum storage temperature to standby at 20 °C	8 h
Electrical rating	• Rated voltage: 12 V • Permitted input voltage range: 10 V to 16 V

WM 67891a 2024-08

Specification	Device
Max. power consumption	60 W
Current consumption	0.15 A to 4 A
Operating hours on battery without options	7.5 h under the following conditions: Mode: IPPV, f=12/min, Vt= 600 ml, lung parameters of a healthy adult, PEEP=0 hPa, compliance=50 ml/hPa, resistance=5 hPa/l/s, display brightness=80 %, new fully-charged rechargeable battery, ambient temperature 23 °C ± 3 °C
Operation with on-board power supply: Rated voltage Max. internal resistance of on-board power supply	 12 V 500 mΩ
Disconnector	Disconnection of the power supply (charging adapter or portable unit) or unplugging of the power plug.
Disconnection from line power	Taking out the power plug disconnects the device from line power on all poles.
Operating mode	Continuous operation
Classification acc. to EN 60601-1: • Type of protection against electric shock • Degree of protection against electric shock	 Protection class II Degree of protection BF
Degree of protection against: • Ingress of solid objects • Ingress of dust • Ingress of water with harmful effect	 IP54
Electromagnetic compatibility, radio interference suppression, radio interference immunity in accordance with EN 60601-1-2 and EN 301489	Test specifications: • EN 55011 • EN 55025 • EN 61000-3 (Parts 2, 3) • EN 61000-4 (Parts 2-6, 8, 11, 39) • RTCA DO-160G (EUROCAE ED-14G) • ISO 7637-2 • UNECE R10 Test parameters and limit values can be obtained from the manufacturer if required.

WM 67891a 2024-08

Specification	Device
Resistance to shock and vibration	• EN 1789 • EN 60601-1-12 (Categories: Secured in an emergency vehicle, secured in an airplane, secured in a helicopter, portable at the site of the emergency) • EUROCAE ED-14G/RTCA DO 160 G: Section 7 (Cat. A) and 8 (U/U2 + Cat. S)
Type of emergency vehicle	Secured in emergency vehicle, ship, airplane, and helicopter, as well as portable at the site of the emergency
Display	10.92 cm (4.3") TFT color display Resolution 480 pixels x 272 pixels
Alarm volume	100 %: > 60 dB(A) 50 %: > 55 dB(A)
Standards applied	EN 60601-1 EN 60601-1-2 EN 60601-1-6 EN 60601-1-8 EN 60601-1-12 EN 1789 EN ISO 17664-1 EN 13718-1 EN 794-3 ISO 10651-3 ISO 10993-1 RTCA DO-160 G MIL-STD 810 G
Applied parts acc. to EN 60601-1	• Ventilation mask • Tracheal tube • Breathing circuit • MEDUtrigger and connection line to FlowCheck sensor
Essential performance features	Dispensing of ventilation within the set alarm limits or initiating an alarm state
Volume-controlled ventilation modes	• IPPV • Manual Optional: • S-IPPV • SIMV • SIMV + ASB

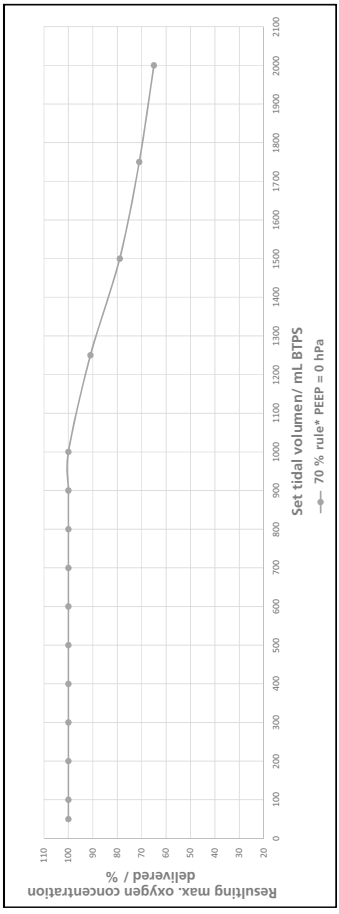
WM 67891a 2024-08

Specification	Device
Pressure-controlled ventilation modes	• CPAP Optional: • CPAP + ASB • PRVC + ASB • aPCV • BiLevel + ASB • PCV • CPAP + PS (only available in selected countries) • PRVC + PS (only available in selected countries)
Monitoring	• Volume • Pressure • Respiratory rate • Flow
Measured values	• MVi • f(fsp) • O_2i Optional: • MVe • pAw • pMean • pPeak • pPlat • Vleak • Vte
Supply gas O_2	Medical oxygen (100 %) or concentrator oxygen (93 % ± 3 %)
Operating pressure range O_2	0.3 bar to 6 bar at maximum 15 l/min STPD
Minimum operating pressure	3 hPa (not adjustable)
Minimum limit pressure, vacuum (Plim min)	10 hPa The device generates no active vacuum.
Maximum limit pressure (Plim max)	60 hPa
Means of limiting pressure	Pressure control
Means of safeguarding the minimum value	Pressure control
Maximum outlet flow	150 l/min (in BTPS)
Mechanical pressure relief/emergency air valve	Pressure limitation to < 100 hPa
I:E	Adjustable from 1:4.0 to 4.0:1 Manual mode: 1:1

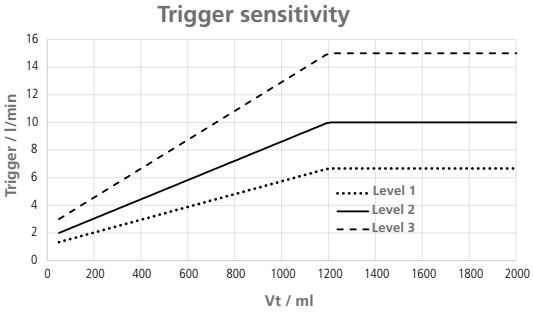
WM 67891a 2024-08

Specification	Device
Ventilation rate	5/min to 40/min ±1/min
Respiratory rate measurement	Measuring range: 3/min to 140/min Tolerance: • Spontaneous breathing fsp: ±1/min • Total respiratory rate f: ±1/min
Inspiratory time	0.5 s to 4 s
Tidal volume	50 ml to 2000 ml (±40 ml or ±20 %) (BTPS)
Respiratory minute volume	1.5 l/min to 20 l/min (BTPS)
Expiratory tidal volume	• 40 ml to 8000 ml (±20 ml or ±20 %) • 0 ml to 40 ml (±40 ml)
Ventilation pressure	3 mbar to 60 mbar (±3 mbar or ±15 %) The maximum ventilation pressure can decrease with increasing altitude (from 2000 m altitude linearly down to max. 35 mbar at 5000 m altitude).
PEEP end-expiratory pressure	0 mbar to 20 mbar (±3 mbar or ±15 %)
Proximal flow measurement	-200 l/min to 200 l/min (±(0,3 l/min + 15 %))

WM 67891a 2024-08

Specification	Device
Maximum achievable O_2i at a flow of flow 15 l/min (ATPD)	 70 % rule: Physiologically, the alveolar area of a lung is crucial for gas exchange. Literature research shows that 60 % to 70 % of tidal volume reaches the alveolar area, with the remaining 40 % to 30 % remaining in the dead space volume of the lung.

WM 67891a 2024-08

Specification	Device
Accuracy of the O_2i display	Determined with leak-free ventilation and supply gas preset matching supply gas used
	MVi ≤ 4 l/min: • ±30 % when using medical oxygen • ±35 % when using concentrator oxygen
	MVi> 4 l/min: • ±20 % when using medical oxygen • ±25 % when using concentrator oxygen
Pressure limit (pMax)	10 mbar to 60 mbar (±3 mbar or ±15 %)
Trigger (only with BiLevel + ASB, CPAP + ASB, aPCV, PRVC + ASB, SIMV + ASB)	Inspiratory trigger: 1 l/min to 15 l/min Expiratory trigger: 5 % flow to 80 % flow
Inspiratory trigger Can be set to levels 1 to 3 (only with SIMV, S-IPPV and CPAP + PS, PRVC + PS (only available in selected countries))	
Airway pressure sensor	-5 hPa to 80 hPa, measurement position close to patient
Accuracy of airway pressure measurement	-5 hPa to 80 hPa (±5 % or ±1.5 hPa)
Pressure support ΔpASB (only with BiLevel + ASB, CPAP + ASB, aPCV, PRVC + ASB, SIMV + ASB)	0 hPa to 30 hPa (±3 hPa or ±15 %) above PEEP
Pressure support ΔpPS (only with CPAP + PS and PRVC + PS (only available in selected countries))	0 hPa to 30 hPa (±3 hPa or ±15 %) above PEEP
Volume sensor	-30 l/min to 150 l/min, measuring position ventilation hose connection (BTPS or ATP, whichever value is lower)
Accuracy of measurement of respiratory minute volume (MVi, MVe)	±20 % or ±2 l/min (BTPS, whichever value is higher)
Accuracy of measurement of tidal volume (Vti, Vte)	±20 % or ±40 ml (BTPS, whichever value is higher)
Gas composition	Mixture of air, oxygen, CO_2. Oxygen fraction 21 % to 100 %, CO_2 fraction 0 % to 10 %

WM 67891a 2024-08

Specification	Device
Ventilation hose connection	22 mm outer cone
Patient valve connections	22 mm outer cone 15 mm inner cone
Hygiene filter service life	Service life: 6 months Operating time as a function of filter wear: • Filter wear normal, 100 %: 24 h operation • Filter wear high, 150 %: 16 h operation • Filter wear very high, 200 %: 12 h operation
Hygiene filter separation rate	> 99 %
CE marking	CE 0197
Subject to design modifications.	

16.2 Rechargeable battery

Specification	Rechargeable battery
Type	Li-ion
Dimensions (W x H x D)	66 mm x 120 mm x 28 mm
Weight	333 g ±5 g
Rated capacity	4.5 Ah (46.8 Wh typical)
Rated voltage	10.8 V
Charging time (0 % to 95 %)	2.5 h
Charging temperature	0 °C to +45 °C
Temperature range for operation	-20 °C to +50 °C
Storage/transport: Temperature range up to 48 h Temperature range longer than 48 h Relative humidity	 -40 °C to +70 °C -20 °C to +40 °C (recommended: 0 °C to +25 °C) 0 % to 95 %, no condensation
Service life	At least 300 charging cycles* or a maximum of 5 years
Operating hours without options	7.5 h under the following conditions: Mode: IPPV, f=12/min, Vt= 600 ml, lung parameters of a healthy adult, PEEP=0 hPa, compliance=50 ml/hPa, resistance=5 hPa/l/s, display brightness=80 %, new fully-charged rechargeable battery, ambient temperature 23 °C ± 3 °C

WM 67891a 2024-08

Specification	Rechargeable battery
Charging intervals after 100 % charge	When stored in the device without power supply: every 6 months When stored outside the device: every 12 months

*One charging cycle corresponds to a 100 % battery charge. Example: If you charge the battery twice from 50 % to 100 %, the device counts one charging cycle.

16.3 Power supply unit and charger

Specification	Power supply unit and charger
Operation of power supply unit and charger 100 W (WM 28937): Temperature range Relative humidity Air pressure Altitude above sea level	 0 °C to +40 °C 5 % to 95 %, no condensation 700 hPa to 1100 hPa -500 m to 3000 m
Input voltage (external power supply unit and charger)	100 V to 240 V~/50 Hz to 60 Hz
Rated output voltage	15 V
Disconnection from line power	Taking out the power plug disconnects the device from line power on all poles.
Type	PMP120F-13-K24

WM 67891a 2024-08

16.4 Breathing circuits

Specification	Breathing circuit
Operation: Temperature range Relative humidity	 -20 °C to +50 °C 15 % to 95 %, no condensation
Storage/transport: Temperature range up to 48 h longer than 48 h Relative humidity	 -40 °C to +70 °C -20 °C to +40 °C 15 % to 95 %, no condensation
Patient valve: Patient connection mask/tracheal tube	15 mm inner cone 22 mm outer cone EN ISO 5356-1
Patient valve: Expiratory opening	Non-connectible expiratory opening
Compliance: • Reusable breathing circuit • Disposable breathing circuit	 0.79 ml/hPa (ml/cmH_2O) 0.90 ml/hPa (ml/cmH_2O)
Internal volume of entire breathing system without FlowCheck sensor: • Reusable breathing circuit • Disposable breathing circuit	 Approx. 573 ml Approx. 573 ml
Internal volume of entire breathing system with FlowCheck sensor: • Reusable breathing circuit • Disposable breathing circuit	 Approx. 582 ml Approx. 582 ml
Materials used	PC, silicone, TPE, PA, PP, TPR, PE, PU, polyisoprene
Reusable breathing circuit service life	50 reprocessing cycles or 4 years

Dead space volumes		
Patient valve	**Without elbow**	**With elbow**
Reusable patient valve	Approx. 16 ml	Approx. 28 ml
Disposable patient valve	Approx. 16 ml	Approx. 24 ml
FlowCheck sensor	**Article no.**	**Volume**
Reusable FlowCheck sensor	WM 28835	Approx. 9 ml
Disposable FlowCheck sensor	WM 29154	Approx. 9 ml
Breathing system filter	**Article no.**	**Volume**
Breathing system filter	WM 22162	Approx. 35 ml

WM 67891a 2024-08

Pressure drop [hPa] over the section of inspiratory and expiratory flow at different flows [l/min] as per EN 794-3			
	Flow	**Reusable breathing circuit, 2 m WM 35850 additionally with reusable FlowCheck sensor and elbow**	**Disposable breathing circuit, 2 m WM 35860 additionally with disposable FlowCheck sensor and elbow**
Spontaneous breathing in the event of energy failure, inspiratory (STP)	2.5 l/min	< 2.4 hPa	< 1.8 hPa
	15 l/min	< 2.4 hPa	< 1.8 hPa
	30 l/min	< 4.1 hPa	< 3.4 hPa
Spontaneous breathing in the event of energy failure, expiratory (BTPS)	2.5 l/min	< 1.7 hPa	< 1.8 hPa
	15 l/min	< 1.7 hPa	< 1.8 hPa
	30 l/min	< 2.5 hPa	< 2.6 hPa
Normal operation, inspiratory (STP)	5 l/min	< 0.7 hPa	< 0.5 hPa
	30 l/min	< 1.3 hPa	< 1.3 hPa
	60 l/min	< 2.9 hPa	< 2.8 hPa
Normal operation, expiratory (BTPS)	5 l/min	< 0.9 hPa	< 0.9 hPa
	30 l/min	< 2.8 hPa	< 2.4 hPa
	60 l/min	< 4.8 hPa	< 4.6 hPa

STP (Standard Temperature and Pressure): Volume/flow at 21 °C and 1013 hPa
BTPS (Body Temperature and Pressure, saturated): Volume/flow at current ambient pressure and 37 °C at 100 % saturated moist gas

Pressure drop at different flows			
Part	**Article no.**	**Flow**	**Pressure drop**
Breathing system filter	WM 22162	30 l/min	1.5 hPa (cmH_2O)
		60 l/min	3.5 hPa (cmH_2O)

WM 67891a 2024-08

16.5 Connection lines

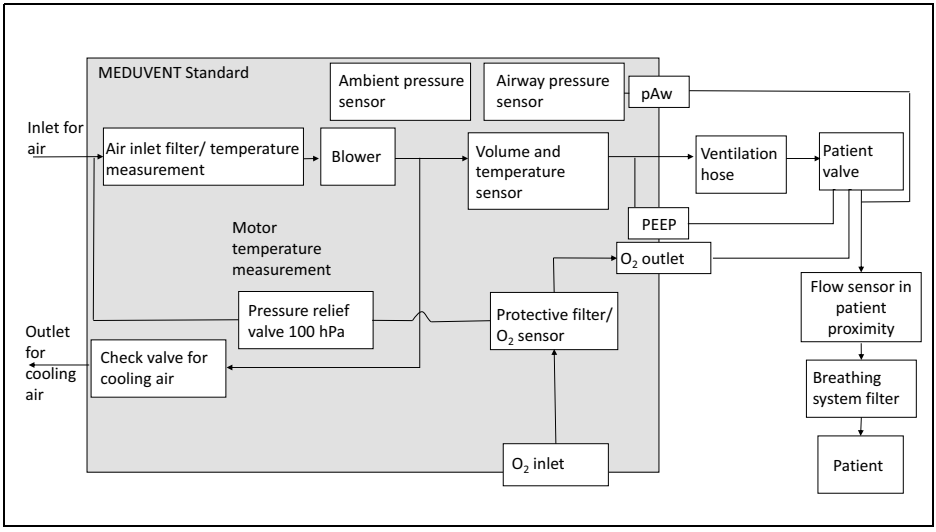
Specification	MEDUtrigger	MEDUtrigger with FlowLine-FlowCheck connection line
Operation: Temperature range Relative humidity Air pressure	 -20 °C to +50 °C 15 % to 95 %, no condensation 540 hPa to 1100 hPa	
Storage/transport: Temperature range up to 48 h longer than 48 h Relative humidity Air pressure	 -40 °C to +70 °C -20 °C to +40 °C 15 % to 95 %, no condensation 540 hPa to 1100 hPa	
Service life	400 reprocessing cycles or 5 years	

16.6 FlowCheck sensor

Specification	FlowCheck sensor (reusable)	FlowCheck sensor (disposable)
Operation: Temperature range Relative humidity Air pressure	 -20 °C to +50 °C 15 % to 95 %, no condensation 540 hPa to 1100 hPa	
Storage/transport: Temperature range up to 48 h longer than 48 h Relative humidity Air pressure	 -40 °C to +70 °C -20 °C to +40 °C 15 % to 95 %, no condensation 540 hPa to 1100 hPa	
Service life	50 reprocessing cycles or 4 years	–

WM 67891a 2024-08

16.7 Block diagram



16.8 Electromagnetic compatibility (EMC)

⚠ WARNING

Disrupted or failed therapy due to interaction between medical electrical devices!

Medical electrical devices which are operated directly next to or on top of one another can cause mutual interference to functionality. This may cause serious or life-threatening injury to the patient.

⇒ Do not stack the device with other medical electrical devices.

⇒ Do not operate the device in the immediate vicinity of other medical electrical devices (exception: Other WEINMANN Emergency devices which have been tested to ensure that they can be operated alongside the device without problems.).

⇒ 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.

WM 67891a 2024-08

⚠ WARNING

Disrupted or failed therapy due to portable radio-frequency communication equipment in the immediate vicinity of the device!

Portable radio-frequency communication equipment (e.g. radios, antennas and antenna cables) in the immediate vicinity of the device might affect the functioning of the device. This may cause serious or life-threatening injury to the patient.

⇒ Keep portable radio-frequency communication equipment a minimum distance of 30 cm away from the device and its accessories.

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 documents.

Guidelines and manufacturer's declaration - emission of electromagnetic interference		
MEDUVENT Standard is designed for operation in the electromagnetic environment described below. The customer or user of the MEDUVENT Standard device should ensure that it is operated in such an environment.		
Measurements of interference emission	**Compliance**	**Electromagnetic environment - guidelines**
RF emissions acc. to CISPR 11	Group 1, Class B	The RF emission of MEDUVENT Standard is very low, and it is unlikely to interfere with adjacent electronic devices.
Emission of oscillations acc. to IEC 61000-3-2	Compliant	MEDUVENT Standard is suitable for use in all facilities, including domestic environments, and those which are connected directly to the public power grid which also supplies buildings used for residential purposes.
Emission of voltage fluctuations/flicker acc. to IEC 61000-3-3	Compliant	
RF emissions acc. to RTCA DO-160 G	Section 21, Category M	MEDUVENT Standard is suitable for use in operating locations of Category M inside aircraft due to its low RF emission.
RF emissions acc. to UN/ECE Rule no. 10	Annex 6, Annex 7	MEDUVENT Standard is suitable for use in motor vehicles due to its low RF emission.
Emissions interfering with motor vehicle power supply lines acc. to ISO 7637-2	Compliant	MEDUVENT Standard is suitable for connection to the on-board power supply due to its low RF emission.

WM 67891a 2024-08

Guidelines and manufacturer's declaration - electromagnetic immunity			
MEDUVENT Standard is designed for operation in the electromagnetic environment described below. The customer or user of the MEDUVENT Standard device should ensure that it is used in such an environment.			
Interference immunity tests	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidelines**
Electrostatic discharge (ESD) acc. to IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 kV air	Floors should be made of wood or concrete, or have ceramic tiles laid on them. If the floor has a synthetic material laid on it, relative humidity must be at least 30 %.
Electrical fast transients/bursts acc. to IEC 61000-4-4	±2 kV for line power cables ±1 kV for input and output cables	±2 kV for line power cables ±1 kV for input and output cables	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Surges acc. to IEC 61000-4-5	±1 kV line-to-line ±2 kV line-to-ground	±1 kV line-to-line ±2 kV line-to-ground	The quality of the supply voltage should correspond to that of a typical business or hospital environment.
Voltage dips, short interruptions and voltage fluctuations in power supply voltage acc. to IEC 61000-4-11	0 % U_T; ½ cycle at 0, 45, 90, 135, 180, 225, 270 and 315 degrees, 0 % U_T, 1 cycle and 70 % U_T, 25/30 cycles, single-phase: at 0 degrees, 0 % U_T, 250/300 cycles	0 % U_T; ½ cycle at 0, 45, 90, 135, 180, 225, 270 and 315 degrees, 0 % U_T, 1 cycle and 70 % U_T, 25/30 cycles, single-phase: at 0 degrees, 0 % U_T, 250/300 cycles	The quality of the supply voltage should correspond to that of a typical business or hospital environment. If the user of the MEDUVENT Standard device demands continued function even if interruptions to the power supply occur, we recommend supplying the MEDUVENT Standard using its fully charged battery.
Note: U_T is the alternating line voltage prior to application of the test levels.			
Magnetic fields in close proximity acc. to IEC 61000-4-39	8 A/m (30 kHz) 65 A/m (134.2 kHz) 7.5 A/m (13.56 MHz)	8 A/m (30 kHz) 65 A/m (134.2 kHz) 7.5 A/m (13.56 MHz)	The environment may contain low-frequency electromagnetic sources such as induction stoves, RFID readers or wireless charging systems for electric vehicles.
Pulses interfering with motor vehicle power supply lines acc. to ISO 7637-2	Test pulses 1, 2a, 2b, 3a, 3b and 4	Test pulses 1, 2a, 2b, 3a, 3b and 4	The motor vehicle to which MEDUVENT Standard is fitted should be E1-certified.

WM 67891a 2024-08

Guidelines and manufacturer's declaration - electromagnetic immunity			
MEDUVENT Standard is designed for operation in the electromagnetic environment described below. The customer or user of the MEDUVENT Standard device should ensure that it is used in such an environment.			
Interference immunity tests	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidelines**
			Portable and mobile RF equipment should not be used any closer to the MEDUVENT Standard device including its cables than the recommended separation distance calculated in accordance with the formula applicable to the transmission frequency. **Recommended separation distance:**
Conducted RF interference acc. to IEC 61000-4-6	3 $V_{effective\ value}$ 150 kHz to 80 MHz outside ISM bands[a]	3 V	$d = 1,2\sqrt{P}$
	6 $V_{effective\ value}$ 150 kHz to 80 MHz within ISM bands[a]	6 V	$d = 1,2\sqrt{P}$
Radiated RF interference acc. to IEC 61000-4-3	10 V/m 80 MHz to 2.7 GHz	30 V/m	$d = 0,4\sqrt{P}$ for 80 MHz to 800 MHz
			$d = 0,8\sqrt{P}$ for 800 MHz to 2.5 GHz
			where P is the maximum rated power of the transmitter in watts (W) according to the transmitter manufacturer's information, and d is the recommended separation distance in meters (m).[b] An on-site investigation[c] should demonstrate that the field strength of stationary RF transmitters is below the compliance level at all frequencies.[d] Interference is possible in the environment of devices which bear this symbol. 

Note 1: The higher frequency range applies at 80 MHz and 800 MHz.
Note 2: These guidelines may not be applicable in all cases. The propagation of electromagnetic fields is affected by absorption and reflection associated with buildings, objects, and people.

WM 67891a 2024-08

[a]The ISM frequency bands (for industrial, scientific and medical applications) between 150 kHz and 80 MHz are 6.765 MHz to 6.795 MHz; 13.553 MHz to 13.567 MHz; 26.957 MHz to 27.283 MHz, and 40.66 MHz to 40.70 MHz.
The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz to 2.0 MHz, 3.5 MHz to 4.0 MHz, 5.3 MHz to 5.4 MHz, 7 MHz to 7.3 MHz, 10.1 MHz to 10.15 MHz, 14 MHz to 14.2 MHz, 18.07 MHz to 18.17 MHz, 21.0 MHz to 21.4 MHz, 24.89 MHz to 24.99 MHz, 28.0 MHz to 29.7 MHz, and 50.0 MHz to 54.0 MHz.

[b]The compliance levels in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range from 80 MHz to 2.7 GHz are intended to reduce the likelihood of mobile/portable communication equipment causing interference if it is unintentionally brought into the patient's vicinity. This is why the additional factor of 10/3 is applied when calculating the recommended separation distances in these frequency ranges.

[c]The field strength of stationary transmitters, such as the base stations for radio-frequency telephones and land-based mobile radio equipment, amateur radio stations, AM and FM radio and television transmitters, for example, cannot be precisely determined theoretically in advance. A survey of the site should be considered in order to determine the electromagnetic environment with regard to stationary transmitters. If the field strength measured at the site where MEDUVENT Standard is used exceeds the above compliance levels, MEDUVENT Standard should be monitored to provide evidence of function in accordance with its intended purpose. If unusual performance characteristics are observed, additional measures may be required, such as a different orientation or location for MEDUVENT Standard.

[d]Field strength should be below 3 V/m across the frequency range of 150 kHz to 80 MHz.

Guidelines and manufacturer's declaration - electromagnetic immunity

MEDUVENT Standard has been tested for immunity to the radio services listed below.
If the field strength measured at the site where MEDUVENT Standard is used exceeds the above compliance levels, MEDUVENT Standard should be monitored to provide evidence of function in accordance with its intended purpose. If unusual performance characteristics are observed, additional measures may be required, such as a different orientation or location for MEDUVENT Standard.

Testing frequency **MHz**	**Frequency band [a]** **MHz**	**Radio service [a]**	**Modulation [b]**	**Max. output power** **W**	**Distance** **m**	**Immunity test level** **V/m**
385	380 to 390	TETRA 400	Pulse modulation [b] 18 Hz	1.8	0.3	27
450	430 to 470	GMRS 460, FRS 460	FM [c] ±5 kHz deviation 1 kHz sine	2	0.3	28

WM 67891a 2024-08

Guidelines and manufacturer's declaration - electromagnetic immunity						
Testing frequency **MHz**	**Frequency band** [a] **MHz**	**Radio service** [a]	**Modulation** [b]	**Max. output power** **W**	**Distance** **m**	**Immunity test level** **V/m**
710	704 to 787	LTE Band 13, 17	Pulse modulation [b] 217 Hz	0.2	0.3	9
745						
780						
810	800 to 960	GSM 800/ 900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation [b] 18 Hz	2	0.3	28
870						
930						
1720	1700 to 1990	GSM 1800, CDMA 1900, GSM 1900 DECT, LTE Band 1, 3, 4, 25, UMTS	Pulse modulation [b] 217 Hz	2	0.3	28
1845						
1970						
2450	2400 to 2570	Bluetooth®, WLAN 802.11 b/g/n RFID 2450 LTE Band 7	Pulse modulation [b] 217 Hz	2	0.3	28
5240	5100 to 5800	WLAN 802.11 a/n	Pulse modulation [b] 217 Hz	0.2	0.3	9
5500						
5785						

[a] For some radio services, only the frequencies for uplinking the mobile communication equipment to the base station were included in the table.

[b] The carrier must be modulated with a square wave with a 50 % signal ratio.

[c] As an alternative to frequency modulation (FM), pulse-width modulation with a 50 % 18 Hz signal ratio can be used, as this would represent the worst-case scenario even if it is not the actual modulation.

WM 67891a 2024-08

16.9 Calculating tidal volume on the basis of height

In the start menu, you can set the patient's height under the **New patient** menu item. This section explains how the tidal volume for the patient is calculated from the height and the **Vt per kg body weight** setting in the operator menu (see "9.4 Ventilation presets", page 143).

The ideal body weight (IBW) in kg is calculated from the stated height in cm (x) as shown below:

- Child[1] (height ≤ 154 cm):

$$\text{IBW (child)} = 2.05\ \text{kg} \cdot \exp\left(\frac{x}{50\ \text{cm}}\right)$$

- Adult[2] (height > 154 cm):

$$\text{IBW (female)} = 45\ \text{kg} + 2.3\ \text{kg} \cdot \left(\frac{x}{2.54\ \text{cm}} - 60\right)$$

$$\text{IBW (male)} = 50\ \text{kg} + 2.3\ \text{kg} \cdot \left(\frac{x}{2.54\ \text{cm}} - 60\right)$$

The tidal volume for the patient is calculated and automatically set with the aid of ideal body weight and the setting **Vt per kg body weight** in ml/kg in the operator menu.

$$\text{Vt} = \text{IBW} \cdot \text{Vt per kg body weight}$$

Example:

- Patient, male, height 185 cm
- Setting for **Vt per kg body weight** = 7 ml/kg

$$\text{IBW (male)} = 50\ \text{kg} + 2.3\ \text{kg} \cdot \left(\frac{185\ \text{cm}}{2.54\ \text{cm}} - 60\right) = 79.52\ \text{kg}$$

$$\text{Vt} = 79.52\ \text{kg} \cdot 7\ \frac{\text{ml}}{\text{kg}} = 557\ \text{ml} \approx 560\ \text{ml}$$

[1] Source: TRAUB, S. L.; JOHNSON, C. E.: Comparison of methods of estimating creatinine clearance in children. In: American Journal of Hospital Pharmacy 37, 1980, No. 2, p. 195–201
[2] Source: DEVINE, B. J. Gentamicin therapy. The Annals of Pharmacotherapy, 1974, 8th year, No. 11, p. 650-655

WM 67891a 2024-08

16.10 Service data

16.10.1 Structure and content of service data

When you have exported the service data to an SD card (see "9.7 Importing/exporting data", page 150), there is a folder named **MEDUVENT Standard SNXXXX** on the SD card. The following files are located in this folder:

File name	Description
MVS_SNXXXX_debug.wm	Supports communication in the event of servicing. Only for internal use at WEINMANN Emergency.
MVS_SNXXXX_fcheck.txt	Recorded function checks (see "16.10.2 Recorded function checks (fcheck file)", page 229)
MVS_SNXXXX_status_A.txt	Supports troubleshooting and session reconstruction in the event of servicing.
MVS_SNXXXX_status_B.txt	
MVS_SNXXXX_status_C.txt	
update.txt	Contains information about software updates performed.

16.10.2 Recorded function checks (fcheck file)

The **fcheck** file stores the function checks which have been carried out, together with the date, time, and their results. This information helps you with documentation in the context of your quality management system. You can open the **fcheck** file with a spreadsheet program (e.g. Microsoft® Excel®).

The following tests are performed as part of the function check and listed in the **fcheck** file:

Columns	Description
#date	Date of the function check
time	Time of the function check
sequence	Sequential session number
uid	Unique numerical description of the log entry type
fcheck	Indicates that this is a log entry in the context of the function check

WM 67891a 2024-08

Columns	Description
result	Overall result of the function check: • **ok** = check passed • **failed** = check failed • **not tested** = check not performed A function check is considered failed if at least one test is failed.
alarmsystem	Check of visual and audible alarms including alarm for • Airway pressure high ↑ • Energy failure
buttontest	Check of buttons and navigation knob
filterwear	Check of hygiene filter
medutrigger	Check of MEDUtrigger
powerelectronics	Check of electronics
blower	Check of blower
flowout	Check of zero point of flowout differential pressure sensor
flowo2	Check of zero point of flowO_2 differential pressure sensor
presplausible	Check of airway pressure sensor (pneumatic)
expvalvecontrol	Check of patient valve control
hosesystemtight	Check of breathing circuit for leaks
expvalvetight	Check of patient valve for leaks
volplausible	Check of volume administered
checkvalvetight	Check of check valve diaphragm in patient valve
flowoutplausible	Cross-check of flow measurement sensors (flowout and flowo2)
pawaccurate	Check of airway pressure sensor (pneumatic)
deviceconfig	Check of device configuration
oxygeninletopen	Check of oxygen inlet

16.10.3 Recorded session data

The device saves detailed session data of up to 20 session hours. The maximum saved duration per session is 2 h.

Depending on the frequency of the sessions, the time required to export the data may vary.

WM 67891a 2024-08

The following data are saved in the session data:

- Measured values: The device records means of the measured values as trend data.
- All ventilation settings and their changes: All alarms which have occurred and changes to settings are saved immediately.

16.11 Alarms

16.11.1 Alarm delay times

Alarm	Delay time
Apnea	Adjustable from 4 s to 60 s
Vt not achievable • At 5/min • At 40/min	Triggers after 2 mechanical breaths. Up to 24 s 3 s
Frequency high ↑ • At 5/min • At 40/min	Triggers after 2 mechanical breaths. Up to 24 s 3 s
Vt low ↓ **/ Stenosis** • At 5/min • At 40/min	Triggers after 2 mechanical breaths. Up to 24 s 3 s
PEEP high ↑ • At 5/min to 8/min • At 40/min	Triggers after 2 mechanical breaths. 5 s 3 s
Expiratory minute volume high ↑ **Expiratory minute volume low** ↓ • At 5/min to 8/min • At 40/min	Triggers after 1 mechanical breath. 12 s 1.5 s
Oxygen concentration high ↑ **Oxygen concentration low** ↓	Up to 60 s

16.11.2 Recording of the alarm system

Alarms are recorded together with other events in the internal memory and can be exported to the SD card (see "16.10.1 Structure and content of service data", page 229).

The amount of data saved is limited to a maximum of 2 × 1.5 MB. When the limit of 2 × 1.5 MB is reached, the oldest 1.5 MB are deleted.

WM 67891a 2024-08

17 Warranty

The warranty terms and conditions are available at www.weinmann-emergency.com.

18 EU declaration of conformity

WEINMANN Emergency Medical Technology GmbH + Co. KG hereby declares that the product complies fully with the relevant provisions of Regulation (EU) 2017/745 for medical devices. The unabridged text of the EU declaration of conformity can be found on our website at www.weinmann-emergency.com.

WM 67891a 2024-08

Manufacturer
WEINMANN Emergency
Medical Technology GmbH + Co. KG
Frohbösestraße 12
22525 Hamburg
GERMANY
T: +49 40 88 18 96-0
E: customerservice@weinmann-emt.de

Center for Production, Logistics, Service
WEINMANN Emergency
Medical Technology GmbH + Co. KG
Siebenstücken 14
24558 Henstedt-Ulzburg
GERMANY

CE 0197

WM 67891a 2024-08 EN