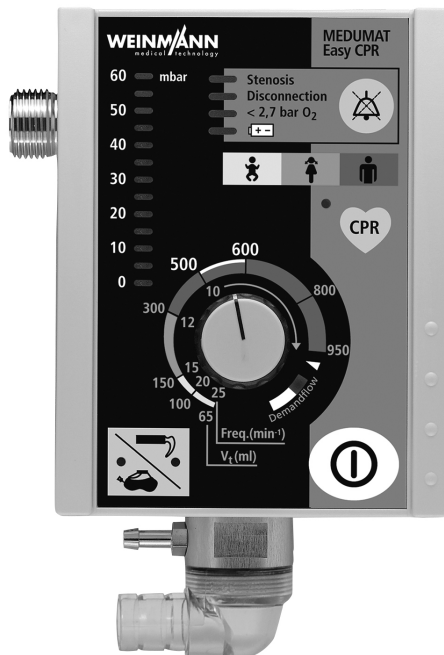


MEDUMAT Easy CPR

ERC 2010

Ventilator

Description and instructions for use



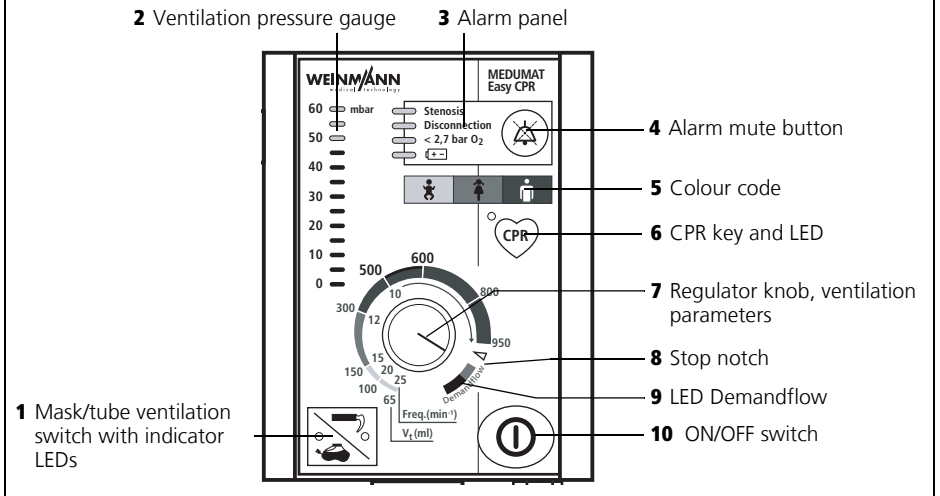
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1. Overview

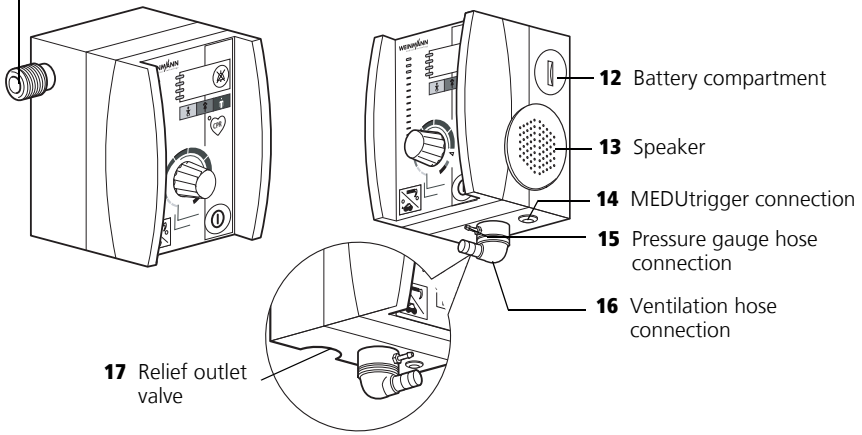
1.1 Device

MEDUMAT Easy CPR control panel

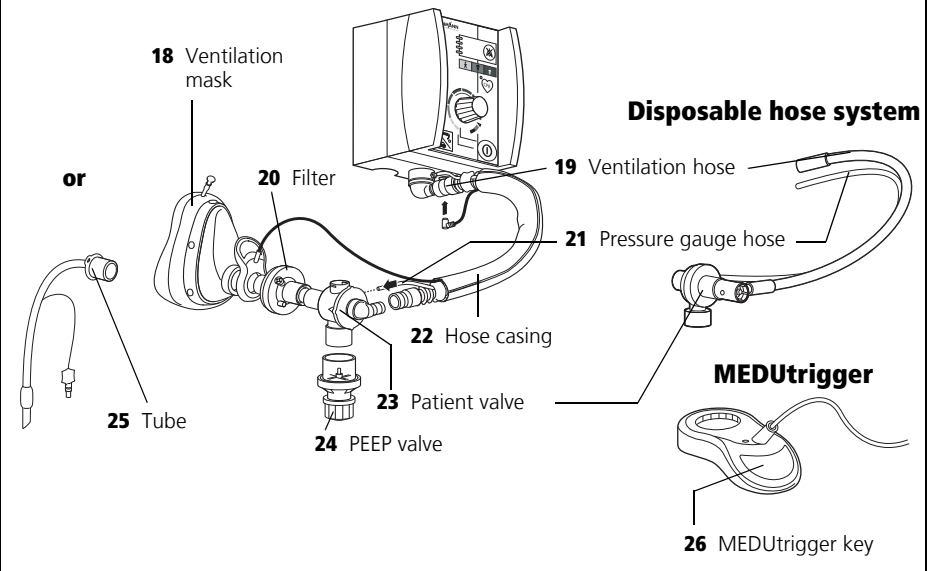


MEDUMAT Easy CPR connections

11 Pressurized gas connection

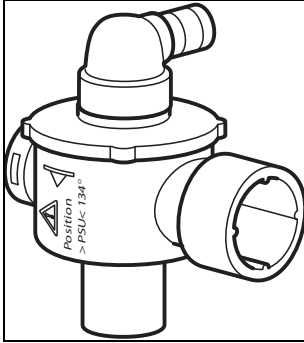



MEDUMAT Easy CPR device combinations




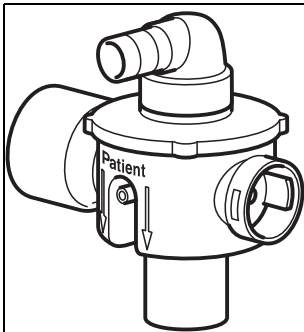
1.2 Particular markings on the device

Patient valve



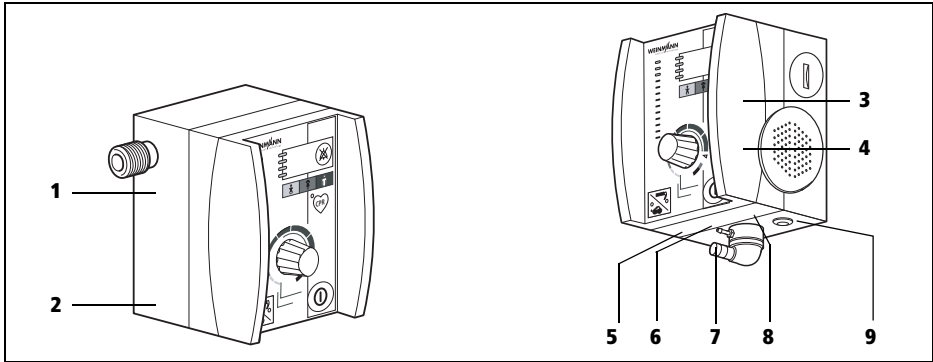
The  symbol on the patient valve is a reminder that the lip membrane must be changed immediately if it becomes crinkled, sticky or misshapen. The patient must not be used again until the membrane has been changed, as this could cause malfunction (see "7.4 Checking patient hose system" on page 50).

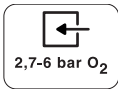
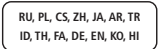









The  symbol indicates the correct position for insertion of the lip membrane.


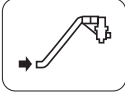






When connecting the patient valve, take care to ensure that the direction of respiratory gas flow is correct (see arrows).

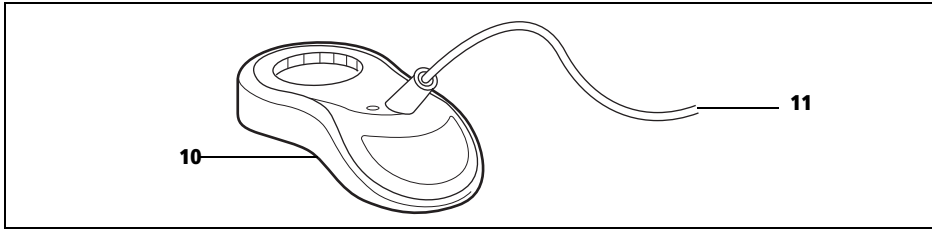
MEDUMAT Easy CPR









1		Inlet 2.7 - 6 bar O ₂
2		Languages available on this device
MEDUMAT Easy CPR ID plate		
3		Serial number of device
		Date of manufacture
		3.6 V lithium battery
		Direct voltage
		CE symbol (confirms that the product conforms to the applicable European directives)
		Protection against ingress of water
		Protection class BF
		Do not dispose of the device in domestic waste
		ERC mark (ERC recommendations taken into account)

4		Follow instructions for use
6		Tube system connection
7		Maximum pressure ≤ 100 mbar
9		Indicates where to connect the MEDUtrigger.
Safety check and servicing label		
8		Safety check [STK] label: (Germany only): indicates when the next safety check as per §6 of the German law governing medical devices and their owners/operators is required.
5		Service label: Indicates when the next service is required.

MEDUtrigger



MEDUtrigger ID plate

10		Protection class BF
		Do not dispose of the device in domestic waste
	CE 0197	CE symbol (confirms that the product conforms to the applicable European directives)
	IP54	Protection against ingress of dust and water
		Protection class II, protective insulation
		Date of manufacture
11	 	Keep connector upright and do not rotate it when taking it out

2. Description of device

2.1 Intended use

MEDUMAT Easy CPR is an automatic oxygen respiration device (short-term ventilator) with additional inhalation facility.

You can use MEDUMAT Easy CPR:

- to revive patients at the site of the emergency;
- for longer periods in more protracted emergencies, e.g. fires;
- for short-term O₂ inhalation using a respiration mask.

You can use MEDUMAT Easy CPR while transporting patients:

- between the various rooms and departments of a hospital;
- between the hospital and other premises;
- in emergencies;
- when transport over considerable distances is planned.

MEDUMAT Easy CPR:

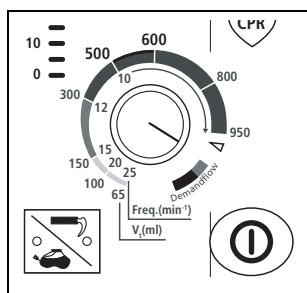
- is designed to provide controlled ventilation to persons of 10 kg body weight or more;
- is used to treat respiratory arrest;
- can be preset to parameters that ensure evenly balanced ventilation, provided that the selected maximum ventilation pressure P_{max} is not exceeded.

- permits respiration-controlled oxygen inhalation in Demand mode.
- enables the user to initiate individual ventilation strokes in CPR mode.

2.2 Owner/operator and user qualification

As an owner/operator or user, you must be familiar with the operation of this medical device. Observe the legal requirements for operation and use (in Germany, the regulations governing owner/operators of medical devices apply in particular). Basic recommendation: get a person authorized by WEINMANN Emergency to provide you with proper instruction about the handling, use and operation of this medical device.

2.3 Ventilation function



MEDUMAT Easy CPR operates within a pressure range of 2.7 to 6 bar and at a flow rate of not less than 70 l/min O₂. It has a built-in power pack.

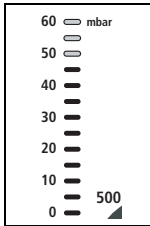
It uses high-pressure, medicinal-grade oxygen. An external pressure reducer brings this down to the required operating pressure. The oxygen supply is fed in at input valve.

The infinitely adjustable ventilation values (frequency and tidal volume are linked) are regulated by internal electronic control mechanisms.

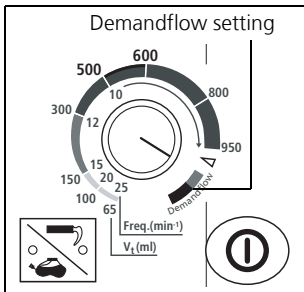
The gas for inspiration flows along the hose and through the patient valve and either the mask or tube into the patient's airways. The patient valve is

fitted with a lip membrane that enables expired gas to be conducted away through the expiration tube.

You can check the course of ventilation at ventilation pressure gauge.

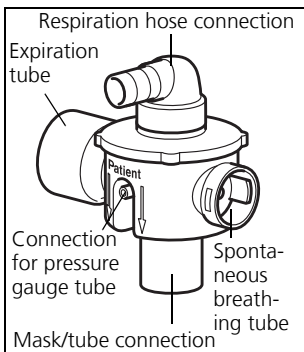


2.4 Demandflow function



The Demandflow setting switches the MEDUMAT Easy CPR breathing-controlled O₂ inhalation. Such inhalation must be carried out with the respiration mask. A small inspiration (trigger-) pulse causes oxygen to continue flowing until slight overpressure interrupts the flow. Expiration then takes place via the patient valve as in ventilation.

2.5 Patient hose system with patient valve



The respiratory gas is routed to the patient via the patient hose system with patient valve. The patient hose system with patient valve is designed so that even if the ventilator fails, spontaneous breathing is possible, regardless of which ventilation mode you have selected.

2.6 Audio response

The device has an audio response facility that can be switched on for user guidance, especially for users who have little practice.

If audio response is not required, a key combination can be used to switch it off (see “5.11 Audio response for user guidance” on page 34).

3. Safety instructions

3.1 Safety information

For your own safety and the safety of your patients and in accordance with the requirements of Directive 93/42 EEC, please note the following:

General

- Please read these instructions for use through carefully. They are a constituent part of the device and must be available at all times.
- Use the MEDUMAT Easy CPR for the described purpose only (see “2.1 Intended use” on page 9).
- The user must subject the patient hose system to a functional check and a visual inspection before use (see “7.4 Checking patient hose system” on page 50).

Note

- Do not use the MEDUMAT Easy CPR in toxic environments or where there is a risk of explosion.
- MEDUMAT Easy CPR is not suitable for hyperbaric use (pressure chamber).
- Do not use MEDUMAT Easy CPR with flammable anesthetics.
- A back-up ventilator should always be available in case of technical failure.
- Before starting to work with MEDUMAT Easy CPR, you must understand how to operate it.

- To prevent infection or bacterial contamination, please observe section “6. Hygiene preparation” on page 42.
- MEDUMAT Easy CPR should be used only by medically qualified personnel who have had training in ventilation techniques. Severe physical damage may be caused by incorrect use.
- Be aware that a safe distance needs to be maintained between MEDUMAT Easy CPR and devices which emit HF radiation (e.g. cell phones), otherwise there might be malfunctions (see “11.4 Relationship between ventilation parameters” on page 72).
- We recommend having measures such as servicing and repair work carried out by the manufacturer, WEINMANN Emergency, or by specialists expressly authorized to do so.
- If third-party items are used, functional failures and restricted fitness for use may result. Biocompatibility requirements may also not be met. Please note that in these cases, any claim under warranty and liability will be void if neither the accessories nor genuine replacement parts recommended in the instructions for use are used.
- Design changes to the device are not permitted and may put patients and users at risk.

Oxygen



Spontaneous explosive reactions can occur if highly-compressed oxygen comes into contact with flammable substances (grease, oil, alcohol etc.).

- Keep the devices and all screwed connections absolutely free of oil and grease.
- Always wash your hands before starting to work on the oxygen supply.

- Smoking and open flames are strictly prohibited in the vicinity of all fittings containing or transporting oxygen.
- During assembly and when changing oxygen bottles only hand-tighten screwed connections to the bottle and the pressure reducer. Never use tools for this purpose. Excessive tightening damages the screw threads and seals, and can cause leaks.
- Protect oxygen cylinders from accidental falls. If a cylinder falls over, the pressure reducer or the valve may break off and cause a violent explosion.

Important

- Always open the bottle valve slowly to stop pressure hammer to the fittings.
- The oxygen cylinder should never be completely emptied, as this may allow air containing moisture to enter the cylinder and cause corrosion.



Ventilation/Operation

- Both patient and ventilator must be kept under constant observation during ventilation.
- When connecting the patient valve, please ensure that the direction of respiratory gas flow (> patient >) is correct. Make sure that neither the expiration tube nor the spontaneous breathing tube on the patient valve are blocked or their function impeded in any other way, e.g. by the patient's position.

Note

- Disposable hose system WM 28110 is intended to be used only once.

Software

- Extensive validation tests have been performed to minimize risks arising from software errors.

Accessories

- Keep silicone/rubber parts out of UV light and avoid prolonged exposure to direct sunlight, otherwise these materials may become brittle and crumble.

4. Installation

Permanent mounting is usually necessary only when MEDUMAT Easy CPR is installed as a fixture in rescue vehicles, helicopters or aircraft.

If MEDUMAT Easy CPR is supplied complete on a carrying platform or in an emergency rucksack, it is ready for use and requires no further installation. Separate directions for use are supplied for carrying platforms and emergency rucksacks.



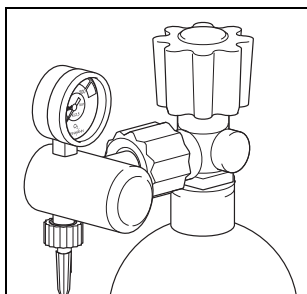
In order to ensure safe and reliable operation, functional tests must be carried out after installation (see "7. Functional check" on page 47).

4.1 Connecting the oxygen cylinder



Always wash your hands thoroughly before starting any work on the oxygen supply. Products containing hydrocarbons (e.g. oils, greases, alcohols, hand creams, sticking plasters) may cause explosive reactions if they come into contact with high-pressure oxygen.

Never use wrenches or similar tools to tighten or loosen the screw connections.



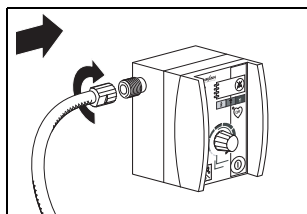
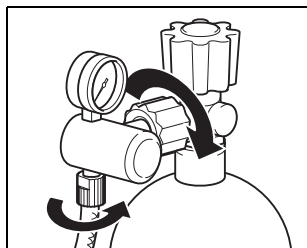
Removing the empty cylinder

1. Close the valve of the oxygen cylinder. Switch on MEDUMAT Easy CPR with ON/OFF switch. This exhausts any residual oxygen and depressurizes the ventilator. Wait until the pressure gauge on the pressure reducer shows 0 bar before undoing the screw connection by hand.
2. Switch off MEDUMAT Easy CPR again.

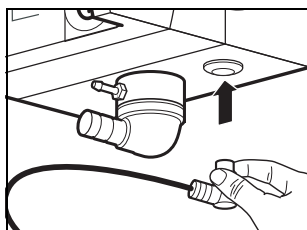
3. Then loosen the screw connection to the cylinder.

Connecting the new cylinder

1. First briefly open and close the valve of the new oxygen cylinder. This is to blow away any potential particles of dirt. Keep the valve opening away from the body, making sure that neither yourself nor other persons can be injured by escaping particles.
2. Screw the pressure reducer to the bottle valve using the corrugated union nut. Tighten the union nut hand-tight.
3. If appropriate, screw the pressure tube to the outlet of the pressure reducer using union nut G 3/8.
4. Screw the other end of the pressure hose on to pressure gas connection on the MEDUMAT Easy CPR if this has not yet been done.



4.2 Ventilation hose and MEDUtrigger

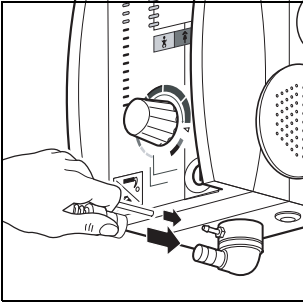


1. Slide the MEDUtrigger onto the MEDUtrigger connection.

Note:

When the MEDUtrigger connector is pulled out, it must be released from the socket from underneath by initially being pushed briefly in a vertical direction. Make sure that you do not rotate the MEDUtrigger connector when either

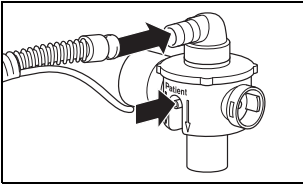
connecting or disconnecting it. The connection socket may be damaged if the MEDUtrigger connector is rotated.



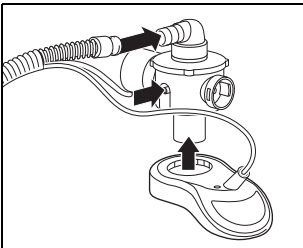
2. Slide the pressure gauge tube onto connection.
3. Slide the ventilation hose onto connection. Make sure that this does not cause any kinks in the pressure gauge tube already connected. If necessary, turn the ventilation tube in the appropriate direction while pushing it on.



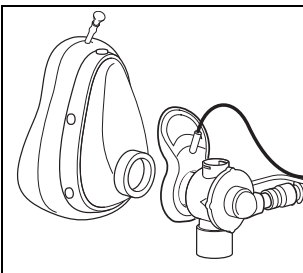
Always grasp the ventilation hose and pressure gauge tube by their end only (position of arrow in adjacent drawing), otherwise they may be damaged or split.



4. Connect the patient valve to the other end of the ventilation hose and pressure gauge tube.

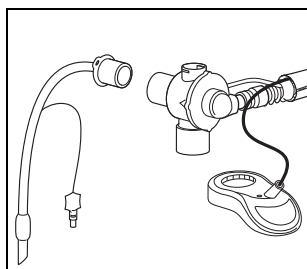


5. Connect the MEDUtrigger to the mask/tube connection.
6. Place the hose casing around the ventilation tube and the connection line for the MEDUtrigger.
7. Fasten the hose casing with the hook-and-loop tape and close it with the zip fastener.



8. If a mask is being used for ventilation, attach the mask connection to the patient valve (identical with tube connection),

or

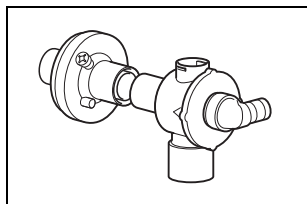


if the patient is intubated, attach the patient valve to the tube.

Filter

If a filter is to be used, this should be installed between the patient side connector on the patient valve and the mask or tube. In this case, the MEDUtrigger is attached to the filter.

Always follow the instructions supplied by the manufacturer of the filter.



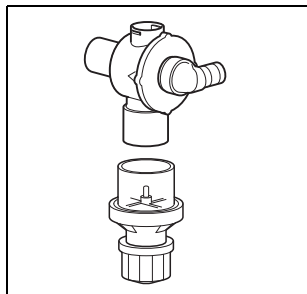
Note

Please note that the respiratory resistance of the entire system is increased when an HME filter or bacteria filter is used and under certain circumstances, may exceed the value permitted by EN 794-3.

PEEP valve

If a PEEP valve is to be used, this should be inserted into the expiration tube on the patient valve.

To adjust the PEEP valve, always follow the instructions supplied by its manufacturer.



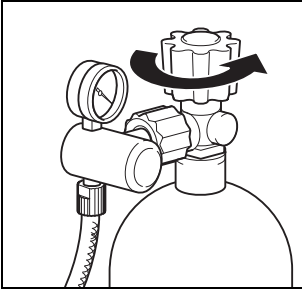
4.3 Wall mounting set

A wall mounting set (see “10.2 Accessories” on page 66) is available for permanent fixing, e.g. on a vertical surface inside a vehicle.

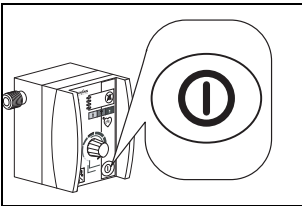
Please refer to the sheet enclosed with the wall mounting set for details of dimensions and installation procedure.

5. Using the ventilator

5.1 Switching on/self-test

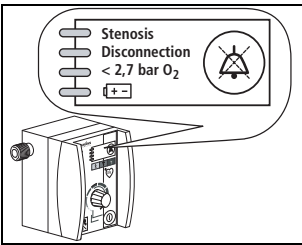


1. Please open the valve of the oxygen cylinder **slowly**. The pressure gauge will now show the pressure in the cylinder.



2. Where appropriate, calculate the remaining operating time (see “5.13 Calculation of oxygen content/remaining operating time” on page 39). You should change the bottle in good time, e.g. at below 50 bar, to ensure an adequate operating time.
3. Select the desired ventilation settings (see “5.2 Selecting the ventilation settings” on page 23).
4. Switch on the MEDUMAT Easy CPR with ON/OFF switch. The ventilator will then run a self-test lasting approx. 2 seconds.

If audio response is enabled, before the self-test you will hear “ऑक्सीजन सिलेंडर खोलें!” (“Open oxygen cylinder”).



During this test, the four LEDs in alarm panel flash on and off and a short acoustic alarm sounds.

If an error is found, all the LEDs in alarm panel continue flashing and an alarm sounds. If this happens, MEDUMAT Easy CPR must not be used for ventilation.

If audio response is enabled, you will hear the message “डिवाइस में खराबी है! वैकल्पिक वेंटिलेशन प्रदान करें” (“Device malfunction! Administer alternative ventilation”).

After the self-test, the ventilator repeatedly checks the oxygen cylinder pressure until adequate pressure is detected. Otherwise an alarm is sounded.

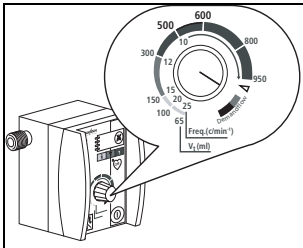
The MEDUMAT Easy CPR will then start to function with the selected ventilation settings.

5.2 Selecting the ventilation settings

We recommend selecting the ventilation settings before switching on, to prevent unnecessary waste of oxygen.

Respiratory frequency and tidal volume

1. Set the minute volume (tidal volume) to the respiratory frequency with the ventilation settings regulator knob.



Distribution of ventilation settings

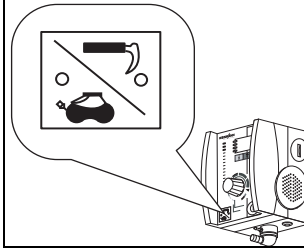
Colour code:	yellow	orange	brown				
Age (years)	1 - 5	5 - 16	16+				
Body weight (kg)	10-25	20-45	45	75	90	120	140
Respiratory frequency (min⁻¹)	25-15	15-12	12	10	10	10	10
Tidal volume (ml)	65-150	150-300	300	500	600	800	950

The figures shown in the table are only recommendations. Different settings may be required in cases of pulmonary damage or for special indications.



To see the relationship between the values, see diagram “11.4 Relationship between ventilation parameters” on page 72.

Maximum ventilation pressure

1. Use the mask/tube switch to set the ventilation pressure. The LED lights up in active mode.



Recommended maximum ventilation pressure:

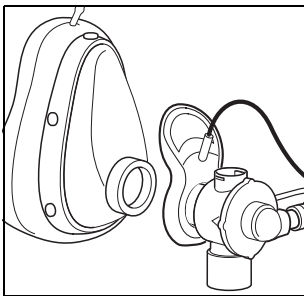
Mask ventilation 	Tube ventilation 
20 mbar	45 mbar
Audio response enabled: “वेंटिलेशन दबाव की सीमा 20 mbar” (“Ventilation pressure limit 20 mbar”)	Audio response enabled: “वेंटिलेशन दबाव की सीमा 45 mbar” (“Ventilation pressure limit 45 mbar”)

If the maximum ventilation pressure is reached, e.g. in cases where compliance is inadequate, MEDUMAT Easy CPR sets off a stenosis alarm (see “Stenosis alarm” on page 31).

Note: The mask/tube switch can only be operated when the ventilator is switched on.

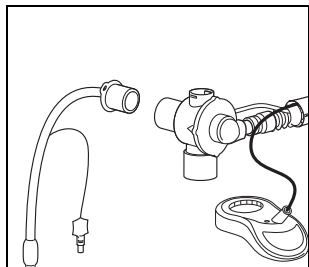
5.3 Performing ventilation

Ventilation mask



1. Attach the mask to the patient valve.
2. If necessary, insert a Guedel tube to keep the airway open before putting on the mask.
3. Place the mask over the patient's mouth and nose.
4. Tilt the head back and use the E-C technique to ensure the mask is hermetically sealed.

Intubation



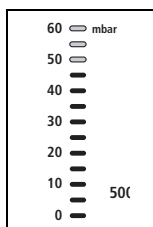
The patient will normally be intubated before the tube is connected to the patient valve.

Risk of injury from the tube moving! The MEDUtrigger on the patient valve may move the tube and injure the patient. Detach the MEDUtrigger from the patient valve before putting the patient valve on the tube.

1. Detach the MEDUtrigger from the patient valve.
2. Attach the patient valve to the connector of the tracheal tube.
3. Monitor the respiratory parameters during ventilation. This will indicate whether the tube is correctly positioned and ventilation is adequate.

5.4 Monitoring ventilation

The patient must be monitored constantly during ventilation.

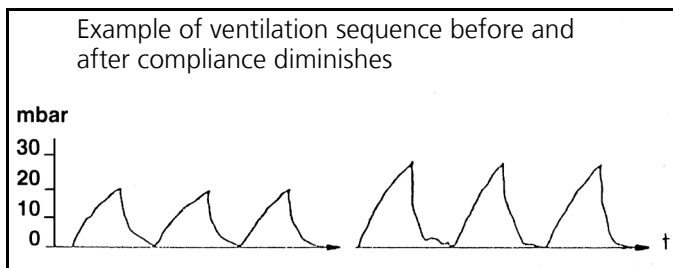


You can read off ventilation pressure on the ventilation pressure gauge.

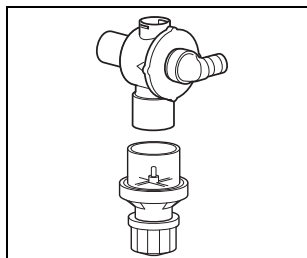
High airway resistance, as a result of obstructions or external cardiac massage for example, will change the tidal volume set. Use suitable volume measuring devices to check the tidal volume actually administered.

Check respiratory parameters during ventilation.

If lung compliance diminishes during ventilation, the ventilator will react by increasing the ventilation pressure at constant volume.



5.5 Ventilation with PEEP valve

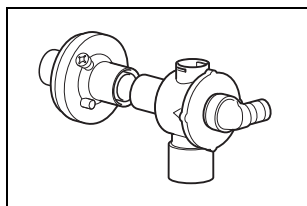


A PEEP valve can be fitted to the expiration tube on the patient valve with an adapter.

This valve makes it possible to use positive end-expiratory pressure (PEEP).

Please see the PEEP valve instructions for details of settings.

5.6 Ventilation with filter



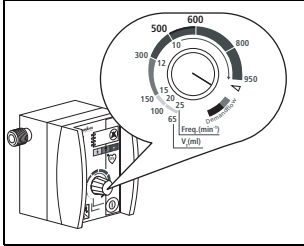
A conventional filter with standard 15/22 mm connectors can be fitted on the inspiration tube of the patient valve for hygiene purposes and to condition the air for inspiration. This will increase both inspiratory and expiratory resistance. You should therefore monitor ventilation pressure and ventilation volume very carefully.

A close watch must be kept for any increase in dead space, especially in children.

Always be sure to follow the instructions supplied by the manufacturer of the filter.

5.7 Demandflow

Note: A PEEP valve must **not** be fitted when using the ventilator in Demandflow mode!



Demandflow must be switched on for O₂ inhalation.

To switch the MEDUMAT Easy CPR to Demandflow mode, turn the ventilation settings regulator knob until it engages in the fixed point marked by the white triangle. The green LED indicates that it is ready for operation. If audio response is enabled, the ventilator announces “डिमांडफ्लो मोड” (“Demandflow mode”).

Attach the mask to the patient valve and place it over the patient’s mouth and nose. Hold the mask to ensure a firm seal. The flow is switched on by the patient breathing in (triggering the device). When the patient starts to breathe out, the flow stops and the expired air is removed via the patient valve. The patient should breathe calmly and evenly. The Demandflow cannot be altered. Fresh air is automatically mixed in with the oxygen when there are more respiratory strokes. This is done via the spontaneous breathing tube of the patient valve.

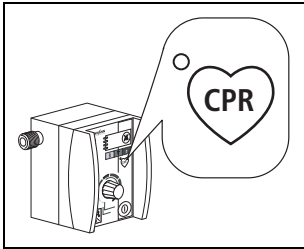
The Demandflow mode is ended by turning the regulator knob back to ventilation mode from the index position marked by the white triangle, or by switching off the ventilator.

If audio response is activated, the ventilator confirms the return to ventilation mode by announcing: “वेंटिलेशन दबाव की सीमा 20 mbar” (“Ventilation pressure limit 20 mbar”).

5.8 CPR mode

Automatic ventilation with the selected frequency is stopped when CPR mode is activated. With the help of MEDUtrigger, you can trigger single respiratory strokes with the selected tidal volume. This enables you to choose the respiratory frequency administered yourself.

Note: CPR mode can only be activated if the MEDUtrigger is connected.



1. Switch on CPR mode by pressing the CPR key. The LEDs on the CPR key and MEDUtrigger light up to indicate operating readiness. If audio response is enabled, you should hear the message “सीपीआर मोड सक्रिय है एवं वेंटिलेशन मैनुअल रूप से ट्रिगर है” (“CPR mode activated! Ventilation triggered manually!”).
2. If metronome is enabled, you should hear the message “अब चेस्ट कंप्रेशंस करें” (“Perform chest compressions now!”). Undertake chest compressions to the beat of the metronome 30 times (110 min^{-1}). The tone pitch rises for the last three strokes of the metronome.
3. You should hear the message “दो वेंटिलेशन प्रदान करें!” (“Provide 2 ventilations now!”). You now have 5 seconds to trigger 2 ventilation strokes.
Ventilate the patient by pressing the MEDUtrigger key:
 - Hold this key until the second ventilation stroke has begun,
 - or
 - manually trigger the second ventilation stroke by pressing the MEDUtrigger key again, if the expiration phase of the first ventilation stroke has ended.

A ventilation stroke cannot be triggered during inspiration and expiration phases. The LEDs on the MEDUtrigger do not light up at this time. The length of the expiration phase matches the length of the inspiration phase (respiration-time ratio is 1:1).

4. Alternate between undertaking chest compressions 30 times and ventilation 2 times.
5. At the end of the heart and lung resuscitation, switch CPR mode off by pressing the CPR key .

Notes:

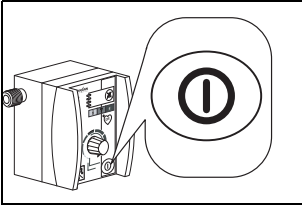
- Voice messages and metronome are constant. We advise that you conform to the metronome and audio responses.
- If CPR mode is switched on during an active resuscitation and the voice messages and the metronome are not synchronized to the resuscitation, current guidelines recommend undertaking chest compressions before ventilation.
- Audio responses for the “stenosis” and “disconnection” alarms are deactivated during CPR mode.
- If the metronome is switched on, pause the acoustic alarms during the phases with chest compressions and audio responses.
- If the key on the MEDUtrigger is pressed and no respiratory stroke is triggered (e.g. if the previous respiratory stroke is not yet over or if CPR mode is not activated) then a notification alarm sounds.
- Audio responses and metronome can be switched off (see “5.11 Audio response for user guidance” on page 34 and “5.12 Switching the metronome on and off” on page 38). This makes particular sense if the MEDUMAT Easy CPR is being used with other devices that have audio responses and/or a metronome (e.g. AED).

- CPR mode cannot be activated when in Demandflow mode. CPR mode switches itself off as soon as Demandflow mode is activated.

5.9 Terminating ventilation or Demandflow

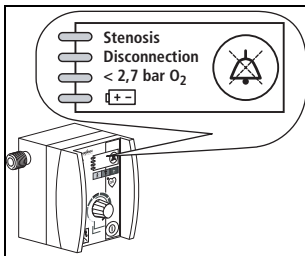
Important!

Never empty the oxygen cylinder completely. Return the cylinder for filling while it still contains residual pressure. This prevents entry of moist atmospheric air that can cause corrosion.



1. Check the oxygen supply on the pressure reducer gauge. You should change the bottle in good time, e.g. at below 50 bar, to ensure an adequate operating time.
2. Close the valve of the oxygen cylinder.
3. Switch off MEDUMAT Easy CPR. To prevent the ventilator being switched off unintentionally, ON/OFF switch must be kept pressed down for at least 2 seconds until the LEDs in the alarm panel light up. If audio response is enabled, you should hear the message: "ऑक्सीजन सिलेंडर बंद करें." ("Close oxygen cylinder").

5.10 Alarm signals

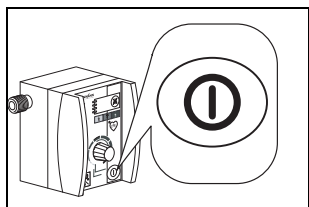


The alarm panel signals the following alarms:

- Stenosis:** Stenosis, or maximum ventilation pressure P_{max} reached in two successive inspiration phases
- Disconnection:** Disconnection between MEDUMAT Easy CPR and patient in two successive inspiration phases
- < 2.7 bar:** Drop in oxygen pressure to below 2.7 bar
- [+ -]:** Battery charge inadequate

All the visual alarms are accompanied by an acoustic alarm.

If the ventilator detects a malfunction during the self-test after switching on or during continuous operation, all LEDs in the alarm panel stay flashing on and off, and an acoustic alarm sounds. If audio response is enabled, you should hear the message “डिवाइस में खराबी है! वैकल्पिक वेंटिलेशन प्रदान करें” (“Device malfunction! Administer alternative ventilation!”).



In this case you must not use the MEDUMAT Easy CPR. The failure alarm can be confirmed by pressing the ON/ OFF switch.

The patient valve is designed to enable spontaneous breathing in the event of equipment failure.

When is the alarm triggered?

An alarm signal is given as soon as any one of the functional problems mentioned above occurs. The relevant LED starts flashing and an acoustic signal sounds. If audio response is enabled, the user also hears additional information about the individual alarm.

Simultaneous disconnection and drop in oxygen pressure will initially trigger only the **< 2.7 bar** alarm.

Stenosis alarm

Actual ventilation pressure exceeds the maximum ventilation pressure (20 or 45 mbar).

MEDUMAT Easy CPR briefly switches to expiration if the maximum ventilation pressure is exceeded, but then tries to continue inspiration in the same inspiration phase.

If the maximum ventilation pressure is exceeded for a second time during the same inspiration phase, the unit finally switches to expiration and vents the patient tube system completely. The next inspiration begins with the following ventilation stroke according to the frequency selected. This does not affect the set frequency.

The alarm is triggered if airway resistance is exceeded in **two** successive inspiration phases. This is intended to prevent false alarms, e.g. due to coughing.

If audio response is enabled, the unit announces “एयरवेज़ और सेटिंग्स की जांच करें!” (“Check airways and settings”) (not in CPR mode).

Disconnection alarm

As a rule this alarm is due to interruption of the breathing system.

The alarm is triggered when the rise in pressure fails to reach at least 8 mbar in **two** successive inspiration phases.

If audio response is enabled, the unit announces “वेंटिलेशन सिस्टम और सेटिंग्स की जांच करें!” (“Check ventilation system and settings”).

Disconnection alarm in CPR mode

If, when in CPR mode, no respiratory stroke is triggered during a break specified by the metronome and also during the subsequent phase of metronome sounds, the “Disconnection” alarm is triggered. The “Disconnection” alarm is triggered after 45 seconds if the metronome is switched off and no respiratory strokes are triggered. If audio response is enabled, the

unit announces “वेंटिलेशन मास्क सेटिंग्स जाँच लें” (“Rule out respiratory arrest and check mask fit.”).

Disconnection alarm in Demandflow mode

If the patient does not trigger MEDUMAT Easy CPR within 15 seconds, the “Disconnection” alarm is given. If audio response is enabled, the unit announces “वेंटिलेशन मास्क सेटिंग्स जाँच लें” (“Rule out respiratory arrest and check mask fit.”).

< 2.7 bar O₂ alarm

Oxygen pressure at the pressure connection to the MEDUMAT Easy CPR has dropped to less than 2.7 bar. The reason is usually an almost empty oxygen cylinder.

In this case, MEDUMAT Easy CPR can no longer function correctly because the operating parameters are no longer within the permissible limits.

If audio response is enabled, you should hear the message: “प्रेसर की नली तथा गैस सप्लाई जाँच लें” (“Check pressure hose system and gas supply!”).

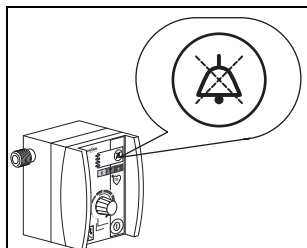
alarm

The battery is failing. Failure of the automatic ventilation function must be expected. Immediate steps must therefore be taken to provide alternative ventilation (see “5.14 Alternative ventilation procedures” on page 41).

If audio response is enabled, you should hear the message “डिवाइस में खराबी है! वैकल्पिक वेंटिलेशन प्रदान करें” (“Device malfunction! Administer alternative ventilation”).

The ventilator must be switched off before the battery can be changed (see "Changing the main battery" on page 63).

Cancelling acoustic alarm



If there is an alarm, you can temporarily cancel the acoustic alarm by pressing the alarm mute button:

Stenosis:	30 seconds
Disconnection:	30 seconds
< 2.7 bar:	30 seconds
[+ -]:	120 seconds

The visual alarm will continue to flash.

If the cause of the alarm is not eliminated, the acoustic alarm will start to sound again after a short interval. Audio response will also resume automatically.

Both the visual and acoustic alarms are cancelled automatically as soon as the malfunction is eliminated.

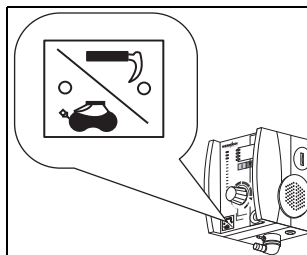
5.11 Audio response for user guidance

Selecting language/switching off audio guidance

The language setting can only be selected if the unit is switched off.

To select a language or to switch off the audio response facility, proceed as follows:

1. Hold down the mask/tube switch. Switch on the ventilator at the ON/OFF switch.
2. Then release the mask/tube switch. The unit is now in the language selection menu. The ventilation pressure gauge displays the most recent

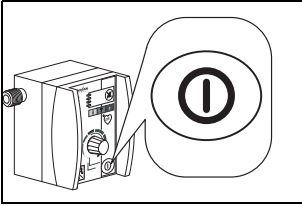
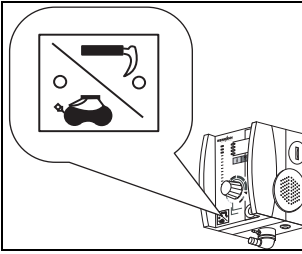


language setting. The following languages are assigned to the individual LEDs:

Device number	mbar	Language, Level 1	Language, Level 2 (Stenosis and disconnection alarm LEDs come on)
WM 28140 WM 28150 (French variant)	60	Icelandic	Still free
	55	Finnish	
	50	Norwegian	
	45	Swedish	
	40	Danish	
	35	Portuguese	
	30	Spanish	
	25	Dutch	
	20	Italian	
	15	French	
	10	English	
	5	German	Brazilian Portuguese
	0	Audio response off	Audio response off
WM 28160 WM 28190 (Japanese variant)	60	Farsi	Still free
	55	Thai	
	50	Indonesian	
	45	Turkish	
	40	Arabic	
	35	Japanese	
	30	Chinese	
	25	Czech	
	20	Russian	
	15	Polish	
	10	English	
	5	German	Korean
	0	Audio response off	Audio response off

Note:

Additional languages may be available depending on the firmware.



3. Press mask/tube switch as many times as necessary until the LED for the desired language lights up and a corresponding message is heard (example: LED 10 mbar, language: English, message: "Selected language: English."). After five seconds the new selection is stored.

Tip

By pressing the ON/OFF switch briefly you can store the language selection without waiting for five seconds.

As there are more languages than LEDs on the ventilation pressure gauge, a new cycle starts on Level 2 once the 60 mbar LED has been reached. Level 2 is displayed by the stenosis and disconnection alarm LEDs. Once the last language on Level 2 has been reached, the cycle starts again at 0 mbar on Level 1 and the stenosis and disconnection alarm LEDs go out.

Select the setting 0 (0 mbar) if you want to switch off the audio response facility. You will then hear the message: "ऑडियो प्रतिक्रिया बंद है" ("Audio response is off!") in the language most recently selected.

After approx. 5 seconds the new setting is automatically stored. The LED for the selected language goes out.

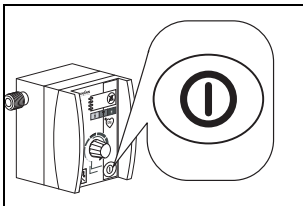
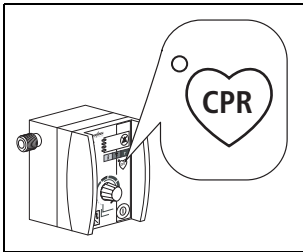
Audio responses

The following is a list of the individual audio response messages with notes on what they mean:

Audio response	Meaning
"ऑक्सीजन सिलेंडर खोलें!" ("Open oxygen cylinder")	Open oxygen cylinder valve slowly .
"सेटिंग्स ठीक करें एवं मरीज को वेंटिलेशन से कनेक्ट करें" ("Adjust settings and connect patient!")	Depending on patient weight, set respiration frequency and tidal volume (page 23). Connect patient to ventilator via ventilation hose and patient valve using the patient mask or the connector of the tracheal tube.
"डिमांडफ्लो मोड" ("Demand-flow mode!")	Demandflow mode is selected.
"वेंटिलेशन दबाव की सीमा 45 mbar" ("Ventilation pressure limit 45 mbar")	Tube ventilation mode is selected. Maximum ventilation pressure for tube ventilation.
"वेंटिलेशन दबाव की सीमा 20 mbar" ("Ventilation pressure limit 20 mbar")	Mask ventilation mode is selected. Maximum ventilation for mask ventilation.
"एयरवेज़ और सेटिंग्स की जांच करें!" ("Check airways and settings!")	MEDUMAT Easy CPR has measured excessive airway resistance. Check the airways or adjust respiratory frequency and tidal volume settings to suit the patient (page 23).
"डिवाइस में खराबी है!" ("Device malfunction!") "वैकल्पिक वेंटिलेशन प्रदान करें" ("Administer alternative ventilation!")	The device is faulty or the battery is failing. The device can no longer be used for ventilation. You must therefore use another ventilation method (page 41).
"प्रेसर की नली तथा गैस सप्लाई जाँच लें" ("Check pressure hose system and gas supply!")	MEDUMAT Easy CPR has measured low pressure on the inlet side. Check whether the O ₂ cylinder still contains sufficient oxygen and that the oxygen hose is not leaking, kinked or jammed.
"वेंटिलेशन मास्क सेटिंग्स जाँच लें" ("Rule out respiratory arrest and check mask fit.")	In Demandflow mode: MEDUMAT Easy CPR can no longer detect a breathing pulse (trigger). Check the patient's breathing, and if necessary switch to a different ventilation mode. Check the connections and mask fit. In CPR mode without the metronome: No respiratory stroke has been triggered for 45 seconds. Trigger at least one respiratory stroke by pressing the key on the MEDUtrigger.
"ऑक्सीजन सिलेंडर बंद करें." ("Close oxygen cylinder.")	After switching off the ventilator, turn off the O ₂ cylinder or the external O ₂ supply.

Audio response	Meaning
"वेंटिलेशन सिस्टम और सेटिंग्स की जांच करें!" ("Check ventilation system and settings!")	Disconnection: a pressure rise of 8 mbar is not achieved during the inspiration phase under controlled ventilation. This is usually due to an interruption of the ventilation system or to a low tidal volume setting. Check the connections or adjust the tidal volume to suit the patient.
"भाषा चुनें: हिंदी" ("Selected language: English")	When selecting the language for the audio response, press the mask/ tube switch as many times as necessary until the desired language is announced.
"ऑडियो प्रतिक्रिया बंद है" ("Audio response is off!")	Confirmation that audio response is deactivated.
"सीपीआर मोड सक्रिय है एवं वेंटिलेशन मैन्युअल रूप से ट्रिगर है" ("CPR mode activated! Ventilation triggered manually!")	Automatic ventilation is stopped. Trigger the respiratory strokes with the MEDUtrigger at the right time.
"सीपीआर मोड निष्क्रिय है!" ("CPR mode deactivated!")	MEDUMAT Easy CPR ventilates with the selected frequency.
"दो वेंटिलेशन प्रदान करें!" ("Provide 2 ventilations now!")	Trigger 2 respiratory strokes with the MEDUtrigger.
"अब चेस्ट कंप्रेसंस करें" ("Perform chest compressions now!")	Undertake 30 chest compressions to the beat of the metronome.

5.12 Switching the metronome on and off



1. With the device switched off, press and hold the CPR key. Briefly press the on/off switch.
2. Release the CPR key.
3. Press the CPR key:
 - LED 50 mbar (red) lights up: the metronome is deactivated
 - LED 45 mbar (green) lights up: the metronome is activated
4. Press the CPR key to change the status of the metronome.
5. Press the on/off switch to confirm the status of the metronome:
 - 1 x audible confirmation: metronome deactivation is confirmed

- 2 x audible confirmation: metronome activation is confirmed

5.13 Calculation of oxygen content/remaining operating time

Oxygen content of cylinder

Oxygen volume = volume of cylinder x cylinder pressure.

	Cylinder volume	x cylinder pressure	= oxygen content
Example 1	10 l	x 200 bar	= 2000 l
Example 2	10 l	x 100 bar	= 1000 l

Real ventilation time

Minute volume (MV) = respiratory frequency x tidal volume

$$\text{Real ventilation time (min)} = \frac{\text{oxygen content (l)}}{\text{MV (l/min)}}$$

Example:

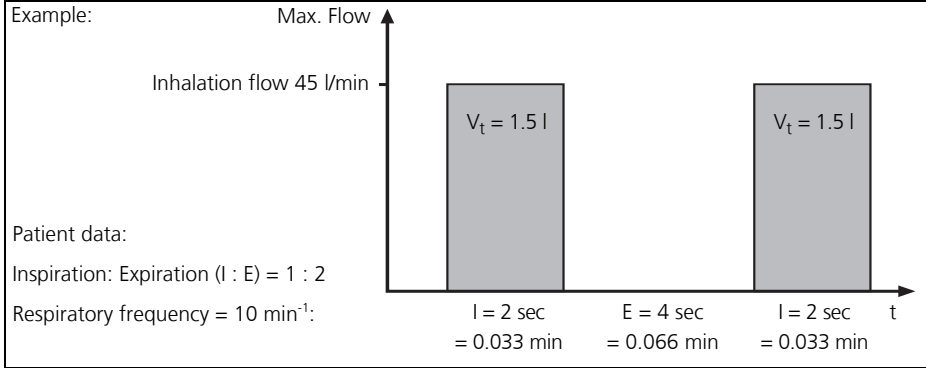
O₂ content = 1000 l; f = 10; V_t = 600 ml.

This gives the following equation:

$$\text{MV} = 10 \text{ min}^{-1} \times 600 \text{ ml/min} = 6 \text{ l/min}$$

$$\text{Real ventilation time (min)} = \frac{1,000 \text{ l}}{6 \text{ l/min}} = 160 \text{ min} = 2 \text{ h } 40 \text{ min}$$

Real Demandflow time



Tidal volume (V_t) = inhalation flow x inhalation time

For the above example:

Tidal volume (V_t) = $45 \text{ l/min} \times 0.033 \text{ min} = 1.5 \text{ l}$

Minute volume (MV) = respiratory frequency x tidal volume (V_t)

For the above example:

Minute volume (MV) = $10 \text{ min}^{-1} \times 1.5 \text{ l} = 15 \text{ l/min}$

$$\text{Real Demandflow time (min)} = \frac{\text{oxygen content (l)}}{\text{MV (l/min)}}$$

Example:

O_2 content = 2000 l, MV = 15 l/min.

This gives the following equation:

$$\text{Real Demandflow time} = \frac{2,000 \text{ l}}{15 \text{ l/min}} = 133 \text{ min} = 2 \text{ h } 13 \text{ min}$$

5.14 Alternative ventilation procedures

If MEDUMAT Easy CPR ceases to function during a ventilation procedure, the following alternatives can be applied:

Ventilation bags

1. Remove the patient valve from the tube or the mask.
2. Replace it with the ventilation bag, e.g. a WEINMANN Emergency COMBIBAG WM 11000, and perform manual ventilation.

Exhaustion of oxygen supply

In emergency situations when the oxygen supply runs out, MEDUMAT Easy CPR can also be operated with respiratory air.

6. Hygiene preparation

After every use the MEDUMAT Easy CPR and any accessories used must undergo hygienic preparation.

- Be sure to carry out a functional check after every hygienic preparation (see "7. Functional check" on page 47).
- **This product may contain disposable items.** Disposable items are intended to be used only once. So use these items only once and do **not** reprocess them. Reprocessing disposable items may impair the functionality and safety of the product and lead to unforeseeable reactions as a result of ageing, embrittlement, wear, thermal load, the effects of chemical processes, etc.

6.1 MEDUMAT Easy CPR

You can keep MEDUMAT Easy CPR clean by simply wiping with disinfectant as described in section 6.7.



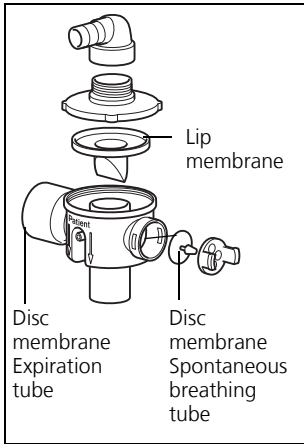
Never immerse MEDUMAT Easy CPR in disinfectants or other liquids. Otherwise damage to the device and thus a hazard to users and patients may result.

6.2 Patient valve

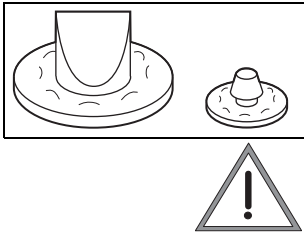


Always grasp the hoses by their ends. Otherwise you might damage or tear them.

1. Disconnect the patient valve from the hoses.



2. Dismantle the patient valve as shown in the adjacent diagram. It is neither necessary nor permissible to remove the membrane in the spontaneous breathing tube for cleaning and disinfection.

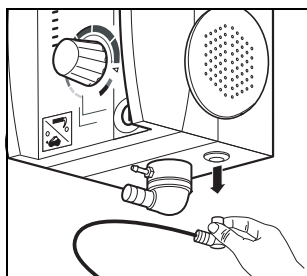
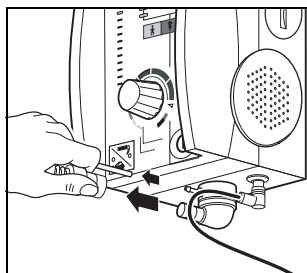


3. Crinkled, misshapen and sticky lip and valve membranes must be replaced.
4. Perform the hygienic preparation as described in section 6.7.
5. Reassemble the patient valve. When reassembling, make sure that the lip membrane is correctly positioned.
6. Always perform a functional check before using the valve again (see "7.4 Checking patient hose system" on page 50).

6.3 Ventilation hose

Caution!

Only reusable hose system WM 22520 (scope of supply) is suitable for the hygienic preparation described here. Do **not** subject disposable hose system WM 28110 available as an accessory to hygiene preparation. Replace it with a new one.



1. Take the ventilation hose and the pressure gauge hose off both connection ports.
Caution! Always grasp the hoses **at the end**, as shown in the drawing, otherwise the hoses may be damaged or torn off.
2. Pull the MEDUtrigger plug down and out without turning or levering it (see diagram).
3. Perform the hygienic preparation as described in section 6.7.
4. For reassembling, see “4.2 Ventilation hose and MEDUtrigger” on page 18.

6.4 MEDUtrigger

Perform the hygienic preparation of the MEDUtrigger as described in section 6.7.

6.5 Masks

Perform the hygienic preparation of the masks as described in section 6.7.

6.6 Fittings

For external cleaning of fittings (e.g. pressure reducer, valve), use only a clean cloth. The cloth can be dry or moistened with clean water.



Never immerse the fittings in disinfectants or other liquids. You may only disinfect them by wiping. On no account may liquid get into the pressure reducer, as this could cause explosions.

6.7 Method

Hygienic preparation of the MEDUMAT Easy CPR and the accessories used should be performed as described in the following table.

Follow the instructions for use for the disinfectant used. We recommend gigasept® FF (new) for disinfecting by immersion and terralin® protect for disinfecting by wiping. We recommend the use of suitable gloves (e.g. household or disposable gloves) for disinfection.

Parts	Cleaning	Disinfection	Thermal disinfectant	Sterilization
MEDUMAT Easy CPR	With a dry or damp cloth	Disinfect by wiping ⁽¹⁾	Not permitted	Not permitted
Patient valve	in hot water with a mild detergent	Immerse in dilute solution so that all surfaces, inside and out, are thoroughly wetted without bubbles. Wait until the full exposure time has elapsed. After disinfection, rinse all parts thoroughly inside and out with distilled water and leave to dry. ⁽²⁾	Cycle up to 95 °C (thermal disinfection in an automatic cleaning machine)	Steam sterilization at 134 °C in devices to EN 285, residence time at least 5 - 18 minutes.
Silicone ventilation mask				
Ventilation hose				
Hose casing, reusable	Wipe with a dry or damp cloth	Rinse cycle 30°C, no spin	Possible during cycle	Not permitted
Oxygen fittings	With a dry or damp cloth	Disinfect by wiping	Not permitted	Not permitted
MEDUtrigger	With a dry or damp cloth	Disinfect by wiping	Not permitted	Not permitted

- (1) If disinfecting by wiping is required: ensure that no liquids penetrate the connections. Cleaning agents containing alcohol or moisturizers form a flammable mixture in combination with compressed oxygen and may lead to explosions.
- (2) To disinfect the pressure gauge tube of the ventilation hose, proceed as follows:
 1. Connect one end of the pressure gauge tube to a sterile disposable 20-ml syringe.
 2. Immerse the other end in the dilute disinfectant solution (for gigasept® FF (new): residence time 15 minutes).
 3. Draw the disinfectant solution through the pressure gauge tube into the syringe until the latter is full. Do not flush through the pressure gauge tube in the opposite direction!
 4. Detach the syringe from the pressure gauge tube and empty it out completely.
 5. Repeat this process another 5 times.
 6. After disinfection, the pressure gauge tube must be rinsed with distilled water at least 8 times using the same principle.

You can support the subsequent drying process with medical compressed air or medical oxygen.



Then allow the components to dry thoroughly. If any water is left in the patient valve or the pressure gauge tube of the ventilation hose, the unit may not function correctly.

7. Functional check

MEDUMAT Easy CPR must not be used if the functional checks reveal defects or deviations from the specified parameters.

First try to correct the error with the help of the information provided in section “8. Troubleshooting” on page 59. If this is not possible, have the unit repaired by the manufacturer – WEINMANN Emergency – or by specialists explicitly authorized by WEINMANN Emergency.

7.1 Preparation for functional check

For the functional check, you require:

- patient’s hose system
- test bag
- oxygen cylinder
- soap-and-water solution made from non-perfumed soap
- adapter from test set WM 15357

We recommend that you hold reserve stocks of the following items:

- washers for the connections;
 - lip membranes for the patient valve.
1. Connect the device to the oxygen cylinder.
 2. Connect the patient’s hose system to the device.

- Note** Check the test bag before each functional check. The balloon of the test bag must be undamaged and firmly connected to the connector. Have the test bag serviced at the same time as the device.

7.2 Intervals

Before each use:

- Perform a functional check.

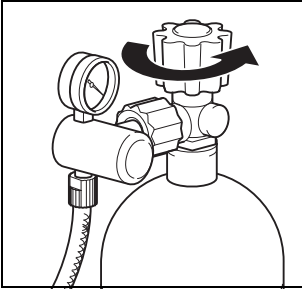
After each use or dismantling:

- Clean, disinfect or sterilize the ventilator and its components (see “6. Hygiene preparation” on page 42);
- Check the lip membrane in the patient valve (see “7.4 Checking patient hose system” on page 50). It must not be crinkled, sticky or misshapen.
- Perform a functional check.

At least every 6 months, if the ventilator has not been used in the meantime:

- Perform a functional check.

7.3 Checking for leaks in the system



1. Open the valve of the oxygen cylinder **slowly**. You can now read the pressure in the cylinder from the gauge on the pressure reducer. For example, a reading of 200 bar means that the cylinder is full, whereas 100 bar means it is half full. You should change the bottle in good time, e.g. at below 50 bar, to ensure an adequate operating time.
2. Close the bottle valve again.
3. Watch the needle of the gauge on the pressure reducer for approx. 1 minute. If it stays in the same place, the system is free of leaks. If the needle drops steadily, there is a leak somewhere.

Always keep a stock of washers for the connections available.

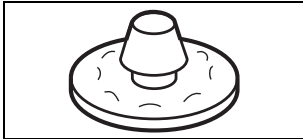
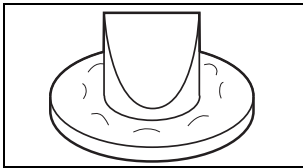
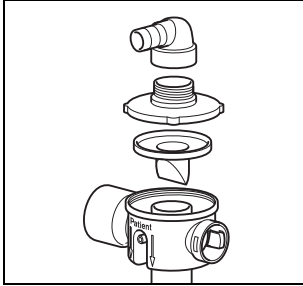
Important
The screw connections on the oxygen lines must be tightened by hand only.

Repairing leaks

1. Prepare a soap/water solution using non-perfumed soap.
2. Wet all the screw and hose connections with the solution. Bubbles will form at the site of the leak.
3. Depressurize the system:
To do this, first close the oxygen cylinder. Switch on MEDUMAT Easy CPR briefly until the pressure gauge on the O₂ cylinder reads "0". Then switch off MEDUMAT Easy CPR again.
4. If leaks are discovered, the defective components must be changed.
5. After changing, make a fresh check for leaks.
6. If it proves impossible to eliminate the leak, the ventilator will have to be repaired.

7.4 Checking patient hose system

Checking reusable hose system



1. Dismantle the patient valve.
2. Carry out a visual check of all components for cracks or other physical damage. The lip membrane must be replaced if it is crinkled, sticky or misshapen. It must no longer be used for ventilation as it could cause serious functional problems.

Also perform a visual check of the valve membranes in the expiration and spontaneous breathing arms. To do so, there is no need to dismantle the valve membranes. Crinkled, misshapen or sticky valve membranes must be replaced, however, as they can lead to considerable malfunctions.

3. Reassemble the patient valve. When reassembling, make sure that the lip membrane is correctly positioned.



Checking disposable hose system


Visual inspection

Check the following items by inspecting the patient hose system:


- the patient valve and the connectors may not exhibit any external damage, cracks or dirt.
- the hose connections must be located firmly and securely on the connecting pieces.
- the patient valve and emergency air membranes may not exhibit any damage or deformation.

7.5 Checking the tidal volume

Checking ventilation frequency

1. Open the valve of the oxygen cylinder **slowly**.
2. Switch on MEDUMAT Easy CPR.
3. Select the following settings:
 - Frequency: 25 min⁻¹ (left limit)
 - Mask/tube switch:
 (P_{max}: 45 mbar)
4. Count the number of inspiration phases over a period of exactly one minute. The figure should lie between 23 and 27.
5. Turn up the frequency to 10 min⁻¹ (right limit before the index point).
6. Count the number of inspiration phases over a period of exactly one minute. The figure should lie between 8 and 12.
7. Switch off MEDUMAT Easy CPR again.

Checking the tidal volume

1. MEDUMAT Easy CPR must be switched off and the oxygen cylinder must be open.
2. Attach the test bag to the patient valve with the adapter from test set WM 15357.
3. Select the following settings:
 - V_t : 950 ml/ Frequency: 10 min⁻¹
 - P_{max} :  (45 mbar)

Note

During the expiration phase, you must simulate the expiration stroke of the test bag by hand. To do so, place the test bag on a firm base. During the expiration phase, press the test bag with the flat of your hand until the volume is completely expelled through the patient valve.

4. Switch on MEDUMAT Easy CPR. The test bag must become fully inflated during inspiration. This ensures a tidal volume of 950 ml per inspiration stroke. At all events the test bag is not sufficiently inflated if a disconnection alarm is triggered.

Note

In combination with test bag WM 1454, these settings may lead to a **Stenosis** alarm. If the test bag inflates fully, the functional check has been passed.


5. Switch off MEDUMAT Easy CPR again.



Risk of injury if test bag removed incorrectly!

If the test bag is removed incorrectly, the connector of the test bag may remain on the patient's hose system. The increased airway resistance on inspiration which results may injure the patient.


- When removing the test bag, always take it off at the connector.

6. Detach the test bag from the patient valve.
7. Select the following settings:
 - V_t : 65 ml / frequency 25 min^{-1}
 - P_{max} :  (45 mbar)
8. Switch on MEDUMAT Easy CPR and close the patient connection at the patient valve. A stenosis alarm should be triggered.
9. Switch off MEDUMAT Easy CPR again.



7.6 Checking maximum ventilation pressure

Important

Be sure to use the test bag. If you hold the tube connection closed by hand, the needle swings across and correct reading of the precise figure is impossible.

1. MEDUMAT Easy CPR must be switched off and the oxygen cylinder must be open.
2. Attach the test bag to the patient valve with the adapter from test set WM 15357.
3. Select the following settings:
 - V_t : 600 ml / frequency: 10 min^{-1}
 - P_{max} :  (20 mbar)
4. Switch on MEDUMAT Easy CPR. Check that the needle of the pressure gauge on the MEDUMAT Easy CPR is standing at "0".

During this test you must not assist the expiration stroke. This ensures that the pressure builds up slowly. Between 15 and 25 mbar MEDUMAT Easy CPR must trigger the **stenosis** alarm. Usually this occurs after the second inspiration stroke.

5. Switch the mask/tube switch to .
6. Repeat the check for intubation ventilation with the settings:
 - V_t : 950 ml, frequency: 10 min^{-1}
 - P_{max} :  (45 mbar)

If audio response is enabled, the ventilator must announce "वेंटिलेशन दबाव की सीमा 45 mbar" ("Ventilation pressure limit 45 mbar").

During this test you must not assist the expiration stroke. This ensures that the pressure builds up slowly. Between 40 and 50 mbar MEDUMAT Easy CPR must trigger the **stenosis** alarm. Usually this occurs after the second inspiration stroke.

7. Switch off MEDUMAT Easy CPR again.



Risk of injury if test bag removed incorrectly!

If the test bag is removed incorrectly, the connector of the test bag may remain on the patient's hose system. The increased airway resistance on inspiration which results may injure the patient.

- When removing the test bag, always take it off at the connector.
8. Detach the test bag from the patient valve.

7.7 Test demand flow

1. Make sure that MEDUMAT Easy CPR is switched off and the oxygen cylinder is open.
2. Attach the test bag to the patient valve with the adapter from test set WM 15357.
3. Select the setting "Demandflow".
4. Switch on MEDUMAT Easy CPR. The green "Demandflow" LED lights up.
If audio response is enabled, the ventilator announces "डिमांडफ्लो मोड" ("Demandflow mode!").
5. Simulate an inspiration pulse by hand by firmly squeezing and quickly releasing the test bag.
6. The MEDUMAT Easy CPR switches the flow on and then immediately off again. This test can be repeated several times.



7. Switch off MEDUMAT Easy CPR again.

Risk of injury if test bag removed incorrectly!

If the test bag is removed incorrectly, the connector of the test bag may remain on the patient's hose system. The increased airway resistance on inspiration which results may injure the patient.

- When removing the test bag, always take it off at the connector.

8. Detach the test bag from the patient valve.

7.8 Checking the alarm systems


Important

In the case of the stenosis alarm and the disconnection alarm, the alarm signal (or message) is only triggered when the cause of the alarm is repeated in two successive inspiration phases. This prevents the alarm being triggered by a very short-lived dysfunction.

Important

In this test the rise in pressure is so strong that the pressure gauge needle may overswing into the red zone. There are technical reasons for this, and it does not indicate any malfunction.


Stenosis

1. Open the oxygen cylinder.
2. If necessary: Remove the tube or the ventilation mask from the patient valve.
3. Switch on MEDUMAT Easy CPR.
4. Switch the mask/tube switch to .
5. Keep the ventilation connector on the patient valve closed with the flat of your hand during two successive inspiration phases. The **stenosis** alarm should be triggered.
If audio response is enabled, the ventilator announces "एयरवेज़ और सेटिंग्स की जांच करें!" ("Check airways and settings!").
6. Switch off MEDUMAT Easy CPR again.

Important

In this test the rise in pressure is so strong that the pressure gauge needle may overswing into the red zone. There are technical reasons for this, and it does not indicate any malfunction.

Disconnection (interruption of breathing system)

1. Open the oxygen cylinder.
2. If necessary: Remove the tube or the ventilation mask from the patient valve.
3. Switch on MEDUMAT Easy CPR.
4. Switch the mask/tube switch to .
5. Keep the ventilation connector on the patient valve closed with the flat of your hand during two successive inspiration phases. The **stenosis** alarm should be triggered.
If audio response is enabled, the ventilator announces “एयरवेज़ और सेटिंग्स की जांच करें!” (“Check airways and settings!”).
6. Then remove your hand. The **stenosis** alarm should now cease (LED goes out, acoustic alarm stops sounding).

After two successive inspiration phases the **disconnection** alarm should be triggered.

If audio response is enabled, the ventilator announces “वेंटिलेशन सिस्टम और सेटिंग्स की जांच करें!” (“Check ventilation system and settings!”).

7. Switch off MEDUMAT Easy CPR again.

Drop in O₂ pressure (<2.7 bar O₂)

1. Open the valve of the oxygen cylinder **slowly**.
2. Switch on the MEDUMAT Easy CPR.
3. Close the valve on the oxygen cylinder. When the oxygen pressure in the system has fallen below 2.7 bar, the **<2.7 bar O₂** alarm should be triggered.

If audio response is enabled, the ventilator announces “प्रेसर की नली तथा गैस सप्लाई जाँच लें” (“Check pressure hose system and gas supply!”).


4. Switch off MEDUMAT Easy CPR again.

Power supply (☐+-)

The alarm that indicates a failing battery is checked automatically in the self-test that runs when MEDUMAT Easy CPR is switched on.

The power supply is in order if no alarm is triggered when the valve on the oxygen cylinder is opened and MEDUMAT Easy CPR is switched on and starts to function.

7.9 Checking the MEDUtrigger

1. Make sure that MEDUMAT Easy CPR is switched off and the oxygen cylinder is open.
2. Attach the test bag to the patient valve with the adapter from test set WM 15357.
3. Select the following settings:
 - V_t : 950 ml / frequency: 10 min⁻¹
 - P_{max} :  (45 mbar)
4. Switch on MEDUMAT Easy CPR.
5. Press the CPR key.
6. Manually trigger a respiratory stroke by pressing the MEDUtrigger key.

The MEDUtrigger is working correctly if the test bag becomes fully inflated during inspiration and the LEDs on the MEDUtrigger go out.
7. Switch off MEDUMAT Easy CPR again.




Risk of injury if test bag removed incorrectly!

If the test bag is removed incorrectly, the connector of the test bag may remain on the patient's hose system. The increased airway resistance on inspiration which results may injure the patient.

- When removing the test bag, always take it off at the connector.
8. Detach the test bag from the patient valve.

8. Troubleshooting

Fault	Cause of fault	Remedy
MEDUMAT Easy CPR will not switch on.	MEDUMAT Easy CPR defective.	Have repaired.
	Battery failing.	Replace battery in battery compartment (9.3, page 62). If ventilator still refuses to switch on, have internal auxiliary battery replaced by manufacturer or authorized specialists.
Stenosis alarm (excessive airway resistance).	Airways obstructed.	Remove obstruction.
	Kink or obstruction in ventilation hose/mask/tube.	Remove kink or obstruction; if necessary replace parts.
	Tube incorrectly positioned.	Correct tube position.
	MEDUMAT Easy CPR defective.	Have repaired.
Disconnection alarm (breathing system interrupted).	Ventilation hose leaking/slipped out.	Check connections.
	Mask/tube incorrectly positioned.	
	Pressure gauge hose leaking/slipped out.	
	MEDUMAT Easy CPR defective.	Have repaired.
< 2.7 bar alarm (oxygen pressure too low).	Oxygen cylinder nearly empty.	Change O ₂ cylinder (4.1, page 17).
	Oxygen valve closed.	Open oxygen valve.
	Pressure reducer defective.	Replace pressure reducer.
	Kink or blockage in oxygen hose.	Take corrective action.
 alarm.	Battery failing or fuse defective.	Replace battery in battery compartment (9.3, page 62). If ventilator still refuses to switch on, have internal auxiliary battery or fuse replaced by manufacturer or authorized specialists.

Fault	Cause of fault	Remedy
Visual alarms flashing, but no acoustic alarm and no audio response.	Short-term electronic problem or defect in electronic system.	Switch off, then on again. If error recurs, arrange for repairs.
Acoustic alarm, but no visual alarm flashing.		
Acoustic alarm sounds and all visual alarms flashing.		
Alarm: Device malfunction.	Device defective.	
No audio response.	Audio response deactivated.	Activate audio response (5.11, page 34).
MEDUMAT Easy CPR is functioning, but without any displays.	Pressure gauge hose on MEDUMAT Easy CPR or on patient valve slipped off.	Check pressure gauge hose.
	Kink in pressure gauge hose.	
V_t too low.	Ventilation parameters incorrectly set.	Check ventilation parameters.
	MEDUMAT Easy CPR defective.	Have repaired.
Unusually high oxygen consumption.	Leak in oxygen supply.	Find and eliminate leak (7.3, page 49).
MEDUMAT Easy CPR will not switch off.	Operating error.	Keep key pressed for at least 3 seconds.
Pressure gauge not reading "0".	MEDUMAT Easy CPR defective.	Arrange for repair.
The MEDUtrigger does not trigger a respiratory stroke (CPR mode only)	Respiratory stroke was triggered during the inspiration phase	Wait until the expiration phase is over to trigger the respiratory phase (corresponds to the length of the inspiration phase)
The MEDUtrigger does not work	MEDUtrigger not correctly connected	Check whether the MEDUtrigger plug is correctly positioned and correct it

9. Servicing

9.1 Intervals

Have the cleaned and disinfected device serviced at regular intervals. Servicing, safety checks ([sicherheitstechnische Kontrollen or STKs] in accordance with §6 of the German law governing the owners/operators of medical devices - only applies to Germany) and maintenance measures such as servicing and repairs may only be performed by the manufacturer or by specialists expressly so authorized by the manufacturer.

Maintain the following intervals:

Interval	Parts affected	Person to carry out
Every 2 years (service and safety check)	<ul style="list-style-type: none">– System components: e.g. carrying systems, tube connections*– Accessories– Test bag– Oxygen fittings– Specified wear parts relevant to safety	Manufacturer or specialists expressly so authorized by the manufacturer
Every 4 years	<ul style="list-style-type: none">– Oxygen fittings– Specified wear parts relevant to safety	
Every 10 years	Steel and aluminum oxygen cylinders	

* Disposable hose system WM 28110 does not require any maintenance.

9.2 Sending in device



Warning!

Risk of infection from contaminated parts during maintenance measures!

The device, components and accessories may be contaminated and infect specialist staff with bacteria or viruses when they are carrying out maintenance measures.

- Clean and disinfect device, components and accessories.
 - Do not send in potentially contaminated parts.
1. Remove components and accessories.
 2. Clean the device, components and accessories (see “6. Hygiene preparation” on page 42).
 3. Send device, and if necessary components and accessories, to WEINMANN Emergency or to specialist staff expressly authorized by WEINMANN Emergency.

Note

If you send in obviously contaminated parts, these will be disposed of by WEINMANN Emergency or by specialist staff expressly authorized by WEINMANN Emergency at your expense.

9.3 Batteries

MEDUMAT Easy CPR is equipped with two batteries:

- Main battery (lithium battery 3.6 V) for main power supply. This may be changed by the operator.
- A CR2430 button cell. This can only be changed by specialist personnel. It supplies auxiliary pow-

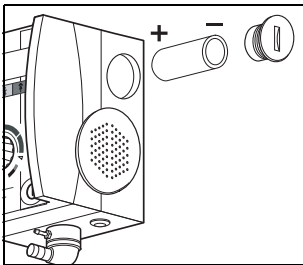
er to the electronic system if the main battery fails. This makes it possible to trigger an alarm even if the main battery fails.

The battery capacity is calculated to be sufficient for power requirements under normal operating conditions for the full period between the two-yearly services. The batteries are completely replaced every two years during servicing.

We recommend having the batteries changed only by the manufacturer – WEINMANN Emergency – or by qualified specialists expressly authorized by the manufacturer. Special precautions need to be taken during the change in order to protect the electronic system.

In an emergency, proceed as follows:

Changing the main battery



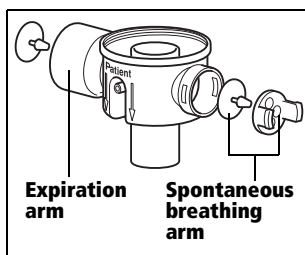
1. Make sure the ventilator is switched off.
2. Open the battery compartment on the side of the MEDUMAT Easy CPR (e.g. with a coin).
3. Remove the old 3.6 V lithium battery.
4. Put in a new battery. Make sure it is inserted the right way round.
5. Close the battery compartment again.

Important

The 3.6 V lithium battery is a special battery for this unit. Use only batteries supplied by WEINMANN Emergency.

9.4 Change valve membrane in patient valve

If one of the valve membranes in the expiration or spontaneous breathing arms of the patient valve is crinkled, sticky or misshapen, it must be changed.



Spontaneous breathing arm

1. Take the spontaneous breathing insert out of the patient valve. To do so, push the two locking lugs out of their seat, using a small screwdriver, for example.
2. Pull the defective valve membrane out of the spontaneous breathing insert using pointed tweezers.
3. Put in a new valve membrane.
4. Push the spontaneous breathing insert back into the patient valve.

Expiration tube

1. Use pointed tweezers to pull the defective valve membrane out of the expiration arm.
2. Put in a new valve membrane.

9.5 Storage

If you do not intend to use MEDUMAT Easy CPR for a long period, we recommend the following storage precautions:

1. Clean and disinfect (see "6. Hygiene preparation" on page 42).
2. Store MEDUMAT Easy CPR in a dry place.
3. The battery can remain inside the unit even for lengthy periods.

Important! Even if devices are in storage, servicing intervals must still be maintained, otherwise the device may not be used when it is removed from storage.

Note For disposable hose system WM 28110, observe the storage temperature of -40 °C to 70 °C at a relative humidity of 15 % to 95 %. This product can be stored for a maximum of 2 years.

9.6 Disposal



Do not dispose of the device in domestic waste. To dispose of the device properly, contact an approved, certified electronics scrap dealer. You can obtain the address from your Environment Officer or your local authority. The device packaging (cardboard and inserts) can be disposed of in paper recycling facilities.



Disposing of batteries/rechargeable batteries

Used batteries/rechargeable batteries may not be disposed of in domestic waste. Contact WEINMANN Emergency or your local authority waste disposal department.

Disposing of the patient hose system

After use, the patient hose system should be disposed of properly with plastics.

10. Scope of supply

10.1 Standard scope of supply

MEDUMAT Easy CPR, complete	WM	28140
consisting of:		
– MEDUMAT Easy CPR, single unit	WM	28237
– Operating instructions	WM	67281
– Summary of operating instructions	WM	67291
– Set of mounting attachments	WM	15007
– Ventilation hose and patient valve with spontaneous breathing facility (reusable)	WM	22520
– MEDUtrigger	WM	20900
– Hose casing	WM	8297
– Ventilation mask for adults, size 5	WM	5074
– Test kit for functional checks	WM	15357

10.2 Accessories

The following accessories are not included with the standard product:

1. Oxygen cylinder, 2 liters	WM	1822
2. Aluminum lightweight oxygen cylinder, 2 liters	WM	1814
3. Oxygen cylinder, 0.8 liters	WM	1818
4. WM pressure reducer OXYWAY Fix III	WM	30301
5. Set, permanent fixing kit	WM	15197
6. PEEP valve with conical connection	WM	3215
7. Patient hose system and patient valve (disposable)	WM	28110
8. Ventilation mask, transparent, with inflatable silicone rim: – for children and young adults, size 3	WM	5082
9. Rendell-Baker ventilation mask, silicone: – children, approx. 3 – 12 years, size 3	WM	5063

10. Set tracheal tubes (disposable):		
– Set tracheal tubes without balloon 2.5 mm and 4 mm;		
with balloon 5 mm, 6.5 mm and 7.5 mm	WM	15075
– Set tracheal tubes, without balloon 2 mm to 4.5 mm	WM	15077
11. Pressure hoses:		
– 1m, straight connection nozzle with nut at both ends	WM	22301
– 1m, straight connection nozzle with nut and angled connection nozzle with nut	WM	22302
– 3m, sealing nipple and plug acc. to DIN 13260	WM	22303
– 3m, sealing nipple and bayonet	WM	22304
– 3m, sealing nipple and straight connection nozzle with nut	WM	22306
– 3m, sealing nipple and angled connection nozzle with nut	WM	22307
– 3m, DIN 13260 plug and straight connection nozzle with nut	WM	22308
– 3m, sealing nipple (AGA) and straight connection nozzle with nut	WM	22309
– 3m, bayonet (male) and straight connection nozzle with nut	WM	22311
– 3m with O ₂ plug acc. to DIN 13260 and straight connection nozzle with nut	WM	22312
– 3m, sealing nipple (AGA) and angled connection nozzle with nut	WM	22313
– 3m, bayonet (male) and angled connection nozzle with nut	WM	22314
– 1m, straight connection nozzle with nut and screw nozzle	WM	22316
– 3m, sealing nipple and sealing nipple (AGA)	WM	22288
– 3m, bayonet seal at both ends	WM	22371
12. Set, adapter G3/8-NIST	WM	15554
13. O ₂ plug DIN 13260-S-O2 for GCS socket	WM	2057
14. Angle adapter for French coupling (bayonet)	WM	22910
15. Respiratory system filter	WM	22162

10.3 Replacement parts

You can order replacement parts separately if required. You can obtain a current list of replacement parts either on the Internet at www.weinmann-emergency.com or through your specialist dealer.

11. Technical data

11.1 Device

	MEDUMAT Easy CPR
Dimensions WxHxD in mm	100x145x90 incl. connections
Weight incl. accessories	approx. 0.6 kg
Device category (93/42/EEC)	II b
Operation: Temperature range Humidity Air pressure	-18 °C to +60 °C max. 95 % 70 kPa ⁽¹⁾ to 110 kPa
Storage	-40 °C to +70 °C
Electromagnetic compatibility (EMC) according to EN 60601-1-2 and EN 794-3: - Radio interference suppression - Radio interference resistance	Test parameters and limit values can be requested from the manufacturer (WEINMANN Emergency Medical Technology GmbH + Co. KG, Frohboesestraße 12, 22525 Hamburg, Germany). EN 55011 B EN 61000-4 Parts 2 to 6, Part 11
Control unit	timing pulse, volume constant
Gas supply	Medical oxygen
Gas for internal control system	0 l/min
Operating pressure	2.7 to 6.0 bar ⁽²⁾
Minimum gas volume required	70 l/min O ₂

	MEDUMAT Easy CPR
Insp-exp. ratio (I:E)	1:2 ($V_t \leq 150$ ml), 1:3 ($V_t > 150$ ml)
Respiratory time ratio (I:E) in CPR mode	1:1
Demandflow	47-52 l/min
Ventilation frequency	continuously variable from 10 to 25 min ⁻¹
Tidal volume (V_t)	continuously variable from 65 to 950 ml
V_t tolerances: Room temp. (20 °C) -18 °C to +60 °C	for ≤ 100 ml = ± 20 % * for > 100 ml = ± 15 % * for ≤ 100 ml = ± 35 % * for > 100 ml = ± 20 % * or 30 ml** * Tolerance related to measured value ** The larger tolerance applies
Max. ventilation pressure	20 or 45 mbar ⁽³⁾
O ₂ concentration	100 % O ₂ (at least 98 %)
Pressurized gas connection	External thread G 3/8
Respiration hose connection	External diameter 13 mm

- (1) Under normal atmospheric conditions, 70 kPa correspond to a maximum altitude for use of approx. 3,000 meters.
- (2) 1 bar \approx 100 kPa
- (3) 1 mbar \approx 1 hPa

	MEDUMAT Easy CPR
Power supply	maintenance-free lithium battery 3.6 V; 5.2 Ah,
Life expectancy	> 2 years
Max. storage period	10 years after delivery
Auxiliary power for alarm system	Button cell CR2430
Max. storage period	10 years after delivery
Degree of protection against water	IP54
Standards applied	EN 794-3 + A2 ISO 10651-3 EN 1789 + A1 EN 60601-1 EN 60601-1-2
Elasticity of breathing system	negligible

	MEDUMAT Easy CPR
Pressure gauge accuracy	±5% of upper range value
Alarm sound pressure	60 dB (A)
Components with critical flow direction	Patient valve
Components containing latex	None
Demandflow mode:	
– trigger	< 1 mbar
– peak flow	> 40 l/min
– shut-off pressure	3 mbar

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Subject to technical change without notice.

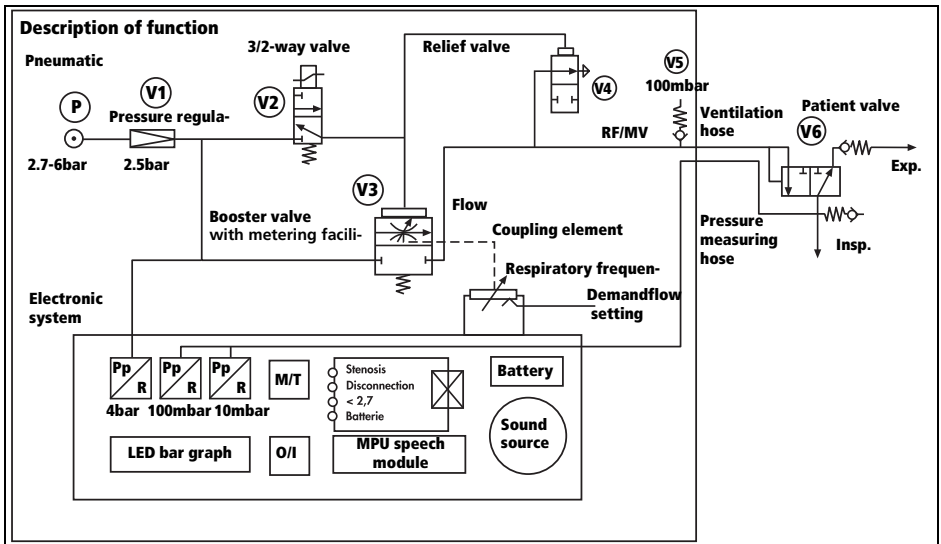
Recommended safety distances between portable and mobile HF telecommunication devices (e.g. cell phones) and the MEDUMAT Easy CPR		
Nominal power of HF device	Safety distance depending on transmission frequency	
	in m	
	80 MHz - 800 MHz	800 MHz – 2.5 GHz
0.01	0.12	0.23
0.1	0.34	0.73
1	1.20	2.30
10	3.40	7.30
100	12.00	23.00

11.2 Patient's hose system

	Patient's hose system (reusable), 2 m WM 22520	Patient's hose system (disposable), 2 m WM 28110
Operation: Temperature range Humidity:	-18 °C to +60 °C 15% to 95%	
Storage	-40°C to +70°C	
Patient valve – inspiration tube – mask/endotracheal tube	15 mm internal tapered connector 22 mm external tapered connector EN 5356-1	
Patient valve – expiration tube	30 mm external tapered connector EN 5356-1	
Ventilation tube connection	WEINMANN Emergency-specific	
Standards applied	EN 794-3	
Patient valve resistance (as per EN 794-3): Inspiration Expiration Spontaneous respiration	<6 mbar ⁽¹⁾ at 60 l/min <6 mbar ⁽¹⁾ at 60 l/min 1,5 mbar ⁽¹⁾ at 30 l/min	<6mbar ⁽¹⁾ at 60 l/min <6mbar ⁽¹⁾ at 60 l/min 1,36 mbar ⁽¹⁾ at 30 l/min
Patient valve dead space	12.8 ml	8 ml
Materials used	PSU, silicone	EVA, K-Resin®, PS, PVC (DEHP-free), silicone
Elasticity of breathing system	negligible	

⁽¹⁾ 1 mbar $\hat{=}$ 1 hPa

11.3 Pneumatic / electronic systems



The input pressure at p is max. 6 bar. This is reduced by V1 to 2.5 bar dyn. This is the input pressure at V2, V3 and V4.

Inspiration

An electrical impulse to V2 opens V3 and closes V4. Oxygen flows through the ventilation hose to the patient valve. If the ventilation pressure in the patient valve reaches >100 mbar, the relief valve V5 will open.

Expiration

A fresh electrical impulse closes V2. The relief valve V4 opens and vents the ventilation hose. The patient breathes out through the patient valve.

Demandflow

An inspiration impulse (trigger) at V2 opens valves V3 and V4.

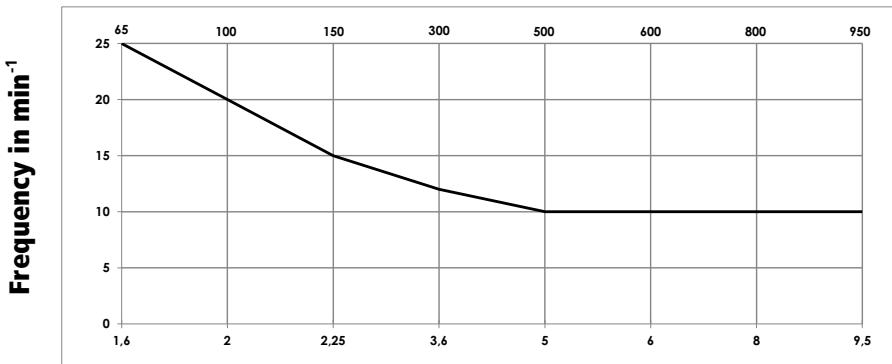
Electronic system

The microprocessor-controlled electronic system sets the ventilation parameters and monitors ventilation, and also O₂ supply and power supply. If necessary, a visual and acoustic alarm is given. The ventilator has an audio response facility that can be switched on for user guidance.

11.4 Relationship between ventilation parameters

The following diagram shows the relationship between the ventilation parameters "tidal volume" and "respiratory frequency":

Tidal volume (V_t) in ml



Tidal volume (MV) in ml/min

12. Warranty

WEINMANN Emergency gives the customer a limited manufacturer warranty on new original WEINMANN Emergency products and any replacement part fitted by WEINMANN Emergency in accordance with the warranty conditions applicable to the product in question and in accordance with the warranty periods from date of purchase as listed below. The warranty conditions can be downloaded from www.weinmann-emergency.com on the Internet. We can also send you the warranty conditions on request.

In the event of a claim under warranty, contact your specialist dealer.

Product	Warranty period
WEINMANN Emergency devices including accessories (except masks) for oxygen medicine and emergency medicine	2 years
Masks including accessories, rechargeable batteries, batteries (unless quoted differently in the technical documentation), sensors, tube systems	6 months
Disposable products	None

13. Declaration of conformity

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

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