emergency

MEDUMAT Easy

Ventilator
Aparato de respiración artificial
Ventilador

Description and instructions for use
Descripción del aparato e instrucciones
Descrição e instruções de funcionamento

WEINMANN
medical technology

English 3
Español 70
Português 146

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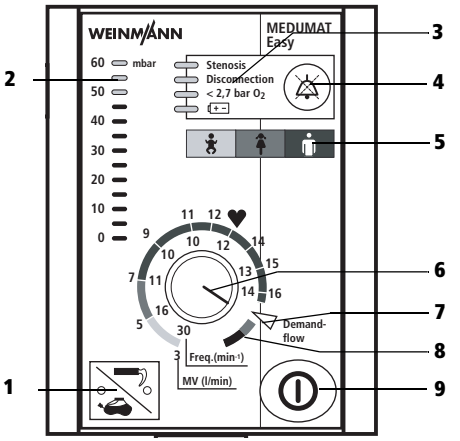
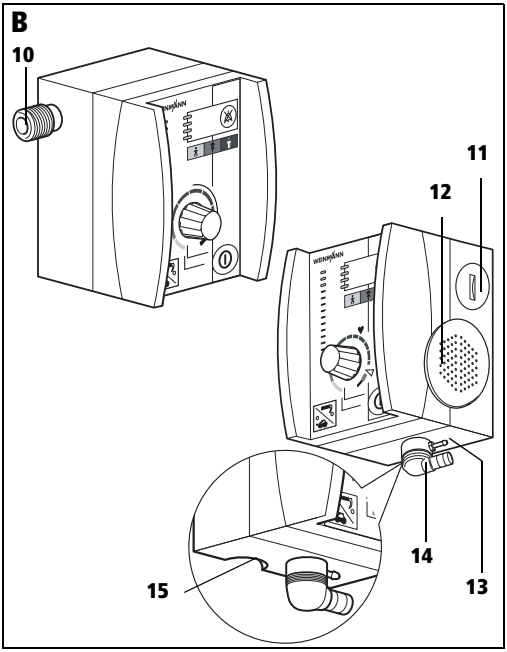
1. Overview

1.1 Device

A

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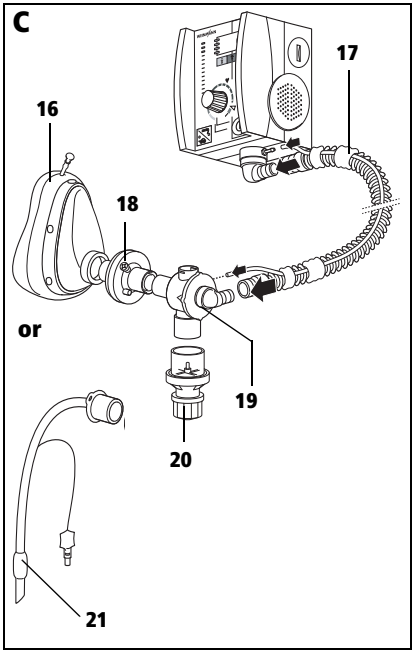
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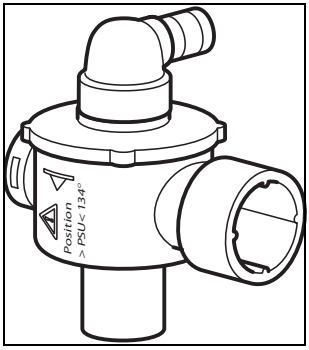
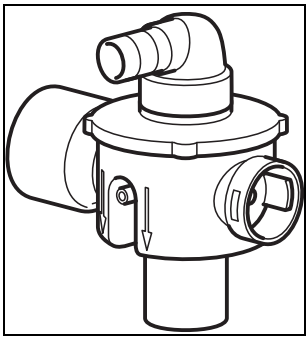
1.2 Special symbols on the ventilator

Patient valve



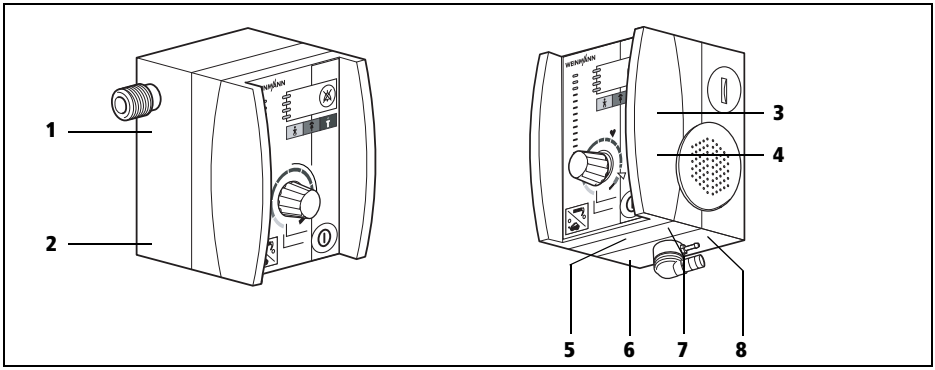
The symbol ⚠ on the patient valve is a reminder that the lip membrane must be changed immediately if it becomes crinkled, sticky or misshapen. The patient must not be used again until the membrane has been changed, as this could cause malfunction (see "8.3 Checking patient hose system" on page 48).

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

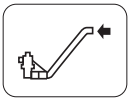


When connecting the patient valve, take care to ensure that the direction of respiratory gas flow is correct (see arrows).

MEDUMAT Easy



1	2,7-6 bar O_2	Inlet 2,7 - 6 bar O_2
2	DE, GB, FR, IT, NL, ES PT, DK, SE, NO, FI, IS	Languages available on this device
MEDUMAT Easy device information plate		
3	**SN**	Serial number of device
		Year of manufacture
		3.6 V lithium battery
		Direct voltage
	CE 0197	CE symbol (confirms that the product conforms to the applicable European directives)
	IP54	Protection against ingress of water
		Protection class BF
		Do not dispose of device in domestic waste

4		Follow instructions for use
5		Tube system connection
6		Maximum pressure ≤100 mbar
Safety check and servicing label		
7		Safety check label: (in Germany only) marks when the next safety check as per §6 of the German law relating to users of medical devices is required.
8		Servicing label: indicates when the next service is due.

2. Legend

A: MEDUMAT Easy control panel

1 Mask/tube ventilation switch with indicator LEDs

2 Ventilation pressure gauge

3 Alarm panel

4 Alarm mute button

5 Colour code

6 Regulator knob, ventilation parameters

7 Stop notch

8 LED Demandflow

9 ON/OFF switch

B: MEDUMAT Easy connections

10 Pressurized gas connection

11 Battery compartment

12 Speaker

13 Pressure gauge hose connection

14 Ventilation hose connection

15 Relief outlet valve

C: MEDUMAT Easy device combinations

16 Ventilation mask

17 Ventilation hose

18 Filter

19 Patient valve

20 PEEP valve

21 Tube

3. Description

3.1 Intended use

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

You can use MEDUMAT Easy:

- to revive patients at the site of the emergency;
- for longer periods in more protracted emergencies;
- for short-term O_2 inhalation using a respiration mask.

You can use MEDUMAT Easy 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:

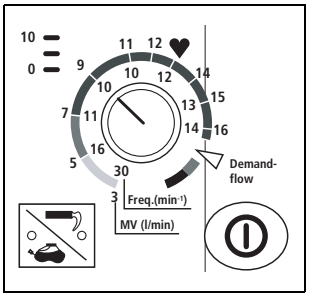
- is designed to provide controlled ventilation to persons of 10 kg body weight or more;
- is used to treat respiratory arrest;
- can be preset to parameters that ensure evenly balanced ventilation, provided that the selected maximum ventilation pressure P_{max} is not exceeded.

- permits respiration-controlled oxygen inhalation in Demand mode.

3.2 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.

3.3 Ventilation function



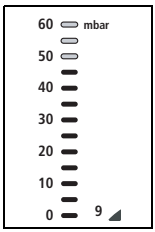
MEDUMAT Easy operates within a pressure range of 2.7 to 6 bar and at a flow rate of not less than 70 l/min O_2. It has a built-in power pack.

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 ventilation settings are continuously variable. These settings (frequency and volume per minute are coupled) and the inspiration/expiration ratio of 1:1.67 are regulated by internal electronic control mechanisms.

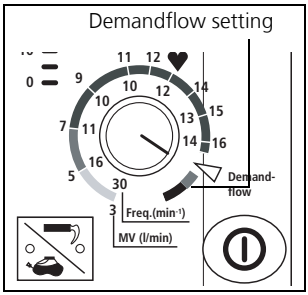
The gas for inspiration flows along the hose and through the patient valve and either the mask or tube into the patient's airways. The patient valve is

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



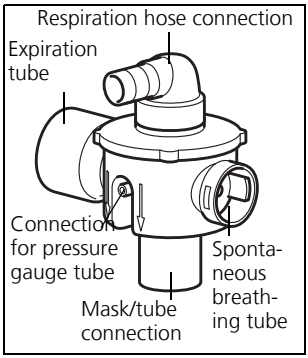
You can check the course of ventilation at ventilation pressure gauge.

3.4 Demandflow function



The Demandflow setting switches the MEDUMAT Easy breathing-controlled O_2 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.

3.5 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.

3.6 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 "6.10 Audio response for user guidance" on page 32).

4. Safety instructions

4.1 Safety regulations

For your own safety, the safety of your patients, and to comply with the requirements of EU Directive 93/42/EEC, please observe the following points:

General

- Please read the directions for use carefully. They are an integral part of the ventilator and must be kept available for reference at all times.
- Use the MEDUMAT Easy for the described purpose only (see "3.1 Intended use" on page 10).
- The user must subject the patient hose system to a functional check and a visual inspection before use (see "8.3 Checking patient hose system" on page 48).

Note:

- Do not use the MEDUMAT Easy in toxic environments or where there is a risk of explosion.
- MEDUMAT Easy is not suitable for hyperbaric use (pressure chamber).
- Do not use MEDUMAT Easy with flammable anesthetics.
- A back-up ventilator should always be available in case of technical failure.
- Before starting to work with MEDUMAT Easy, you must understand how to operate it.
- To prevent infection or bacterial contamination, please observe section "7. Hygienic preparation" on page 40.

- MEDUMAT Easy should be used only by medically qualified personnel who have had training in ventilation techniques. Incorrect use can cause severe physical injury.
- Please note that a safe distance must be maintained between MEDUMAT Easy and equipment that emits HF radiation (e.g. mobile phones), otherwise malfunctions may occur (see " Recommended safe distances between portable or mobile HF telecommunication devices (e.g. mobile phones) and MEDUMAT Easy" on page 64).
- We recommend that maintenance work such as inspections and repairs be performed only by the manufacturer, WEINMANN Emergency, or by qualified technicians expressly authorized by WEINMANN Emergency.
- Malfunctions and a lack of biocompatibility may result if third-party articles are used. Please note that in such cases all warranty entitlement and liability claims shall be void where items other than the accessories recommended in the instructions for use or original spare parts 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 high-pressure oxygen comes into contact with flammable substances (fat, oil, alcohol etc.):

- Keep the equipment and all screw connections absolutely free from 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 the oxygen cylinder, only hand pressure should be used when tightening the screw connections to the cylinder and to 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 valve of the oxygen cylinder slowly to prevent pressure damage to the other 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

- Please protect the silicone and rubber components from UV radiation and prolonged exposure to direct sunlight, as this can make them brittle and friable.

5. Installation

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

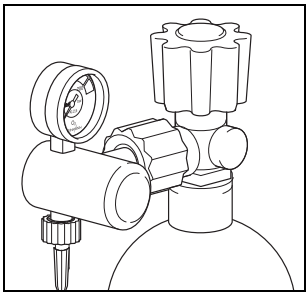
If MEDUMAT Easy is supplied complete on a portable system or in an emergency rucksack, it is ready for use and requires no further installation. Separate directions for use are supplied for portable systems and emergency rucksacks.

In order to ensure safe and reliable operation, functional tests must be carried out after installation (see "8. Functional checks" on page 45).

5.1 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.



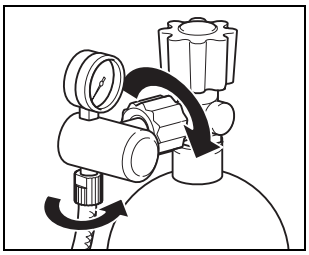
Removing the empty cylinder

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

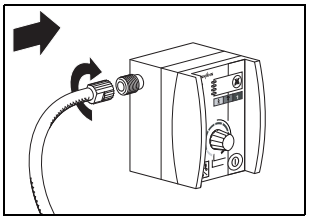
2. First switch off MEDUMAT Easy again.
3. Then loosen the screw connection to the cylinder.

Connecting the new cylinder

1. First briefly open and close the valve of the new oxygen cylinder. This should blow out any particulate matter.
   Keep the valve opening away from the body, making sure that neither yourself nor other persons can be injured by escaping particles.

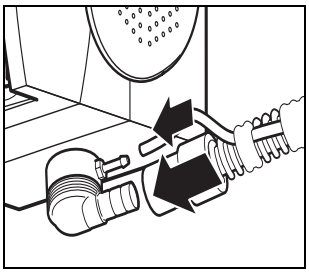


2. Next use the fluted connecting nut to couple the pressure reducer to the valve on the oxygen cylinder. Tighten the connecting nut by hand.
3. If the pressure hose is not already connected to the exit from the pressure reducer, make this connection with the G 3/8 connecting nut.



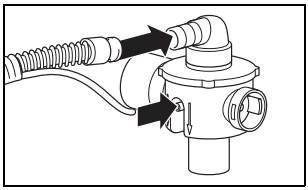
4. Screw the other end of the pressure hose on to pressure gas connection on the MEDUMAT Easy if this has not yet been done.

5.2 Ventilation hose

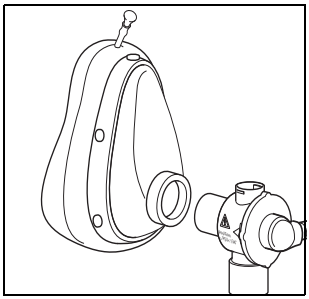


1. Slide the pressure gauge tube onto connection.
2. Slide the ventilation hose onto connection. Make sure that this does not cause any kinks in the pressure gauge tube already connected. If necessary, turn the ventilation hose while sliding on as appropriate.

Always grasp the ventilation hose and pressure gauge tube by their end only, otherwise they may be damaged or split.

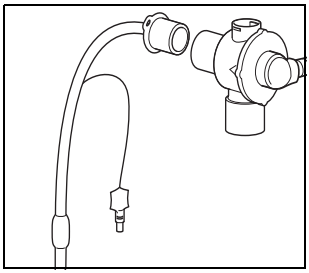


3. Connect the patient valve to the other end of the ventilation hose and pressure gauge tube.



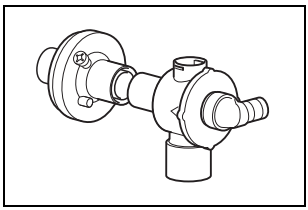
4. If a mask is being used for ventilation, attach the mask connection to the patient valve (identical with tube connection),

or



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

Filter

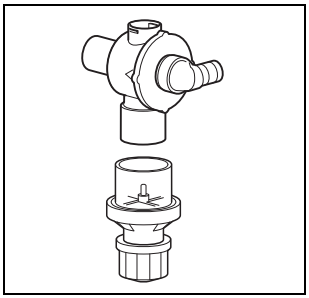


If a filter is to be used, this should be installed between the patient side connector on the patient valve and the mask or tube.

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.

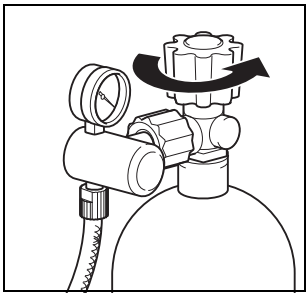
5.3 Wall mounting set

A wall mounting set (see "11.2 Accessories" on page 60) is available for permanent fixing, e.g. on a vertical surface inside a vehicle.

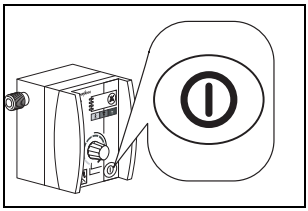
Please refer to the sheet enclosed with the wall mounting set for details of dimensions and installation procedure.

6. Using the ventilator

6.1 Switching on / self test

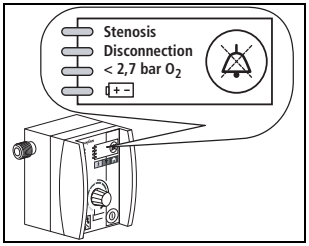


1. Open the valve of the oxygen cylinder **slowly**. The pressure gauge will now show the pressure in the cylinder.
2. Where appropriate, calculate how long the remaining oxygen will last (see "6.11 Calculation of oxygen content/remaining operating time" on page 37). Always change the cylinder in good time, e.g. when the pressure is lower than 50 bar, to ensure that oxygen is available for an adequate period.
3. Select the desired ventilation settings (see "6.2 Selecting the ventilation settings" on page 23).



4. Switch on the MEDUMAT Easy with ON/OFF switch. The ventilator will then run a self test lasting approx. 2 seconds.

   If audio response is enabled, you will hear before the self test the sentence "Open oxygen cylinder".



During this test, the four LEDs in alarm panel **3** flash on and off and a short alarm tone sounds.

If an error is found, all the LEDs in alarm panel **3** continue flashing and an alarm sounds. If this happens, MEDUMAT Easy must not be used for ventilation.

If audio response is enabled, you will hear the message "Device malfunction! Administer alternative ventilation".

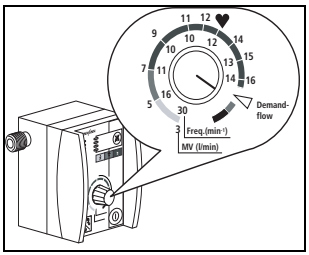
After the self test, the ventilator repeatedly checks the oxygen cylinder pressure until adequate pressure is detected. Otherwise an alarm is sounded.

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

6.2 Selecting the ventilation settings

We recommend selection before switching on, to prevent unnecessary waste of oxygen.

Respiratory frequency and minute volume



1. Set the respiratory frequency and the minute volume with regulator knob.

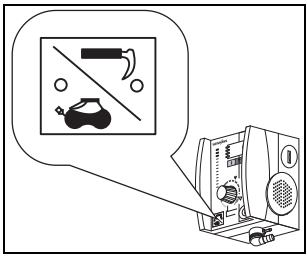
Recommended ventilation settings:

	yellow	orange	brown		
Body weight	10 kg	30 kg	60 kg	80 kg	110 kg
Respiratory frequency	30 min^{-1}	16 min^{-1}	11 min^{-1}	10 min^{-1}	10 min^{-1}
Minute volume	3 l/min	5 l/min	7 l/min	9 l/min	11 l/min

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 "12.2 Relationship between ventilation parameters" on page 66.

Maximum ventilation pressure



1. Use the mask/tube switch to set the maximum ventilation pressure. The LEDs light up in active mode.

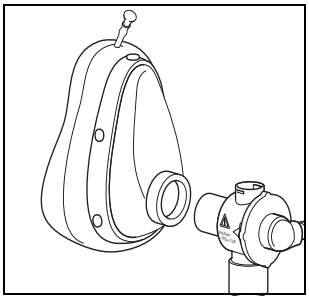
Recommended maximum ventilation pressure:

Device	Mask ventilation	Intubation
	20 mbar	45 mbar
Audio response up to serial number 7999	Audio response enabled: "Mask ventilation mode. Tilt back head, secure mask tightly"	Audio response enabled: "Tube ventilation mode. Ventilation pressure limit 45 mbar"
From serial number 8000 and following repair/servicing/ firmware update	Audio response enabled: "Ventilation pressure limit 20 mbar"	Audio response enabled: "Ventilation pressure limit 45 mbar"

If the maximum level is reached, e.g. in cases where compliance is inadequate, MEDUMAT Easy sets off a stenosis alarm (see " Stenosis alarm" on page 30).

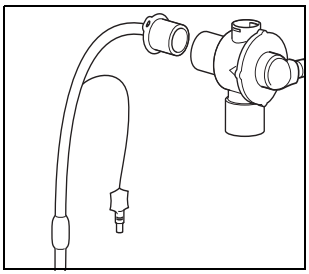
Note: The mask/tube switch can only be operated when the ventilator is switched on.

6.3 Performing ventilation



Ventilation mask

1. Attach the mask to the patient valve.
2. If necessary, insert a Guedel tube to keep the airways 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[1)] to ensure the mask is hermetically sealed.

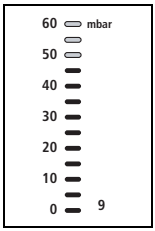


Intubation

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

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

6.4 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

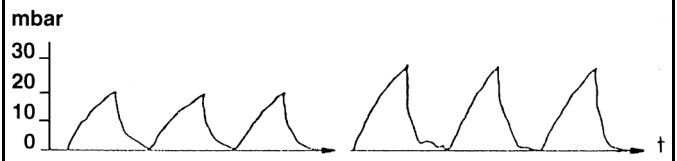
1. See also: Resuscitation, Volume 46 (2000), Special Issue - International Guidelines 2000 for CPR and ECC - A Consensus on Science; p. 115-125.

the tidal volume set. Use suitable volume measuring devices to check the tidal volume actually administered.

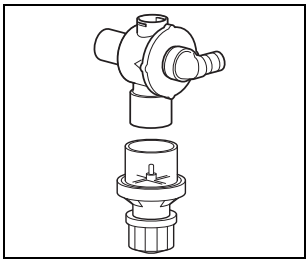
Check respiratory parameters during ventilation.

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

Example of ventilation sequence before and after lung compliance diminishes



6.5 Ventilation with PEEP valve

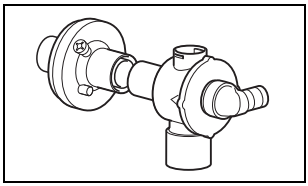


A PEEP valve can be fitted to the expiration tube on the patient valve with an adapter.

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

Please see the PEEP valve instructions for details of settings.

6.6 Ventilation with filter



A conventional filter with standard 15/ 22 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.

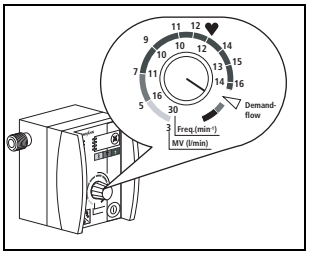
A close watch must be kept for any increase in dead space, especially in children.

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

6.7 Demandflow

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

Demandflow must be switched on for O_2 inhalation.



To switch the MEDUMAT Easy 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 "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. At higher breath rates, fresh air is automatically mixed in with the oxygen. This is done via the spontaneous breathing tube of the patient valve.

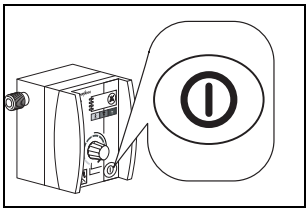
The Demandflow mode is ended by turning the regulator knob back to ventilation mode from the index

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: "Mask ventilation mode. Tilt back head, secure mask tightly" (from serial number 8000 and following repair/servicing/firmware update: "Ventilation pressure limit 20 mbar").

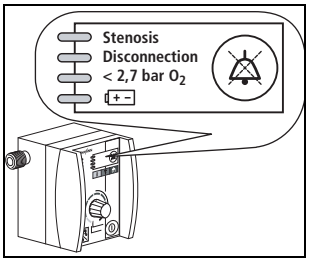
6.8 Terminating ventilation or Demandflow

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. Always change the cylinder in good time, e.g. when the pressure is lower than 50 bar, to ensure that oxygen is available for an adequate period.
2. Close the valve of the oxygen cylinder.
3. Switch off the MEDUMAT Easy. 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 **3** light up. If audio response is enabled, the ventilator announces: "Close oxygen cylinder".

6.9 Alarm signals



Alarm panel signals the following alarms:

Stenosis: Stenosis, or maximum ventilation pressure P_{max} reached in two successive inspiration phases

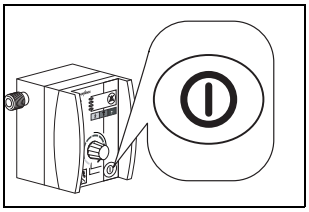
Disconnection: Disconnection between MEDUMAT Easy and patient in two successive inspiration phases

< 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 alarm tone sounds. If audio response is enabled, you will hear the message "Device malfunction! Administer alternative ventilation".



In this case you must not use the MEDUMAT Easy. 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 set off?

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 set off only the **< 2.7 bar** alarm.

Stenosis alarm

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

MEDUMAT Easy 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 set off 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 "Check airways and minute volume" (from serial number 8000 and following repair/servicing/firmware update: "Check airways and settings").

Disconnection alarm

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

The alarm is set off 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 "Check ventilation system and settings".

Disconnection alarm in Demandflow mode

If the patient does not trigger MEDUMAT Easy within 15 seconds, the "Disconnection" alarm is given. If audio response is enabled, the unit announces "Rule out respiratory arrest and check mask fit".

< 2.7 bar O_2 alarm

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

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

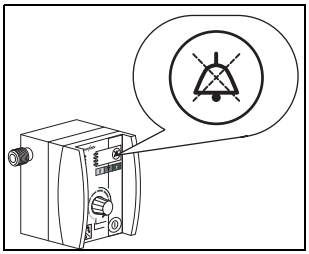
If audio response is enabled, the ventilator announces: "Check pressure hose system and gas supply".

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 "6.12 Alternative ventilation procedures" on page 39).

If audio response is enabled, you will hear the message: "Device malfunction! Administer alternative ventilation".

The ventilator must be switched off before the battery can be changed (see " Changing the main battery" on page 57).



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

Even if audio response is enabled, no messages will be output for the periods stated. 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.

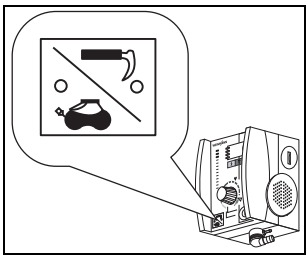
Both the visual and acoustic alarms are cancelled automatically as soon as the malfunction is eliminated.

6.10 Audio response for user guidance

Selecting language / Switching off audio guidance

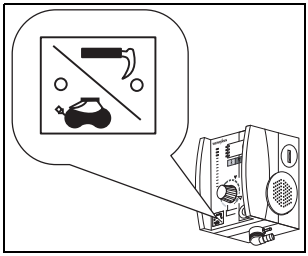
The language setting can only be selected if the unit is switched off.

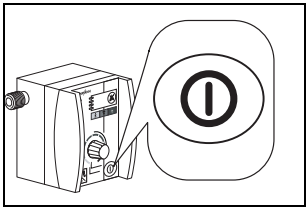
To select a language or to switch off the audio response facility, proceed as follows:



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 28000 WM 28100 (French variant) WM 28050 (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 28020	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





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: "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 response messages

The following is a list of the individual audio response messages with notes on what they mean. Note the differences between the audio responses. The audio responses change from serial number 8000 and following repair/servicing/firmware update (see Table 2).

Table 1:

Audio response up to serial number 7999	Meaning
"Open oxygen cylinder"	Open oxygen cylinder valve **slowly**.
"Check respiration and select mode"	Depending on whether or not the patient is breathing, set MEDUMAT Easy to one of the modes Demandflow (Page 27), mask ventilation or intubation (Page 24).
"Adjust settings"	Depending on patient weight, set respiration frequency and minute volume (Page 23).
"Connect patient"	Connect patient to ventilator via ventilation hose and patient valve using the patient mask or the connector of the tracheal tube.
"Demandflow mode"	Demandflow mode is selected.
"Mask ventilation mode" "Tilt head back" "Secure mask tightly"	Mask ventilation mode is selected. While tilting the head back, use the E-C technique to seal the mask.
"Tube ventilation mode" "Ventilation pressure limit 45 mbar"	Tube ventilation mode is selected. Maximum ventilation pressure for tube ventilation.
"Check airways and minute volume"	MEDUMAT Easy has measured excessive airway resistance. Check the airways or adjust respiratory frequency and minute volume settings to suit the patient (Page 23).
"Device malfunction" "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 39).
"Check pressure hose system and gas supply"	MEDUMAT Easy 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.
"Rule out respiratory arrest and check mask fit"	MEDUMAT Easy can no longer detect a breathing pulse (trigger) in Demandflow mode. Check the patient's breathing, and if necessary switch to a different ventilation mode. Check the connections and mask fit.
"Close oxygen cylinder"	After switching off the ventilator, turn off the O_2 cylinder or the external O_2 supply.
"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 minute volume setting. Check the connections or adjust the minute volume to suit the patient.
"Selected language: English" (Deutsch, Français, ...)	When selecting the language for the audio response, press the mask/tube switch as many times as necessary until the desired language is announced.
"Audio response is off"	Confirmation that audio response is deactivated.

Table 2:

Audio response from serial number 8000 and following repair/ servicing/firmware update	Meaning
"Open oxygen cylinder"	Open oxygen cylinder valve **slowly**.
"Adjust settings and connect patient!"	Depending on patient weight, set respiration frequency and minute volume (Page 23). Connect patient to ventilator via ventilation hose and patient valve using the patient mask or the connector of the tracheal tube.
"Demandflow mode!"	Demandflow mode is selected.
"Ventilation pressure limit 45 mbar"	Tube ventilation mode is selected. Maximum ventilation pressure for tube ventilation.
"Ventilation pressure limit 20 mbar"	Mask ventilation mode is selected. Maximum ventilation for mask ventilation.
"Check airways and settings!"	MEDUMAT Easy has measured excessive airway resistance. Check the airways or adjust respiratory frequency and minute volume settings to suit the patient (Page 23).
"Device malfunction!" "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 39).
"Check pressure hose system and gas supply!"	MEDUMAT Easy 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.
"Rule out respiratory arrest and check mask fit."	MEDUMAT Easy no longer measures respiratory pulse (trigger) in Demandflow mode. Check the patient's breathing, and if necessary switch to a different ventilation mode. Check the connections and mask fit.
"Close oxygen cylinder."	After switching off the ventilator, turn off the O_2 cylinder or the external O_2 supply.
"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 minute volume setting. Check the connections or adjust the minute volume to suit the patient.
"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.
"Audio response is off!"	Confirmation that audio response is deactivated.

6.11 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

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

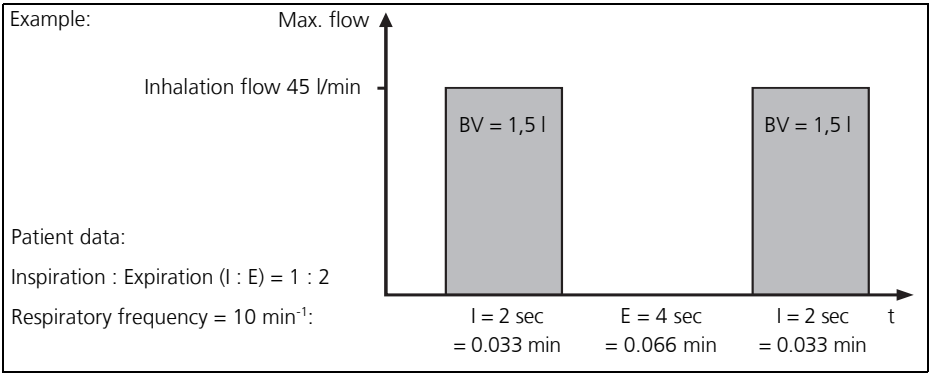
Example:

O_2 content = 1000 l; MV = 11 l/min.

This gives the following equation:

$$\text{Real ventilation time} = \frac{1000\ \text{l}}{11\ \text{l/min}} = 91\ \text{min} = 1\ \text{h}\ 31\ \text{min}$$

Real Demandflow time



Breathing volume (BV) = inhalation flow x inhalation time

For the above example:

Breathing volume = 45 l/min x 0.033 min= 1,5 l

Minute volume (MV) = respiratory frequency x BV

For the above example:

Minute volume (MV) = 10 min-1 x 1.5 l = 15 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:

$$\text{Real Demandflow time} = \frac{2000\ \text{l}}{15\ \text{l/min}} = 133\ \text{min} = 2\ \text{h}\ 13\ \text{min}$$

6.12 Alternative ventilation procedures

If MEDUMAT Easy 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 can also be operated with respiratory air.

7. Hygienic preparation

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

- Be sure to carry out a functional check after every hygienic preparation (see "8. Functional checks" on page 45).
- **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.

7.1 MEDUMAT Easy

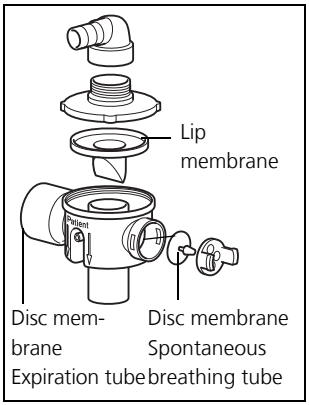
You can keep MEDUMAT Easy clean by simply wiping with disinfectant as described in section 7.6 .

Never immerse MEDUMAT Easy in disinfectants or other liquids. Otherwise damage may be caused to the unit, thus endangering users and patients.

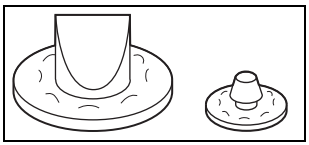
7.2 Patient valve

1. Disconnect the patient valve from the hoses.

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



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.

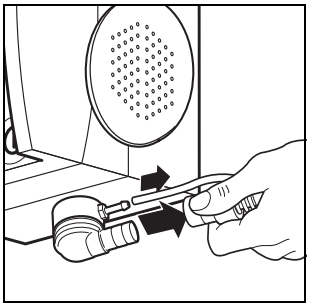


3. Crinkled, misshapen and sticky lip and valve membranes must be replaced.
4. Perform the hygienic preparation as described in section 7.6.

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 "8.3 Checking patient hose system" on page 48).

7.3 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. Close both ends of the pressure gauge hose.
2. Perform the hygienic preparation as described in section 7.6.
3. For reassembling, see "5.2 Ventilation hose" on page 19.

7.4 Masks

Perform the hygienic preparation of the masks as described in section 7.6.

7.5 Fittings

⚠ WARNING

Ensure that no liquids get into the connections for the oxygen fittings, otherwise there is a risk of explosion, especially if you are using products for disinfecting by wiping which contain alcohol.

For external cleaning of fittings (e.g. pressure reducer, valve), use only a clean cloth. The cloth may 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.

7.6 Cleaning and disinfection procedure

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

Observe the instructions for the disinfectant used. We recommend gigasept® FF (new) for immersion disinfection and terralin® protect for wipe disinfection. You are recommended to wear suitable gloves (e.g. household or disposable gloves) during disinfection procedures.

Description of component	Cleaning	Disinfection	Thermal disinfector	Sterilization
MEDUMAT Easy	With a dry or damp cloth	Wiping	Not permissible	Not permissible
Patient valve	in warm water with a mild household 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. (1)	Rinsing programme up to 95 °C (thermal disinfection in automatic cleansing unit)	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	Wiping	Not permissible	Not permissible

(1) 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 the procedure 5 more 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.

8. Functional checks

Before each use, after each dismantling and reassembly, and at the very least every 6 months, the user must carry out functional checks on the ventilator.

Note: Before carrying out the functional check on MEDUMAT Easy, you must connect the ventilation hose and the patient valve.

MEDUMAT Easy 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 "9. Troubleshooting" on page 54. If this is not possible, have the unit repaired by the manufacturer – WEINMANN Emergency – or by specialists explicitly authorized by WEINMANN Emergency.

A complete functional check includes:

- "8.2 Checking for leaks in the system" on page 47;
- "8.3 Checking patient hose system" on page 48;
- "8.4 Checking the minute volume" on page 49;
- " Checking the breath volume" on page 49;
- "8.5 Checking maximum ventilation pressure" on page 50;
- "8.6 Checking Demandflow" on page 51;
- "8.7 Checking the alarm systems" on page 52;

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

- replacement washers for the connections;

- lip membranes for the patient valve.

Note: Ensure that the test bag is not damaged and test its function regularly, e.g. in the context of device servicing.

8.1 Intervals

Before each use:

- Perform a functional check.

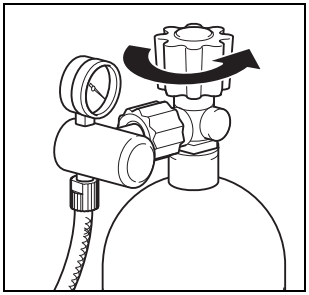
After each use or dismantling:

- Clean, disinfect or sterilize the ventilator and its components (see "7. Hygienic preparation" on page 40);
- Check the lip membrane in the patient valve (see "8.3 Checking patient hose system" on page 48). 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.

8.2 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. Always change the cylinder in good time, e.g. when the pressure is lower than 50 bar, to ensure that oxygen is available for an adequate period.
2. Close the cylinder 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.

Repairing leaks

Always keep a stock of washers for the connections available.

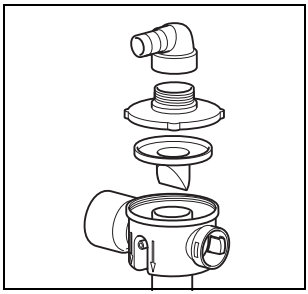
1. Prepare a soap/water solution using non-perfumed soap.
2. Wet all the screw and hose connections with the solution. Bubbles will form at the site of the leak.
3. Depressurize the system:
   To do this, first close the oxygen cylinder. Switch on MEDUMAT Easy briefly until the pressure gauge on the O_2 cylinder reads "0". Then switch off MEDUMAT Easy again.

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

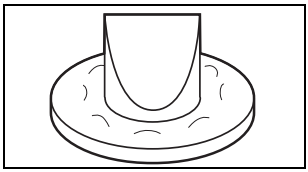
4. If leaks are discovered, the defective components must be changed.
5. After changing, make a fresh check for leaks.
6. If it proves impossible to eliminate the leak, the ventilator will have to be repaired.

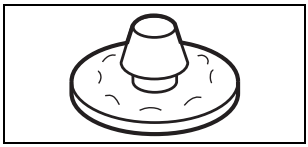
8.3 Checking patient hose system

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.

8.4 Checking the minute volume

Checking ventilation frequency

1. Open the valve of the oxygen cylinder **slowly**.
2. Switch on MEDUMAT Easy.
3. Select the following settings:
   – Frequency: 30 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 28 and 32.
5. Turn up the frequency to 14 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 12 and 16.

Checking the breath volume

1. MEDUMAT Easy 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 WM15323.
3. Select the following settings:
   – MV: 10 l/min (between 9 and 11) / Frequency: 10 min^{-1}
   – P$_{max}$: (45 mbar)

Inspiration stroke= MV/frequency = 10/10 = 1

4. Switch on MEDUMAT Easy. The test bag must become fully inflated during inspiration. This

ensures a breath volume of 1 litre per inspiration stroke. At all events the test bag is not sufficiently inflated if a disconnection alarm is set off.

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.

5. Switch off MEDUMAT Easy again.
6. Detach the test bag from the patient valve.
7. Select the following settings:
   – MV 3 L/min / frequency 30 min^{-1}
   – P_{max}: (45 mbar)
8. Switch on MEDUMAT Easy and close the patient connection at the patient valve. A stenosis alarm should be set off.
9. Switch off MEDUMAT Easy again.

8.5 Checking maximum ventilation pressure

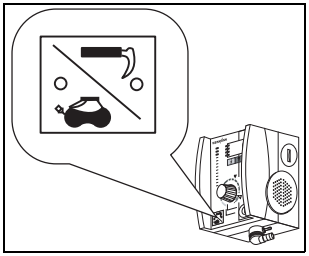
1. MEDUMAT Easy must be switched off and the oxygen cylinder must be open.
2. Attach the test bag to the patient valve with the adapter from test set WM15323.

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.

3. Select the following settings:
   – MV: 7 l/min / frequency: 11 min^{-1}
   – P_{max}: (20 mbar)
4. Switch on MEDUMAT Easy.
   Check that the needle of the pressure gauge on the MEDUMAT Easy 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 must set off 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:
   – MV: 9 l/min / frequency: 10 min^{-1}
   – P_{max}: (45 mbar)
   If audio response is enabled, the ventilator must announce "Tube ventilation mode, ventilation pressure limit 45 mbar" (from serial number 8000 and following repair/servicing/ firmware update: "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 must set off the **stenosis** alarm. Usually this occurs after the second inspiration stroke.
7. Switch off MEDUMAT Easy again.

8.6 Checking Demandflow

1. Make sure that MEDUMAT Easy 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 15323.
3. Select the setting "Demandflow".
4. Switch on MEDUMAT Easy. The green "Demandflow" LED lights up.
   If audio response is enabled, the ventilator announces "Demandflow mode".
5. Simulate an inspiration pulse by hand by firmly squeezing and quickly releasing the test bag.

6. The MEDUMAT Easy switches the flow on and then immediately off again. This test can be repeated several times.
7. Switch off MEDUMAT Easy again.

8.7 Checking the alarm systems

Important
In the case of the stenosis alarm and the disconnection alarm, the alarm signal (or message) is only set off 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.

Stenosis

1. Open the oxygen cylinder.
2. Remove the tube or the ventilation mask from the patient valve.
3. Switch on MEDUMAT Easy.
4. Switch the mask/tube switch to  .

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.

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 set off.
   If audio response is enabled, the ventilator announces "Check airways and minute volume" (from serial number 8000 and following repair/ servicing/ firmware update: "Check airways and settings").

Disconnection (interruption of breathing system)

1. First proceed as for the **stenosis** alarm.
2. 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 set off. If audio response is enabled, the ventilator announces "Check ventilation system and settings".

Drop in O_2 pressure (<2.7 bar O_2)

1. Open the valve of the oxygen cylinder **slowly**.
2. Switch on MEDUMAT Easy.
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 O_2** alarm should be set off.
   If audio response is enabled, the ventilator announces "Check pressure hose system and gas supply".

Power supply (⊞)

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

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

9. Troubleshooting

Fault	Cause	Remedy
MEDUMAT Easy will not switch on.	MEDUMAT Easy defective.	Arrange for repair.
	Battery failing.	Replace battery in battery compartment (10.1, page 57). 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 defective.	Arrange for repair.
Disconnection alarm (breathing system interrupted).	Ventilation hose leaking/slipped out.	Check connections.
	Mask/tube incorrectly positioned.	
	Pressure gauge hose leaking/ slipped out.	
	MEDUMAT Easy defective.	Arrange for repair.
< 2.7 bar alarm (oxygen pressure too low).	Oxygen cylinder nearly empty.	Change O_2 cylinder (5.1, page 18).
	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 (10.1, page 57). If ventilator still refuses to switch on, have internal auxiliary battery replaced by manufacturer or authorized specialists.

Fault	Cause	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 (6.10, page 32).
MEDUMAT Easy is functioning, but without any displays.	Pressure gauge hose on MEDUMAT Easy or on patient valve slipped off.	Check pressure gauge hose.
	Kink in pressure gauge hose.	
MV too low.	Ventilation parameter(s) incorrectly set.	Check ventilation parameter(s).
	MEDUMAT Easy defective.	Arrange for repair.
Unusually high oxygen consumption.	Leak in oxygen supply.	Find and eliminate leak (8.2, page 47).
MEDUMAT Easy will not switch off.	Operating error.	Keep button pressed for at least 3 seconds.
Pressure gauge not reading "0".	MEDUMAT Easy defective.	Arrange for repair.

10. Servicing

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)	– 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	– 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.

10.1 Batteries

MEDUMAT Easy is equipped with two batteries:

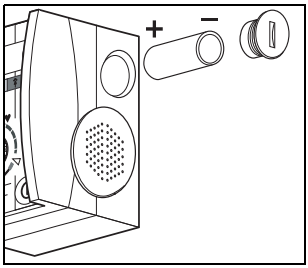
- Main battery (lithium battery 3.6 V) for main power supply. This may be changed by the operator.
- A CR2430 button cell. This can only be changed by specialist personnel. It supplies auxiliary power to the electronic system if the main battery fails. This makes it possible to set off an alarm even 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 (e.g. with a coin).
3. Remove the old 3.6 V lithium battery.
4. Insert a new battery. Make sure it is inserted the right way round.
5. Close the battery compartment again.

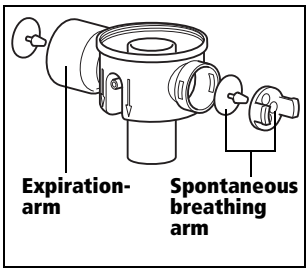
Important

The 3.6 V lithium battery is a special battery for this

unit. Use only batteries supplied by WEINMANN Emergency.

10.2 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 arm

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

10.3 Storage

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

1. Clean and disinfect the ventilator (see "7. Hygienic preparation" on page 40).
2. Store MEDUMAT Easy in a dry place.
3. The battery can remain inside the unit even for lengthy periods.

Important Remember that the ventilator still requires servicing at the specified intervals even when in storage, otherwise it cannot be used when 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.

10.4 Disposal

Do not dispose of the unit with domestic waste. For proper disposal of the device and its components, please contact a certified waste disposal site for electronic goods. Ask your Environmental Officer or local council for the address. 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.

11. Product and accessories

11.1 Standard product

MEDUMAT Easy, complete	WM	28000
comprising:		
– MEDUMAT Easy, single unit	WM	28010
– Operating instructions	WM	16862
– Summary of operating instructions	WM	16844
– Set of mounting attachments	WM	15007
– Ventilation hose and patient valve with spontaneous breathing facility (reusable)	WM	22520
– Ventilation mask for adults, size 5	WM	5074
– Test kit for functional checks	WM	15323

11.2 Accessories

The following accessories are not included with the standard product:

1. Oxygen cylinder, 2 litres	WM	1822
2. Aluminium lightweight oxygen cylinder, 2 litres	WM	1814
3. Oxygen cylinder, 0.8 litres	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 juveniles, size 3	WM	5082
9. Rendell-Baker ventilation mask, silicone:		
– children, approx. 3 – 12 years, size 3	WM	5063
10. Oropharyngeal tube:		
– for adults	WM	3165
– for juveniles	WM	3163
– for children	WM	3162

11. Disposable ventilation mask		
– size 3, for children and juveniles	WM	10563
– size 5, for adults	WM	10565
12. Set tracheal tubes (disposable):		
– Set tracheal tubes	WM	15075
– Set tracheal tubes, DIN 13232-N	WM	15076
– Set tracheal tubes, DIN 13232-K	WM	15077
13. 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 (Walther) and sealing nipple (AGA)	WM	22288
– 3m, bayonet seal at both ends	WM	22371
14. Set, adapter G3/8-NIST, set of 5	WM	15554
15. O_2 plug DIN 13260-S-O2 for GCS socket	WM	2057
16. Angle adapter for French coupling	WM	22910
17. Hose casing	WM	8297

11.3 Spare parts

1.	Washer for pressure hose	WM	1145/31
2.	Set of mounting attachments	WM	15007
3.	Battery, Li 3.6 V	WM	28045
4.	Ventilation hose and patient valve with spontaneous breathing facility (reusable) comprising:	WM	22520
	– respiration tube, twin lumen	WM	22647
	– patient valve	WM	3280
5.	Patient valve comprising:	WM	3280
	– connection nozzle to patient hose	WM	3213
	– upper control element	WM	3181
	– Lip membrane	WM	3211
	– Bottom control element fitted consisting of:	WM	3285
	– Bottom control element for spontaneous breathing	WM	3281
	– insert, spontaneous breathing arm	WM	3282
	– valve membrane for spontaneous breathing arm	WM	3284
	– valve membrane for expiration arm	WM	3212
	– O-ring 15/1,5	WM	1145/118

12. Technical data

	MEDUMAT Easy
Dimensions LxHxB 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	timing pulse, volume constant
Gas input	Medical oxygen
Operating pressure	2.7 to 6.0 bar (2)
Minimum gas volume required	70 l/min O_2
Insp-exp. ratio (I:E)	1:1.67
Ventilation frequency	continuously variable from 10 to 30 min^{-1}
Minute volume (MV)	continuously variable from 3 to 16 l/min

	MEDUMAT Easy
MV tolerances: Room temp. (20 °C) –18 °C to +60 °C	 for 3 l/min = ±20 % for >3 l/min = ±15 % for 3 l/min = ±35% for >3 l/min = ±20%
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
Ventilation hose connection	External diameter 13 mm
Patient valve – inspiration tube – mask/endotracheal tube	 15 mm socket 22 mm plug ISO 5356-1
Patient valve – expiration tube	30 mm socket ISO 5356-1
Power supply Life expectancy Max. storage period	maintenance-free lithium battery 3.6 V; 5.2 Ah, > 2 years 10 years after delivery
Auxiliary power for alarm system Max. storage period	Button cell CR2430 10 years after delivery
Ventilation hose	– Spiral silicone DN 10 – PVC hose DN 8, disposable
Degree of protection against water	IP54
Standards applied	EN 794–3; EN 1789

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

	MEDUMAT Easy
Alarm sound pressure	60 dB (A)
Pressure gauge accuracy	±5% of upper range value
Patient valve resistance, reusable: Inspiration Expiration Spont. breathing	 <6 mbar [3] at 60 l/min <6 mbar [3] at 60 l/min 1.5 mbar [3] at 30 l/min
Resistance of patient hose system, disposable (as per EN 794-3): Inspiration Expiration Spont. breathing	 22,4 mbar[3] at 60 l/min 3,46 mbar[3] at 60 l/min 1,54 mbar[3] at 30 l/min
Elasticity of breathing system	negligible

	MEDUMAT Easy
Patient valve dead space	12,8 ml (reusable) 8 ml (disposable)
Materials used for disposable hose system	PC, silicone, PVC, PP, PS, EVA, K-Resin®
Components with critical flow direction	Patient valve
Components containing latex	None
Demandflow mode: – trigger – peak flow – shut-off pressure	 < 1 mbar [3] > 40 l/min 3 mbar

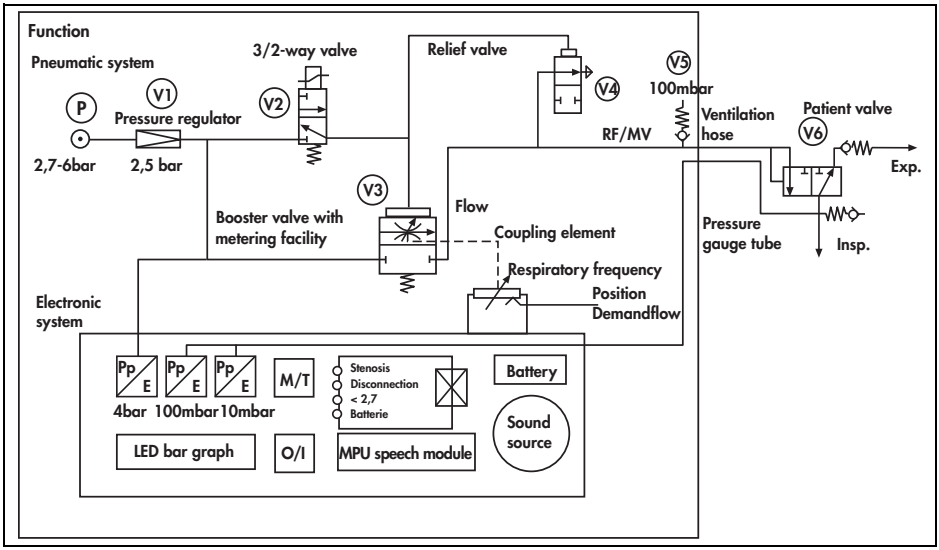
CE 0197

Subject to technical change without notice.

Recommended safe distances between portable or mobile HF telecommunication devices (e.g. mobile phones) and MEDUMAT Easy

Rated output of HF device in W	Safe 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

12.1 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

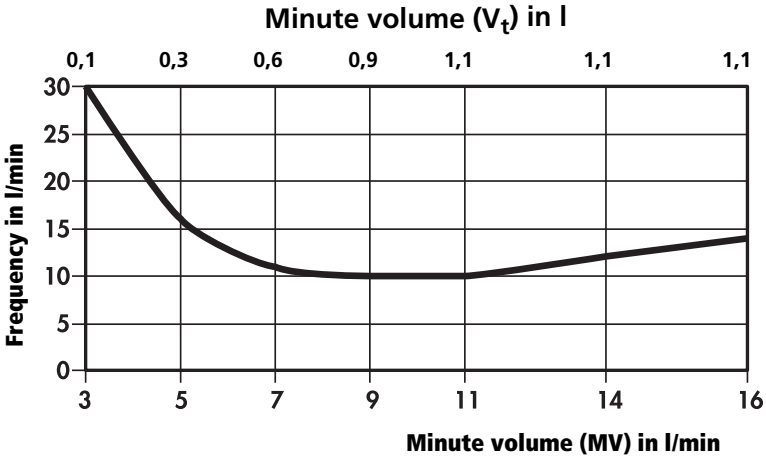
An inspiration impulse (trigger) at V2 opens valves V3 and V4.

Electronic system

The microprocessor-controlled electronic system sets the ventilation parameters and monitors ventilation, and also O_2 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.

12.2 Relationship between ventilation parameters

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



13. 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.de 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

14. 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.de

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medical technology
made in germany

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