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m e d i c a l   t e c h n o l o g y

MEDUVENT Standard

Step-by-step instructions

- Function check
- Ventilation start-up based on height
- Resuscitation with manual mode
- Anesthesia induction (RSI)
- NIV therapy

Attention:
This document does not replace the instructions for use. Full information can be found in the instructions for use.

⌀ Function Check

Perform a function check at the following intervals:

Part concerned	Interval
Device	• Before each use • After each hygienic reprocessing • After each repair
Breathing circuit (reusable)	• Before each use • After each hygienic reprocessing • After each repair

Preparing for the function check

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

   If necessary: Charge rechargeable battery.

2. Check the following parts for external damage:
   - Device
   - Labels on the device
   - Connectors and cables
   - Breathing circuit
   - Accessories

3. If necessary: Replace damaged parts.

4. Check the patient valve of the reusable breathing circuit.

5. If necessary: Replace the breathing circuit.

6. Check the fill level of the oxygen cylinder.

7. If necessary: Replace the oxygen cylinder.

Performing a function check

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

- Testing bag WM 1453
- Testing bag WM 1454
- EasyLung for WEINMANN Emergency WM 28625

Requirement

- The device is disconnected from the patient.
- The rechargeable battery is fully charged.
- There is an SD card in the SD card slot.
- The hygiene filter is inserted in the filter compartment.
- The oxygen supply is shut off.
- The function check has been prepared.
- The device is switched on.

10:51 △ 100% O₂ **IPPV**	1. Select the "Function check" menu item.
🧒 **Emergency Infant**	
🧑 **Emergency Child**	
🧍 **Emergency Adult**	
🧍 **New patient** / **Function check**	

10:57 **Function check**	2. Prepare the device:
1. Connect breathing circuit.	• Connect the breathing circuit to the device.
2. Connect test lung.	• Connect the test lung to the breathing circuit.
3. Connect MEDUtrigger.	• Connect MEDUtrigger.
Cancel **Start**	3. Select "Start".

10:52 **Function check**	4. If you want to test the oxygen supply: Select "Yes".
Test oxygen supply?	or
	If you do not want to test the oxygen supply: Select "No".
No **Yes**	The device skips the oxygen test (steps 5 to 8 are skipped).

5. Set the oxygen supply rate (5-15 l/min).

6. Select "Start".

7. Stop the oxygen supply and close the oxygen cylinder.

8. Select "Next".

9. If an alarm tone sounds: Select "Yes".

10. If the alarm LED flashes red: Select "Yes".

11. Press all the controls except the On/Off button one after another.

12. If the MEDUtrigger is not displayed in the function check: Activate MEDUtrigger in the Operator menu and repeat the function check.
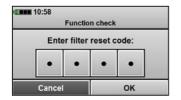

13. Proceed with the hygiene filter in accordance with the following table:

Color	Action
Green	Continue to use hygiene filter.
Yellow	Keep hygiene filter to hand or order hygiene filter.
Red	Replace hygiene filter.

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

10:58
Function check

Enter filter reset code:

| • | • | • | • |

| Cancel | OK |

15. Enter the filter reset code specified in the Operator menu. On delivery, the filter reset code is "0000".
Select "OK".

11:00
Function check

Device ready for use

Finish

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

Proceed with the device in accordance with the following table:

Display	Meaning	Action
Device ready for use.	Function check passed.	Use device without restriction.
Device not ready for use.	Function check failed or function check interrupted.	• Select "Details". Check the parts listed in the display and replace them if necessary. Repeat the function check. • If the function check continues to fail: Contact your authorized dealer or the manufacturer.
Device ready for use. The service symbol flashes in the start menu.	Information about the scheduled service.	Contact your authorized dealer or the manufacturer.

17. Select "Finish".

18. Switch off the device.

19. Take the test lung off the breathing circuit.

⌀ Ventilation Start-Up Based on Height

Start up more quickly and ventilate more accurately

From now on, you no longer need to spend time considering what tidal volume (Vt) is best suited to your patient. With MEDUVENT Standard, you can now start ventilation even more accurately and quickly. When you enter the patient's height and gender, your ventilator automatically calculates all the ventilation parameters via ideal body weight (IBW). IBW is an important indicator for setting ventilation parameters[i].

⚠ WARNING

Risk of injury resulting from incorrectly set limitation of maximum airway pressure! An excessively high airway pressure might expose the patient to serious or life-threatening injury.

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

[i] Gajic, O. et al. Ventilator-associated lung injury in patients without acute lung injury at the onset of mechanical ventilation. Critical Care Medicine, 2004, No. 32, p. 1817-1824.

1. Switch on ventilator.

2. Select "New patient".

3. Enter patient's gender and height and select ventilation mode.

4. Confirm with "Next".

5. The device shows a preview of the ventilation parameters calculated. If necessary: Adjust ventilation parameters. Select "Start".

6. The device shows current ventilation parameters.

Using presets and working within guidelines

In the Start menu, you can set the patient's height under the "New patient" menu item. This section explains how the ventilator automatically calculates the ideal tidal volume using height and gender.

Ideal body weight (IBW) is calculated from stated height (X) as shown below:

• Child[1] (height < 154 cm):

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

• Adult[2] (height > 154 cm):

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

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

The tidal volume for the patient is calculated with the aid of ideal body weight and the setting Vt per kg body weight (Vt/kgBW) in the Operator menu:

$$\text{Vt} = \text{IBW} \bullet \frac{\text{Vt}}{\text{kgBW}}$$

Example

• Patient, male, height 185 cm

• Setting for Vt/kgBW = 6 ml/kg

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

$$\text{Vt} = 79.52 \text{ kg} \bullet 6 \frac{\text{ml}}{\text{kgBW}} \ 477 \text{ ml} \approx 480 \text{ ml}$$

[1] Source: TRAUB, S.L.; JOHNSON, C.E.: Comparison of methods of estimating creatinine clearance in children. In: American Journal of Hospital Pharmacy 37, 1980, No. 2, p. 195–201.

[2] Source: DEVINE, Ben J. Gentamicin therapy. The Annals of Pharmacotherapy, 1974, 8th year No. 11, p. 650-655
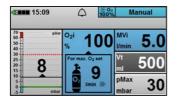
⌀ Resuscitation with Manual Mode

1. Switch on ventilator.

2. Select patient group and switch to "Manual" mode. Alternatively, select "New patient", set the patient's gender and height and select "Manual" mode.

Note: It is possible to switch to "Manual" ventilation mode from any ventilation mode at any time.

3. Check ventilation parameters. Hold the mask over the patient's mouth and nose using the "double C grip". Keep the button on the MEDUtrigger depressed until two mechanical breaths have been administered.
In order to achieve maximum possible oxygen concentration, set the displayed "For max. O_2 set" value in l/min on the oxygen supply.

⚠ WARNING

Therapy disrupted by excessively high flow! If the flow exceeds the maximum permitted value of 15 l/min, the pressure relief valve may open unintentionally during inspiration, putting therapy at risk.

This might injure the patient.

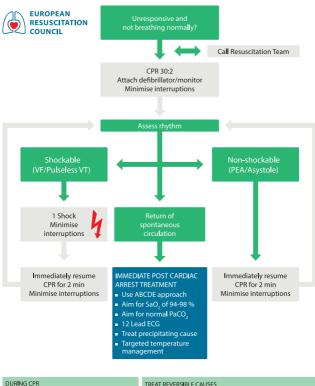⇒ Feed in oxygen only at a maximum flow of 15 l/min.

4. Once the airway has been secured, switch to "IPPV" mode for continuous ventilation.

5. Ventilate continuously in "IPPV" mode. The device shows the parameters for IPPV ventilation.

Info: If the set pMax is reached during CPR, MEDUVENT Standard restricts inspiratory pressure.

Advanced Life Support

EUROPEAN RESUSCITATION COUNCIL

Unresponsive and
not breathing normally?

Call Resuscitation Team

CPR 30:2
Attach defibrillator/monitor
Minimise interruptions

Assess rhythm

Shockable
(VF/Pulseless VT)

Non-shockable
(PEA/Asystole)

1 Shock
Minimise
interruptions

Return of
spontaneous
circulation

Immediately resume
CPR for 2 min
Minimise interruptions

Immediately resume
CPR for 2 min
Minimise interruptions

IMMEDIATE POST CARDIAC ARREST TREATMENT
- Use ABCDE approach
- Aim for SaO_2 of 94-98 %
- Aim for normal $PaCO_2$
- 12 Lead ECG
- Treat precipitating cause
- Targeted temperature management

DURING CPR
- Ensure high quality chest compressions
- Minimise interruptions to compressions
- Give oxygen
- Use waveform capnography
- Continuous compressions when advanced airway in place
- Vascular access (intravenous or intraosseous)
- Give adrenaline every 3-5 min
- Give amiodarone after 3 shocks

TREAT REVERSIBLE CAUSES

Hypoxia	Thrombosis – coronary or pulmonary
Hypovolaemia	Tension pneumothorax
Hypo-/hyperkalaemia/metabolic	Tamponade – cardiac
Hypothermia/hyperthermia	Toxins

CONSIDER
- Ultrasound imaging
- Mechanical chest compressions to facilitate transfer/treatment
- Coronary angiography and percutaneous coronary intervention
- Extracorporeal CPR

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in your country.

Please check
local guidelines.

⌀ Anesthesia Induction (RSI) with Manual Mode

1. Switch on ventilator.

2. Set the patient's gender and height and select "CPAP" ventilation mode for pre-oxygenation. Confirm with "Next".

3. Select a low PEEP for pre-oxygenating a spontaneously-breathing patient.

4. Pre-oxygenate at a low PEEP and set the flow rate on the oxygen supply.

Note: If you want an oxygen concentration of 100 %, use the administered minute volume (MVi) as a guide.
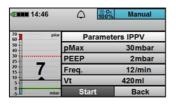
5. Following successful pre-oxygen-ation, switch to "Manual" mode.

6. Auscultate tube position by getting MEDUtrigger to trigger manual mechanical breaths. In an emergency, perform mask ventilation using MEDUtrigger.

7. Once the airway has been secured successfully, perform continuous mandatory ventilation, switching to "IPPV" mode to do so. The ventilation parameters from Item 2 set at the beginning are adopted automatically.

8. Ventilate continuously in "IPPV" mode. The device shows the parameters for IPPV ventilation.

Excerpt from the S1 guideline
"Prehospital Emergency Anaesthesia in Adults" of the DGAI

(DGAI = German Society for Anesthesiology & Intensive Care Medicine)

Indications for prehospital emergency anaesthesia

- Acute respiratory insufficiency (hypoxia and/or respiratory rate* < 6 or > 29/min) and contraindications for or failure of non-invasive ventilation
- Loss of consciousness/neurological deficit with risk of aspiration
- Multiple trauma/severe trauma with
    i)   hemodynamic instability, systolic BP < 90 mmHg or
    ii) hypoxia with SpO_2 < 90% despite = 2 l/min O_2 administration or
    iii) traumatic brain injury with GCS < 9

* in the presence of not rapidly reversible causes

Indication: patient-, mission-, and user-related factors, experience of the emergency medical team, situation at the scene, transport times, air and ground rescue

Communication in the team: Site of anesthesia induction, clear allocation of tasks, selection of medicines, other important notes and agreements

Optimal positioning: "Light, space, warmth" concept, ideal for upper body elevation in the ambulance (caution: not with spinal immobilization or hemodynamically unstable patients), head in "sniffing" position.

parallel

Pre-oxygenation:
For a spontaneously breathing patient, at least 3-4 min O_2 insufflation with 12-15 l/min via a face mask with reservoir or demand valve, if applicable, NIV or mask ventilation.

Standardized preparation:
Anaesthesia and emergency medications, respiratory alternatives, suction, capnography.

Monitoring: Pulse oximetry, ECG, blood pressure, capnography.

Two peripheral venous accesses: In case of difficult puncture conditions, consider intraosseous puncture in a time-critical manner.

Rapid Sequence Induction (RSI)

Continuous monitoring: Anesthesia management and monitoring

If required
Management of complications

Rapid Sequence Induction (RSI)

- If applicable, remove the cervical spine immobilization and begin manual in-line stabilization
- Announcement of the Anaesthesia medication with active substance and dosage, step-by-step application
- Wait for loss of consciousness and relaxation effect
- Airway management without intermediate ventilation in normoxic patients*
- Tube position check (capnography, auscultation, insertion depth)
- If applicable, stop manual in-line stabilization and close the cervical spine immobilization brace again

* In individual cases, despite the increased risk of aspiration, intermediate ventilation may be necessary in order to maintain oxygenation.

Source: Anästh Intensivmed 2015;56:317-335 Aktiv Druck & Verlag GmbH (Translation by WEINMANN Emergency)

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Please check local guidelines.

Ø NIV therapy

1. Switch on ventilator.

2. Select "New patient". Alternatively, select the corresponding Emergency mode: Adult, Child, Infant.

3. Set patient's gender and height.

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10:54	🔔	O₂ 100%	IPPV
♂ Gender		M ♂	
Height		175cm	
Mode		CPAP	
Next		Back	

4. Select "CPAP" ventilation mode and confirm with "Next".

10:56	🔔	O₂ 100%	CPAP

Preview ventilation parameters

pMax	30mbar	PEEP	5mbar
Freq.	12/min	Vt	420ml
🫁 Start		Back	

5. Set the desired PEEP and select "Start". The device starts ventilation.

13:44	🔔	O₂ 100%	CPAP

pAw	O₂i %	21	MVi l/min	5.2
			PEEP mbar	2

6. The parameters can be adapted during ventilation with the aid of the navigation knob. If necessary: Switch ventilation mode via the Menu button.

SOP (Standard Operating Procedure)
Non-invasive ventilation (NIV) for emergency medical services

Modified in accordance with the AGNN's 2019 treatment recommendations for emergency medicine (AGNN = Arbeitsgemeinschaft in Norddeutschland tätiger Notärzte e.V. - Working group of emergency physicians working in North Germany), translated by WEINMANN Emergency.

Logistical requirements

Oxygen supply: At least one 2-l cylinder, full.. Check

Emergency team familiar with NIV .... Check

Clinical requirements

Conscious, co-operative patient breathing spontaneously .... Check

If appropriate, administer mild sedation, e.g. morphine
(5 - 10 mg iv, fractionated) or short-acting benzodiazepine, to agitated patients

Indications

Dyspnea.. Check

Respiratory rate > 25/min (count!) .... Check

$SpO_2 < 90\%$ despite administration of O_2... Check

Contraindications

Absolute contraindications... Check

No spontaneous breathing, gasping, blocked airways
gastrointestinal hemorrhage or ileus

Relative contraindications... Check

Coma, severe agitation, hemodynamic instability, severe
hypoxemia ($SpO_2 < 75\%$ despite O_2 administration), problems accessing airway,
status post gastrointestinal surgery

NIV sequence: Make settings to ventilator. Commence NIV with patient semi-seated or seated. Use mask if at all possible, putting it up to the patient's face slowly. The patient can hold the mask initially, if appropriate. Connect the mask to the breathing circuit with the ventilator running. Aim: To synchronize device and patient

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Pulmonary edema

Primary device settings

Mode...CPAP

PEEP (depending on patient comfort and oxygenation situation): ..... 5 - 10 (12) mbar

FiO_2 ....Initially 100 %, then reduce to suit requirements

Criteria for objective and success

Increase in SpO_2 .... Check

Reduction in dyspnea.. Check

Reduction in respiratory rate and heart rate .... Check

If applicable, improved vigilance.. Check

Escalation stages

Intubate immediately if clinical situation fails to improve or contraindications are found!

Warnings

- Close clinical observation, stop if condition deteriorates

- Do not delay pharmacological/interventional therapy

- Be ready to intubate at all times when using NIV, above all in the case of relative contraindications

- Intubate immediately if situation fails to improve or contraindications are found

- No NIV in the case of burns or facial trauma

- Provide advance information to the admitting hospital in good time

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