

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

WARNING

Hazardous therapy if device connected to patient during function check!

If the device is connected to the patient during the function check, this might lead to therapy posing a risk as a result of excessively high pressures or unsuitable ventilation volumes. This might expose the patient to the risk of serious or life-threatening injury.

⇒ Always disconnect the device from the patient for the function check.

Perform a function check at the following intervals:

Part	Interval
Device	<ul style="list-style-type: none">• Before each use• After each hygienic reprocessing• After each repair
Breathing circuit	<ul style="list-style-type: none">• 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.

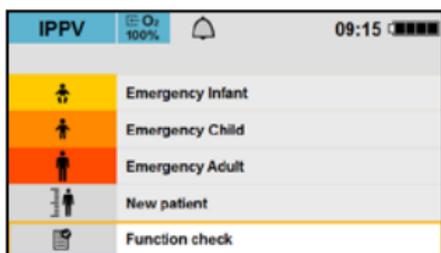
Performing a function check

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

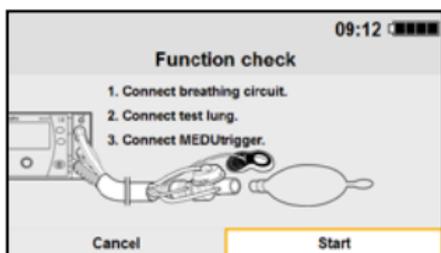
Requirement

- 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.



1. Select the “Function check” menu item.

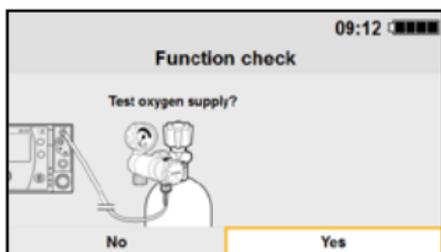
Follow the on-screen instructions.



2. Prepare the device:

- Connect the breathing circuit to the device.
- Connect the test lung to the breathing circuit.
- Connect MEDUtrigger.

3. Select “Start”.



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

or

If you do not want to test the oxygen supply: Select “No”.

The device skips the oxygen test (steps 5 to 8 are skipped).

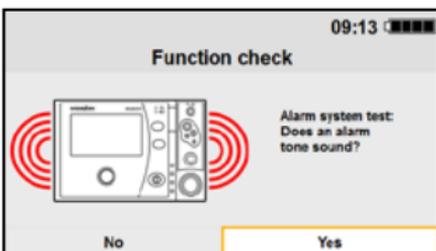
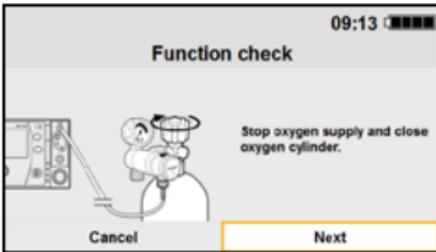
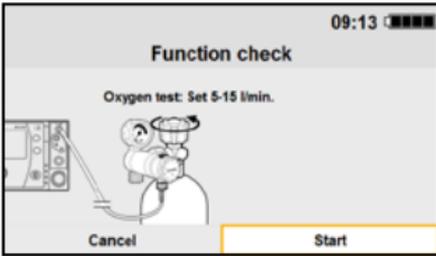
5. Set the oxygen supply rate (5-15 l/min).

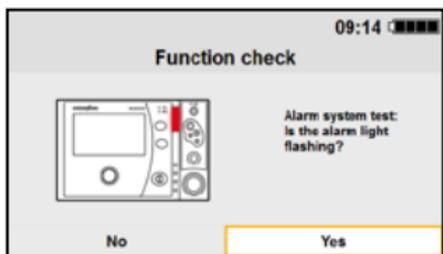
6. Select "Start".

7. Stop the oxygen supply and close the oxygen cylinder. This test item can be skipped if no oxygen source is available.

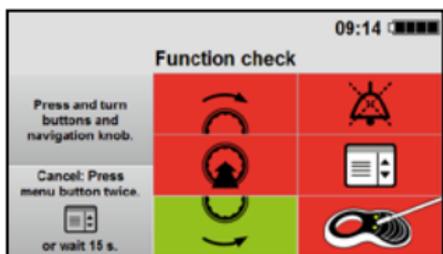
8. Select "Next".

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



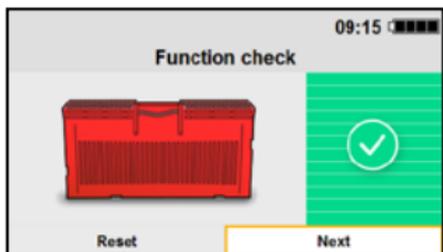


10. If the alarm LED flashes red: Select "Yes".



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

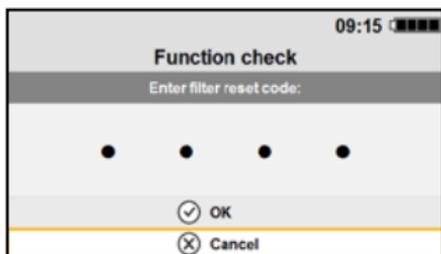
12. If the MEDUtrigger is not displayed in the function check: Activate MEDUtrigger in the Operator menu and repeat the function check.



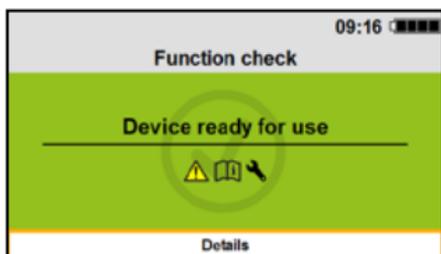
13. Proceed with the hygiene filter in accordance with the following table:

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

14. If you have replaced the hygiene filter: Select "Reset".



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



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.	<ul style="list-style-type: none"> • 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 which tidal volume and which respiratory rate (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 parametersⁱ.

WARNING

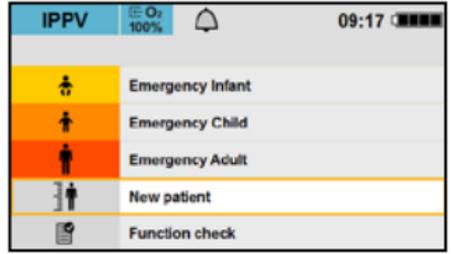
Risk of injury resulting from incorrectly set limitation of maximum airway pressure! An excessively high airway pressure might expose the patient to serious or life-threatening injury.

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

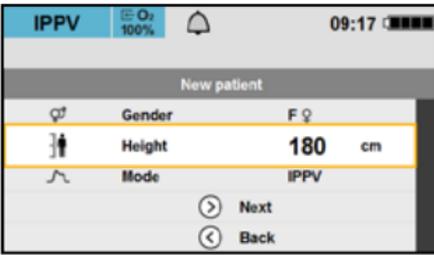
ⁱ Gajic, O. et al. Ventilator-associated lung injury in patients without acute lung injury at the onset of mechanical ventilation. Critical Care Medicine, 2004, No. 32, p. 1817-1824.



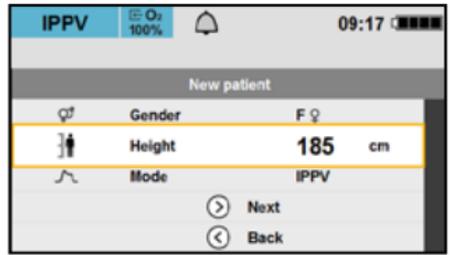
1. Switch on ventilator.



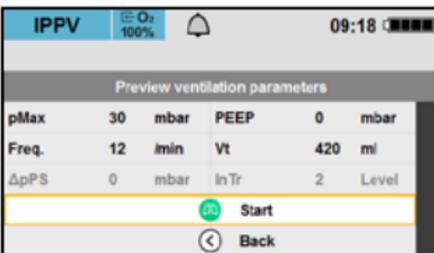
2. Select "New patient".



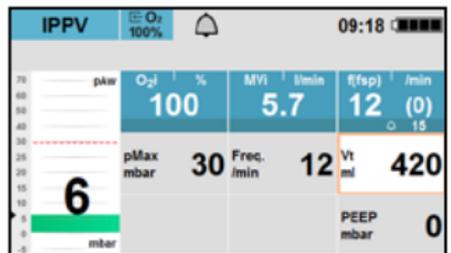
3. Enter patient's gender and height and select ventilation mode.



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):

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

- Adult⁽²⁾ (height > 154 cm):

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

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

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

$$Vt = \text{IBW} \cdot \frac{Vt}{\text{body weight}}$$

Example

- Patient, male, height 185 cm
- Setting for Vt/body weight = 6 ml/kg

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

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

⁽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

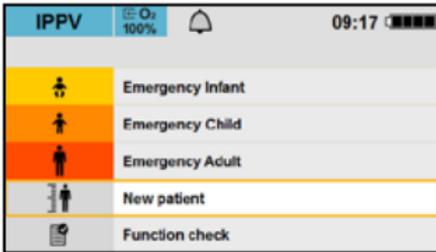


WEINMANN		MEDOVERT Standard		09-18 2000	
PPV	100	FiO2	5.7	PEEP	12 (P0)
Tidal Volume	6	Flow	30	RR	12
				PIP	420
				PEEP	0

Resuscitation with Manual Mode

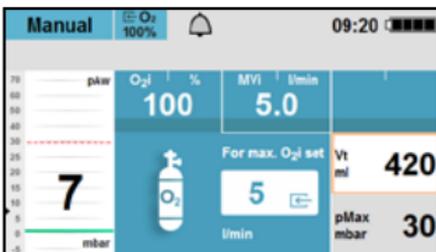


1. Switch on ventilator.



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.

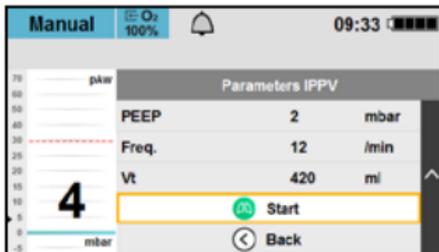
In order to achieve maximum possible oxygen concentration, set the displayed “For max. O₂ set” value in l/min on the oxygen supply.

⚠ WARNING

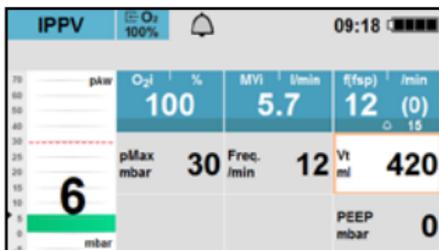
Therapy disrupted by excessively high flow! If the flow exceeds the maximum permitted value of 15 l/min, the pressure relief valve may open unintentionally during inspiration, putting therapy at risk.

This might injure the patient.

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



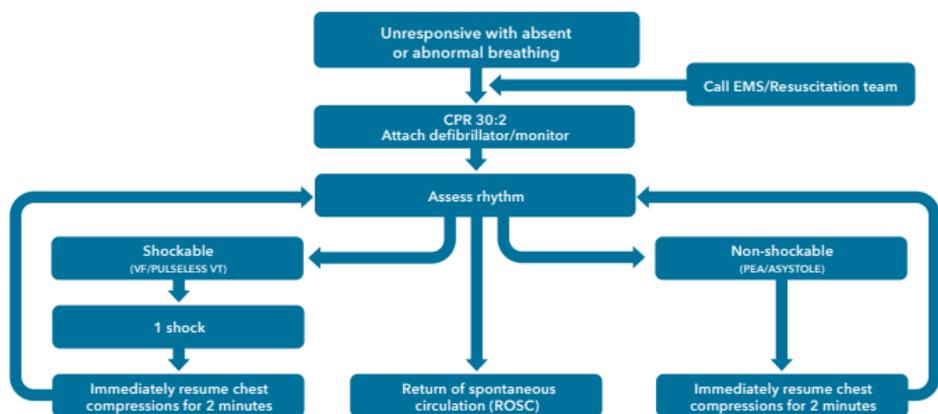
4. Once the airway has been secured, switch to IPPV ventilation via the menu button and “Ventilation mode”.



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



Give high-quality chest compressions and

- Give oxygen
- Use waveform capnography
- Continuous compressions if advanced airway
- Minimise interruptions to compressions
- Intravenous or intraosseous access
- Give adrenaline every 3-5 min
- Give amiodarone after 3 shocks
- Identify and treat reversible causes

Identify and treat reversible causes

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

Consider ultrasound imaging to identify reversible causes

Consider

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

After ROSC

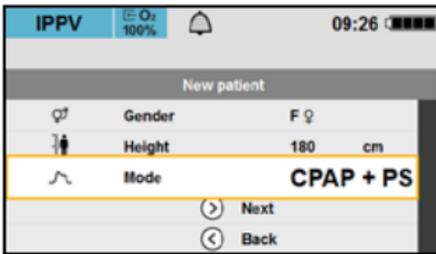
- Use an ABCDE approach
- Aim for SpO₂ of 94-98% and normal PaCO₂
- 12 Lead ECG
- Identify and treat cause
- Targeted temperature management



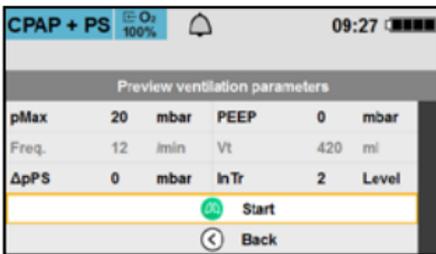
Anesthesia Induction (RSI) with Manual Mode



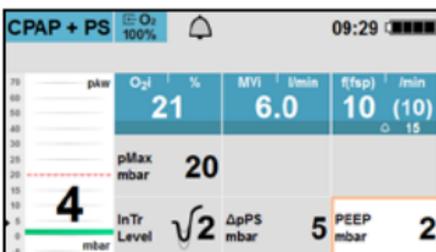
1. Switch on ventilator.



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



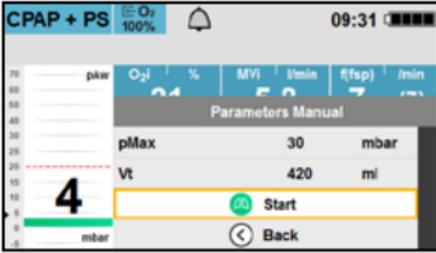
3. Select a low PEEP for pre-oxygenation of a spontaneously-breathing patient. If possible, use of pressure support (PS) should be considered.



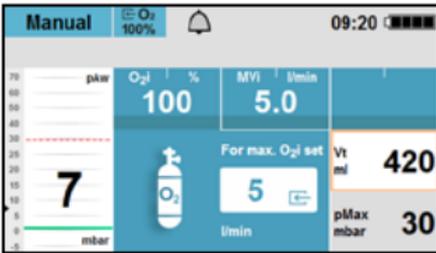
4. Pre-oxygenate at a low PEEP and set the flow rate on the oxygen supply.

Note: If you want an oxygen concentration of 100 %, use the administered minute volume (MVi) as a guide.

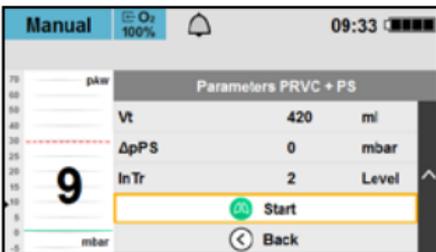
5. Following successful pre-oxygenation, switch to "Manual" mode.



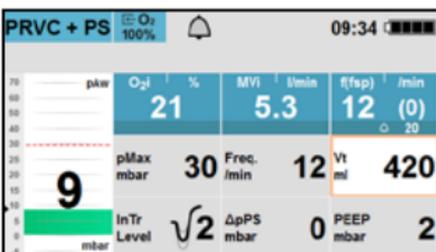
6. Auscultate tube position by getting MEDUtrigger to trigger manual mechanical breaths. In an emergency, perform mask ventilation using MEDUtrigger.



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" or "PRVC+PS" mode. The device shows controlled ventilation parameters.



Excerpt from the S1 guideline

“Prehospital Emergency Anaesthesia in Adults” of the 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 SpO₂ < 90% despite = 2 l/min O₂ 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

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

Pre-oxygenation:
For a spontaneously breathing patient, at least 3-4 min O₂ insufflation with 12-15 l/min via a face mask with reservoir or demand valve, if applicable, NIV or mask ventilation.

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.

Please note that these are excerpts from the S1 Guideline "Prehospital Emergency Anesthesia in adults". The complete guideline is available on the website of the Scientific Medical Society's Working Group (Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaft e.V.) at: awmf.org.

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

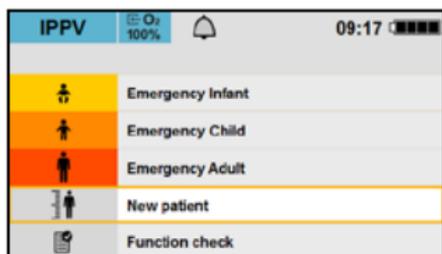
Please note that different standard operating procedures or guidelines may apply in your region.



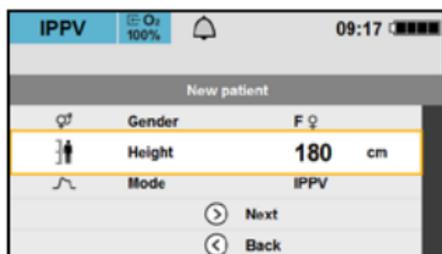
NIV therapy



1. Switch on ventilator.

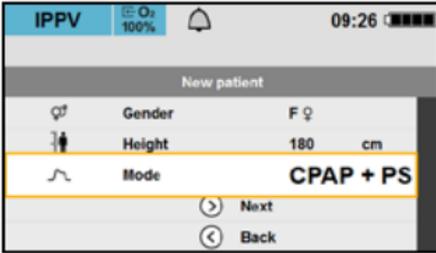


2. Select "New patient". Alternatively, select the corresponding Emergency mode: Adult, Child, Infant.

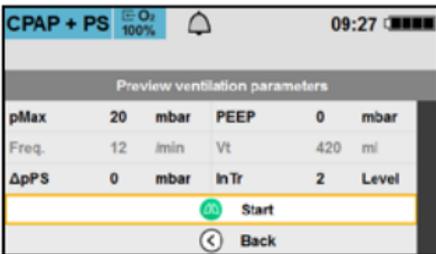


3. Set patient's gender and height.

4. Select “CPAP” or “CPAP+PS” ventilation mode and confirm with “Next”.



5. Set desired PEEP and, if available, PS and select “Start”.



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

SpO₂ < 90 % despite administration of O₂..... 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 (SpO₂ < 75 % despite O₂ 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

Pulmonary edema

Primary device settings

Mode.....CPAP

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

FiO₂Initially 100 %, then reduce to suit requirements

Criteria for objective and success

Increase in SpO₂..... Check

Reduction in dyspnea..... Check

Reduction in respiratory rate and heart rate Check

If applicable, improved vigilance..... Check

Escalation stages

Immediate intubation if clinical situation fails to improve or contra-indications are found!

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
- No NIV in the case of burns or facial trauma
- Provide advance information to the admitting hospital in good time

Exacerbated COPD

Primary device settings

Ventilation mode: CPAP+PS

PEEP: 3/6 mbar

Δp PS (to suit comfort and oxygenation): increase slowly, peak pressure max. 25 mbar

Trigger on inspiration: as low as possible

FiO_2 : as required

Criteria for objective and success

Target SpO: > 85 % Check

Reduction in dyspnea Check

Reduction in respiratory rate and heart rate Check

If applicable, improved vigilance Check

Escalation stages

If respiratory exhaustion is imminent, set ventilation mode PRVC+PS if available.

Immediate intubation if clinical situation fails to improve or contra-indications are found!

Cave

- Close clinical monitoring and close contact with the patient
- Do not delay pharmacological treatment or necessary intubationDo not delay pharmacological treatment or necessary intubation
- Be ready to intubate at any point
- Provide advance information to the admitting hospital in good time
- Do not perform invasive ventilation in the case of burns or trauma to the face







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