

# Ventilation during CPR with CCSV

Synchronizing lungs and heart during CPR



# CCS√

# *<sup>(1)</sup>* The ventilation mode that supports the heart

With Chest Compression Synchronized Ventilation (CCSV), WEINMANN Emergency has developed a ventilation mode specifically designed for resuscitation. Integrated in MEDUMAT Standard<sup>2</sup>, CCSV applies a pressure-controlled mechanical breath synchronized with each chest compression. This revolutionary method is proven to improve gas exchange and hemodynamics.

Hands-off time always in view

No complicated setting of ventilation parameters required



Greater security during chest compression: Frequency tachometer makes resuscitation according to guidelines easier

Optimized display of ventilation and compression for resuscitation



# Chest Compression Synchronized Ventilation – and the lung supports the heart

An essential effect of chest compressions is an increase in the intrathoracic pressure that causes the blood circulation to be maintained or restored. But at the same time, air does escape from the lungs, which inhibits the effect of the pressure buildup and thus reduces the cardiac output. This is precisely where the

CCSV ventilation mode comes into play: Due to the mechanical breath delivered synchronously with the chest compression, no gas volume can escape: the pressure in the lung is increased and the cardiac output increases.



# **1** Conventional resuscitation at 30:2



Compression phase



Decompression phase

During chest compressions, the heart and the pulmonary vessels in the lung are compressed, which also results in air escaping from the surrounding lungs, causing a decrease in pressure.

> Scientific study results comprehensibly processed – you can find these and other medical effects of CCSV in our white paper on CCSV: https://www.weinmannemergency.com/en/ downloadcenter/

**B** Resuscitation with CCSV



Compression phase



Decompression phase

# Compression phase

With CCSV, mechanical breaths are delivered synchronously with manual or even mechanically performed chest compressions. Due to the synchronized mechanical breath, no air escapes from the thorax. This increases the intrathoracic pressure in the compression phase. This produces:

- Increased arterial pressure
- Increased blood circulation
- Improved gas exchange

# Decompression phase

In the decompression phase, the ventilator switches to expiration, which causes air to escape from the lung. At the same time, the intrathoracic pressure decreases and the venous return to the heart can occur unhindered.

# Ø From the emergency site to the hospital

# CCSV adjusts the ventilation optimally to the resuscitation process

# 1. Start of resuscitation

At the emergency site, you start cardiopulmonary resuscitation as quickly as possible in the 30:2 procedure. Press the CPR button of the MEDUMAT Standard<sup>2</sup> to start the resuscitation ventilation. The MEDUtrigger can be used to release the mechanical breaths manually.



Let CCSV work automatically once you have secured the airway. MEDUMAT Standard<sup>2</sup> now ventilates synchronously with your continuous chest compressions – completely automatically without that ventilation parameters have to be adjusted.

# 3. Uninterrupted chest compressions

Focus on the continuous chest compressions – the frequency tachometer offers you additional security! You do not have to interrupt the chest compressions for the ventilation. CCSV detects the compressions and ensures adequate ventilation even when chest compressions are being performed.







7. Does resuscitation have to be repeated? If you have to start the chest compressions again after ROSC has occurred, MEDUMAT Standard<sup>2</sup> resumes the resuscitation ventilation automatically in CCSV mode.

 Return of spontaneous circulation
If chest compressions are interrupted for a longer period of time, MEDUMAT Standard<sup>2</sup> automatically leaves
CCSV mode and switches to volume-controlled backup ventilation.

5. Continuing the chest compressions Once you continue with chest compressions after delivering a shock, CCSV detects them and resumes synchronous ventilation.

# 4. Shock delivery required? Start the analysis!

MEDUMAT Standard<sup>2</sup> interacts perfectly with defibrillator monitoring systems like MEDUCORE Standard<sup>2</sup>. If you interrupt the chest compressions for the rhythm analysis, MEDUMAT Standard<sup>2</sup> detects this and interrupts the ventilation automatically. This makes a trouble-free ECG analysis possible.









Whether human or machine: CCSV is compatible with different chest compression devices!



# CCSV provides a new standard in ventilation during CPR

During resuscitation, continuous chest compressions and reduced hands-off time help establish the circulation required for survival.

But ventilation during continuous chest compressions has presented a challenge for decades. Until now, the sparsely standardized procedures present a risk of less than optimal ventilation due to complicated settings and thus the possibility of operating errors.

The increased use of mechanical chest compression devices presents another challenge for ventilation.

This is where CCSV comes into play: Easy to operate and optimally integrated in the resuscitation process, CCSV offers a ventilation standard for resuscitation ventilation for the first time! CCSV can also be used with customary chest compression devices.





# The CCSV software option is so easy to integrate



# Activated using an enable code

CCSV ventilation mode is available exclusively from WEINMANN Emergency as a software option for the MEDUMAT Standard<sup>2</sup> emergency ventilator. CCSV can be activated either during initial commissioning or later.



# 𝒴 A strong team

# The "Flow measurement + ASB" and "CCSV" software options

In order for you to use CCSV, the "Flow measurement + ASB" software option must be activated. Why? CCSV adjusts the ventilation to the chest compressions and requires a trigger to release a mechanical breath. This trigger is provided by the "Flow measurement + ASB" function. In addition, the compression frequency and applied tidal volume can be monitored with this function.

"Flow measurement + ASB" option



### FlowCheck sensor\*



\* Available in disposable or reusable versions. Disposable patient hose systems with flow measurement are equipped with disposable FlowCheck sensors.

### CCSV option



= CCS√





# Simply Professional

WEINMANN Emergency is a family-owned, internationally active medical technology company. With our mobile system solutions for emergency, transport and disaster medicine, we set standards for saving human lives. In close collaboration with professional users in emergency medical services, hospitals and military medical corps, we develop innovative medical products for ventilation and defibrillation. For more than 100 years we have offered our customers a high degree of reliability, extensive experience and quality made in Germany.

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