

# Important features & specifications of the UNO Micro Ventilator (UMV-03)

## Breathing pattern.

From observation of the breathing pattern of awake mice and rats it can be found that the frequency is so high that there is no rest phase at any point. So. There is no plateau in the breathing pattern during spontaneous breathing. This means that the inspiration / expiration ratio is 1 : 1 (= sinus form).

On the basis of this information, the UNO Micro Ventilator (UMV-03) is designed in such a way that it generates a **sinus pattern** without plateau pressure. The UMV is thus following the natural breathing pattern of mice and rat **without creating high peak pressures in the lungs often seen with valve operated ventilators.**

## Pressure setting / - monitoring

In order to apply reliable inhalation anesthesia with active ventilation of the small animals, it is important to be able to control and adjust the pressure settings of the system. Therefore UNO has also integrated an adjustable **min. and max. pressure setting and -monitor** in the UMV. The monitor (= pressure meter) shows continuously the min. and max. pressure in the system

No extra options have to be purchased because this pressure setting/ monitoring is a standard feature on the UNO Micro Ventilator.

It has to be noted that mice and rat have to be ventilated at a high frequency and with a low pressure. The small endotracheal or intubation tubes used for mice and rats, result in high internal resistance as well as a high gas-flow due to the small diameter of these tubes. The ventilation pump should therefore be able to generate relative high pressures in the system in order to get a good gas exchange in the lungs without generating high pressure in the lungs of the animal.

The pressure is dependent on the diameter of the endotracheal or intubation tube used. The pressure setting on the UMV range from  $\geq 0$  mbar - up and is designed to meet the requirements for mice and rat, also with open thorax surgery.

## Positive End Expiration Pressure (PEEP)

The UMV is standard equipped with the possibility to **set, measure and control PEEP** in the system, thus protecting the lungs of the small animals from collapsing f.i. during open thorax surgery.

Once the UMV is available in your laboratory, no extra cost have to be made to get this feature.

## Volume

The volume setting at the UMV range from  **$\leq 0.1$  ml - 24 ml** without counter pressure of lungs and the resistance of an intubation tube. This volume range is standard available on the UMV without changing any part in the UMV

The gas volume pumped through the intubation tube range from 0.0 ml - 12 ml depending on the size / diameter of the intubation tube.

### Circle system

The UMV is designed as a **circle system**, thus a system in which the expired carbon dioxide is absorbed by means of a CO<sub>2</sub>-absorber; again a standard feature integrated in the UMV. This circle system also operates with a very low fresh gas flow (i.e.  $\leq 100$  ml/min) thus saving gas. It is therefore to be recommended to use a vaporizer and flowmeter which are suitable for **low flows** (also available from UNO!).

The UMV can simply be connected to the low flow vaporizer - flowmeter combination through the mixed gas inlet tube of the UMV.

### Flexibility

The UMV-03 is designed and constructed as a “circle-system”. Part of the circle system is an external flexible tube with a (male-) luer connecting the intubated mouse or rat with a (female-) luer flexible intra-tracheal tube. This flexible tube has a length of  $\pm 100$ cm. Therefore, the UMV-03 makes it possible to place the intubated and ventilated/anesthetized animal in a **stereotact** or under a **microscope** or.....

Through the construction and place of the luer connection (for the intubation tube) of the mouse or rat, the **dead volume** of the UMV-03 is **extremely small**; an essential feature for the use of ventilators for mouse and rat.

## The UNO Micro Ventilator (UMV) “A new concept in mouse and rat ventilation”



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