

Ultrasonic Nebulizer Set

The idea of this setup is to bring an ultrasonic nebulizer into the inspiration line of a ventilator to give nebulized substances to the respiratory path of small animals. The death volume (compliance volume) is held as small as possible (1.5ml) by the special adapter 73-3734. This system can be used together with ventilators for rats, guinea pigs or rabbits. In this nebulizer the max. temperature is around 30°C after a 15 minute run. So compared to other nebulizers the compound is not heated up. The low death volume adapter is installed in the inspiration tube between the ventilator and the animal. The nebulized substance is transported by the ventilator to the lungs.

To avoid too much condensation this unit comes with a timing unit which pulses the nebulizer.

Advantage:

- Nebulized substance does not conterminates the inspiration path in the ventilator.
- High quality aerosol, precise particle size 2.5 to 4 µm
- low flow rate approx. 0.1ml/min
- Low residual volume < 0.2ml
- nebulizer does not alter formulation's molecular integrity



73-3733

ULTRASONIC nebulizer control unit



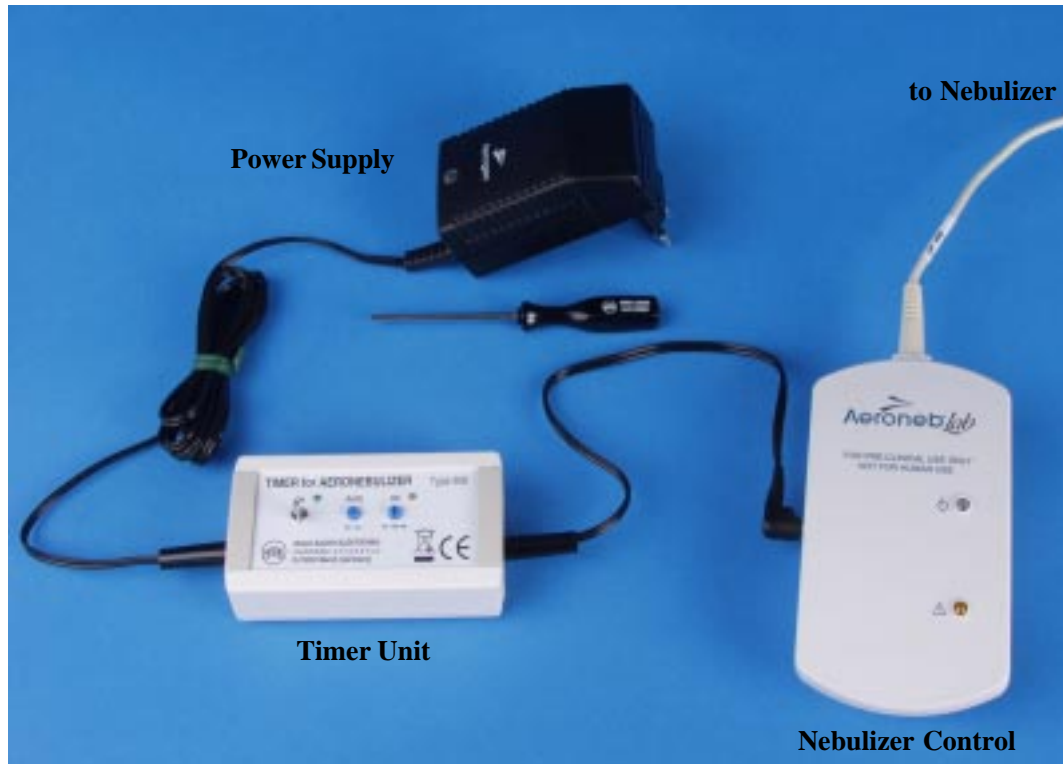
73-3732

ULTRASONIC AEROSOL NEBULIZER UNIT

WITH FILLER CAP (particle size VMD between 2.5 - 4.0 µm), filler cap opened



73-3734 LOW DEATH VOLUME ADAPTER FOR ULTRASONIC NEBULIZER, death volume 1.5ml



In order to avoid condensation of the nebulized substance in the adapter and the tubing this device comes with a timer unit which pulses the nebulizer.



On the Timer Unit the RATE and the ON time can be set by the two trimmers RATE and ON. The RATE can be set between 0.5 and 2 seconds. The ON time can be set between 10 and 100ms. Depending on your Ventilator, Tidal Volume and Respiration Rate you have to find the best settings for your specific application. Best is to set the RATE approx. similar to the respiration rate.

For Example:

Respiration Rate:	50bpm	60bpm	80bpm	100bpm
Rate:	~0.8sec	~1sec	~1.3sec	~1.6sec

This is only an example and a rough setting. The ON time must be set empirically. A good start point is RATE at 1sec and ON time at 20ms. If you see a major condensation in the tubing please reduce the ON time. Under all circumstances a condensation of your nebulized substance in the tubing should be avoided.



Application

This nebulizer allows to give very small volumes of drugs into the respiration path of a ventilated animal.

The transport of the nebulized substance is performed by the respirator. As the nebulizer is pulsed, it needs some time until a few microliters are fully nebulized.

Please take into consideration that never the full nebulizer volume is going to the lung. As you always connect the trachea via a cannula and a Y-piece it can not be guaranteed that all the air travelling in the inspiration line is going into the lungs. Furthermore you always will have a little condensation which will also reduce the volume going to the respiration path.

So if you nebulize e.g. 200ul you should never assume that the full volume has been transported to the lungs.

The produced particle size VMD is between 2.5 - 4.0 um.

RATE and ON time setting

If you start the first experiment a good start point is RATE at ~1sec and ON time at ~20ms. Before a real experiment can be performed it is highly recommended to make a test with distilled water.

Fill e.g. 200ul distilled water into the nebuliser, connect it to the adapter and place the adapter into the inspiration line between ventilator and animal.

Set Tidal Volume and Respiration Rate on your ventilator and start the ventilator.

Start also the Nebulizer and check the tube for condensed fluid. It may be that you don't see something like fog in the line. This is absolute normal. As soon you see fog you get condensation and drops are forced. So don't worry if you don't see the nebulized fluid.

If you see a major condensation in the tubing please reduce the ON time on the timing unit. The RATE should be anywhere in the 1 second area. If you have higher respiration rates than 60bpm you can go higher if you have lower rate you can go lower.

Depending on the ventilator and the respiration rate it may be that you have to adjust the timing. This is normal and can not be preset in the factory as there are too many different settings possible.