



# HAMILTON-C1

Minimum size for maximum performance





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## HAMILTON-C1 - One for all

The high-performance capabilities of the HAMILTON-C1 include advanced lung protective strategies and adaptive ventilation modes to ensure that each patient receives treatment tailored to his or her specific needs, from neonates to adults.

Requiring only a minimum of space, the HAMILTON-C1 combines high reliability, ease of use and maximum mobility with optimal performance. This makes it an ideal companion for your ventilated patients in the intensive care unit, emergency ward, recovery room, in intermediate care and for intrahospital transport.

- General purpose device for all patient groups, from neonates to adults
- More than 4 hours of battery operating time
- Independence from gas cylinders or compressors
- The device is small and easy to operate and fits into any space
- Outstanding value for money



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Small but mighty! Despite its compact size, the HAMILTON-C1 is a fully featured ventilator for use in almost any environment.

Jesko Mertha, Group Leader, Clinic for Intensive Care Medicine  
Cantonal Hospital St. Gallen, St. Gallen, Switzerland

# For use in any environment

## More safety for your intensive care patients

The ventilation cockpit of the HAMILTON-C1 allows the user to check critical parameters at a glance and provides the patient's status as a valuable tool for clinical assessment. The ASV mode provides increased safety and comfort for your patients by adjusting the ventilation to the patients' normal breathing pattern. In doing so, ASV prevents abnormal breathing patterns as well as apnea and tachypnea.

## Outstanding performance for noninvasive ventilation

The integrated high-performance blower provides excellent pneumatic performance that can match any compressed-air-based intensive care ventilator. The blower of the HAMILTON-C1 provides a peak flow rate of up to 260 l/min and therefore guarantees optimal performance even in noninvasive ventilation.

## Mobility for intrahospital transport

The high-performance blower enables the HAMILTON-C1 to be completely independent from compressed air and its integrated battery allows you to ventilate your patients during intrahospital transport for more than four hours without the need of an external power source. The compact design and light weight of the HAMILTON-C1 make handling of the ventilator much easier.



# Optimal performance

## From neonates to adults

The HAMILTON-C1 provides a tidal volume range of 20 ml – 2000 ml, or optionally 2 ml – 300 ml for neonates. This allows for the effective, safe and lung-protective ventilation of all patient groups, from neonates to adults.

## Optimal synchronization

The IntelliTrig function automatically adjusts the inspiratory and expiratory trigger sensitivity to potential leaks and ensures optimal synchronization with the patient's breathing pattern. This is achieved both in invasively and noninvasively ventilated patients.

## High-precision measurement of pressure, volume and flow

The proximal flow sensor precisely measures the pressure, volume and flow directly at the patient's airway opening. This provides the required sensitivity and response time and prevents dead space ventilation. Your patient is better synchronized and has less work of breathing as a result.



## Product overview

- 1 Integrated handle
- 2 Patient interfaces & ports
- 3 Push & turn control knob
- 4 Ventilation Cockpit
- 5 360° visible alarm lamp
- 6 Integrated power supply



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# More safety and comfort for your patients

## Enhanced patient comfort

Each Hamilton Medical ventilator features the intelligent ventilation mode ASV (Adaptive Support Ventilation). ASV measures the patient's lung mechanics and activity on a breath by breath basis and automatically adjusts ventilation, from intubation to extubation. ASV is well-established in intensive care units and as the standard mode for the transport of intubated patients since 1998, has been shown to improve patient/ventilator interaction.<sup>1), 2)</sup>

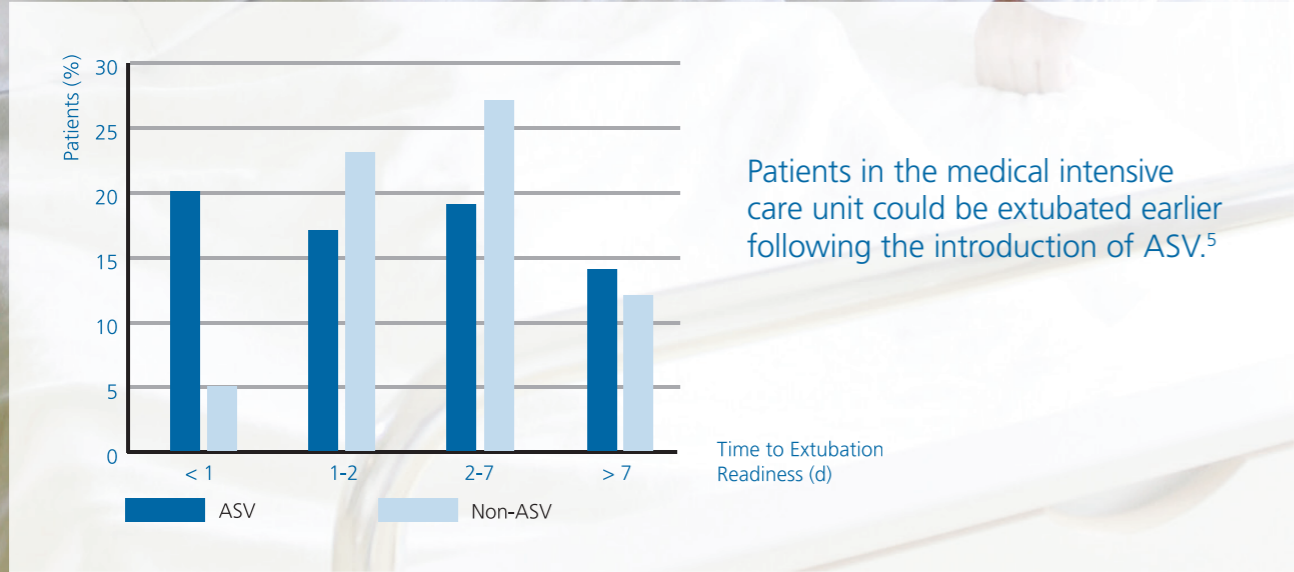
## Lung-protective ventilation

ASV ensures via an optimal breathing pattern that the patient receives the set minute volume, irrespective of the patient's activity. As part of this process, ASV employs lung-protective strategies to minimize complications from AutoPEEP and volutrauma/barotrauma. ASV also prevents apnea, tachypnea, excessive dead space ventilation, and excessively large breaths.<sup>3)</sup>

## Decreased ventilation time

Clinical studies show that

- ASV supports earliest possible spontaneous breathing by the patient <sup>4), 5)</sup>
- ASV shortens the ventilation time in various patient populations <sup>4), 5)</sup>



1 Iotti GA. Intensive Care Med. 2010 Aug;36(8):1371-9.  
2 Sulzer CF. Anesthesiology. 2001 Dec;95(6):1339-45.  
3 Sulemanji D. Anesthesiology. 2009 Oct;111(4):863-70.  
4 Kirakli C. Eur Respir J. 2011 Oct;38(4):774-80  
5 Chen CW. Respir Care. 2011 Jul;56(7):976-83.

# Ease of use

## Intuitive operation

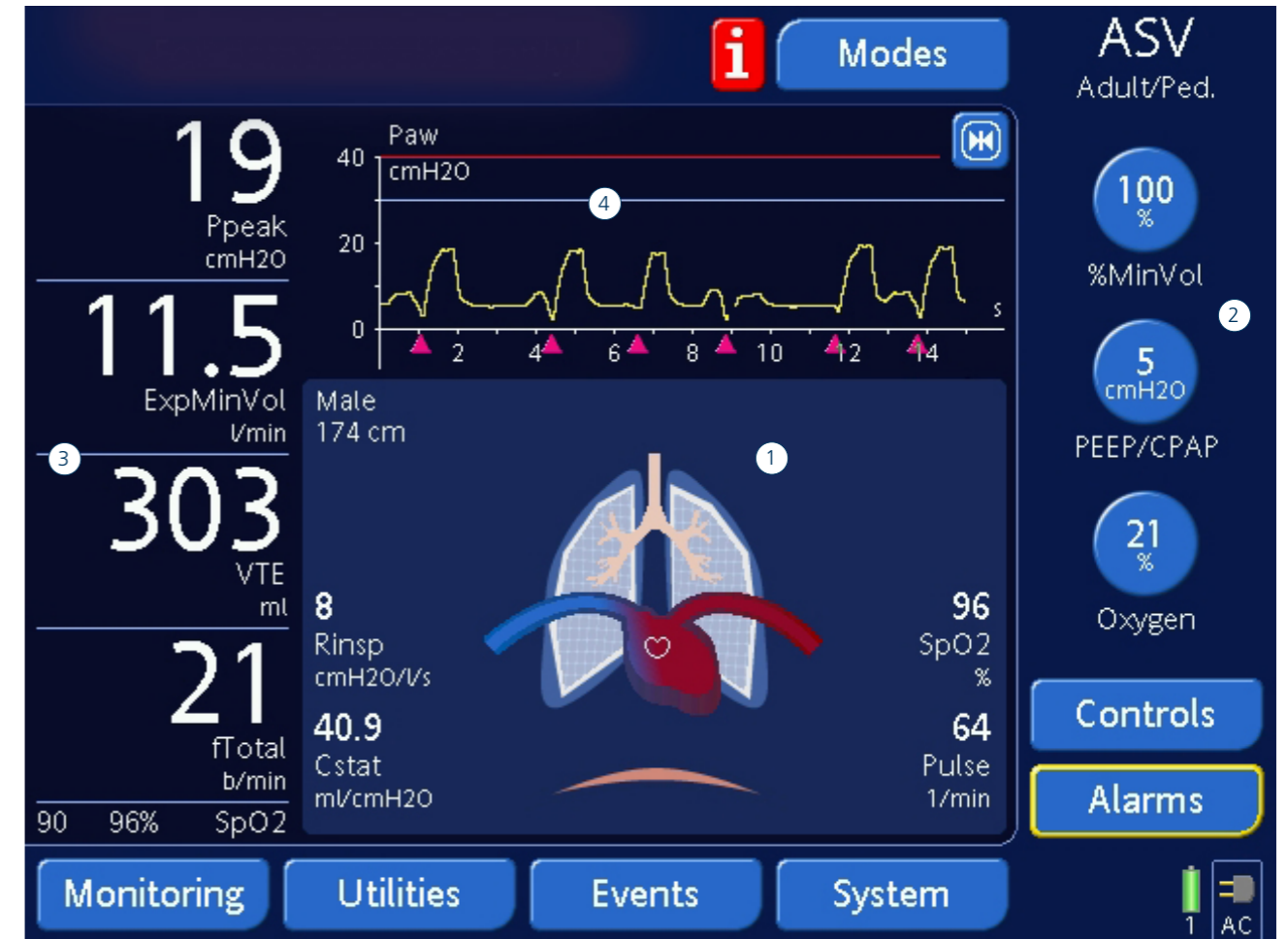
In close cooperation with users and ventilation experts, our engineers have designed the user interface of the HAMILTON-C1 to allow intuitive operation and direct access to important settings. All Hamilton Medical ventilators are operated according to the same principle, which makes switching between different devices very easy.

## Easy-to-understand monitoring

Ventilators display large amounts of monitoring data which are often difficult to interpret. The Ventilation Cockpit of Hamilton Medical ventilators consolidates the diverse monitoring data and converts it into visual displays. These easy-to-understand displays allow a quick overview of the patient's current ventilation status and provides a reliable basis for therapy decisions.

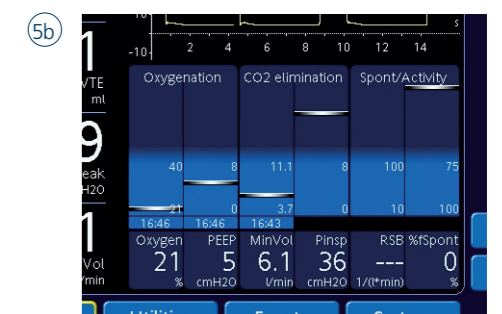
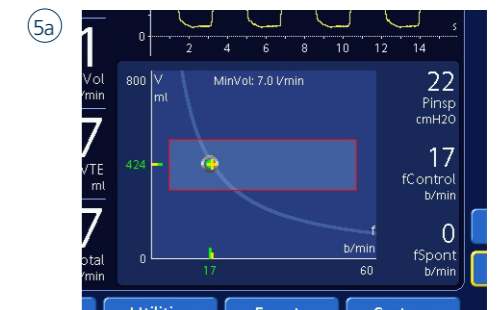
## More time for your patient

In ASV mode, the ventilator continuously adjusts to the patient's breathing activity. This means fewer user interactions are required and significantly less alarms go off. You therefore have more time for your patients.



## The Ventilation Cockpit

- ① Dynamic lung - Real-time display of lung compliance, resistance, breathing activity, SpO<sub>2</sub> and pulse rate
- ② Direct access to the most important settings
- ③ The four most important monitoring parameters
- ④ Configurable waveforms for flow, pressure, SpO<sub>2</sub> and CO<sub>2</sub>
- ⑤ Display options of the Ventilation Cockpit:
  - a) ASV Graph
  - b) Vent Status
  - c) Trends (not shown)
  - d) Loops (not shown)



# Increased efficiency

## Integrated commercial considerations

Ventilators are capital goods that need to be evaluated for cost efficiency. Aspects such as treatment costs and the use of human resources play an important role in this process. Assembled with an extensive standard equipment package that is easy to maintain, Hamilton Medical ventilators are an attractive investment with respect to the cost price and the operating costs.

## Reduction of treatment costs

Each eliminated ventilation day significantly reduces treatments costs - on average by 1,500 USD, according to a study.<sup>1)</sup> It has been shown that the use of Hamilton Medical ventilators and ASV can reduce ventilation time. In addition, the ventilator is now available for the next patient much earlier. A shorter ventilation time also reduces the risk of ventilator associated pneumonia (VAP), which may result in costs of roughly 57,000 USD per case.<sup>2)</sup>

## Optimal utilization of human resources

Hamilton Medical ventilators, along with ASV, can reduce the time needed for standard settings and alarm management while maintaining ventilation quality.<sup>3), 4)</sup> This frees up time for other aspects of patient care. Thanks to the ease of operation, the consistent operating concept and the free e-learning offering from Hamilton Medical, the demand for education and training is also reduced.



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We like to use the HAMILTON-C1 for our noninvasive ventilated patients. The turbine provides a very high flow and the leak compensation works exceptionally well.

Dr. Bernd Schucher, Senior Physician Pneumology  
LungenClinic, Grosshansdorf, Germany

1 Dasta JF et al. Critical Care Med. 2005 Jun;33:1266-71

2 Cocanour CS et al. Surg Infect. 2005 Spring;6:65-72

3 Iotti GA. Intensive Care Med. 2010 Aug;36(8):1371-9

4 Petter AH. Anesth Analg. 2003 Dec;97(6):1743-50

# Perfection in every detail

## Operation via touchscreen or push & turn knob

You can operate the HAMILTON-C1 via the touchscreen or by using a single knob. Hard keys provide direct access to the most important functions.

## Optimal alarm detection

Even from a distance or at high noise levels, the ventilator alarming is easily identified by the top-mounted 360° visible alarm lamp. The optional nurse call capability provides additional support for optimal alarm detection.

## Efficient pulmonary drug administration

The integrated pneumatic nebulizer is fully synchronized and provides a fine mist of aerosol particles that have improved alveolar mobility. This increases the amount of drug introduced into the lung during pulmonary drug administration. Optionally, you can also use an Aeroneb® nebulizer.

## Volumetric capnography (optional)

Proximal flow and CO<sub>2</sub> measurement enables the HAMILTON-C1 to perform up-to-date volumetric capnography. This provides an important basis for the assessment of ventilation quality and metabolic activity.



# Optimized performance for neonates (optional)

## Tidal volumes as low as 2 ml

With tidal volumes as low as 2 ml, the HAMILTON-C1 provides effective, safe and lung-protective ventilation of even the smallest preterm infants.<sup>1)</sup> The proximal flow sensor, specifically developed for neonates, precisely measures the pressure, volume and flow directly at the infant's airway opening and therefore ensures the required trigger sensitivity. This provides improved synchronization and less work of breathing.

## Optimal synchronization even with uncuffed tubes

Leaks are one of the biggest problems in the ventilation of neonates, because uncuffed tubes are being used. The intelligent IntelliTrig leak compensation function automatically adjusts the inspiratory and expiratory trigger sensitivity to potential leaks. This enables optimal synchronization with the neonate's breathing pattern.

## Hamilton Medical nCPAP - Fewer interventions, increased safety

The nCPAP modes of the HAMILTON-C1 are designed in such a way that you only need to set the desired CPAP pressure. The flow is subsequently adjusted automatically based on the patient condition and potential leaks. This prevents unintended peak pressures and guarantees highly efficient leak compensation. Flow adjustment occurs very rapidly due to near-patient pressure measurement and the high sensitivity of the measurement.

1) Volume-targeted versus pressure-limited ventilation in the neonate (Review), 2011 Morley CJ





# Hamilton Medical

## Intelligent Ventilation since 1983

In 1983 HAMILTON MEDICAL was founded with a vision: To develop intelligent ventilation solutions that make life easier for patients in critical care and for the people who care for them. Today, Hamilton Medical is a leading manufacturer of critical care ventilation solutions for a wide variety of patient populations, applications, and environments.

## The right ventilation solution for any situation

The ventilators from Hamilton Medical ventilate all of your patients; in the intensive care unit, during an MRI procedure and in all transport situations, from the neonate to the adult. Each of these ventilators is equipped with the same standardized user interface and uses the same Intelligent Ventilation technologies. This enables Hamilton Medical ventilators to help you to

- increase the comfort and safety of your patients
- make the life easier for the caregivers
- increase the efficiency and return on investment

