



# HAMILTON-C2

The universal ventilation solution



Swiss  
Quality

**HAMILTON**  
**MEDICAL**

Intelligent Ventilation since 1983



HAMILTON C2

Modes ASV Adult/Pea

24 P<sub>peak</sub> cmH<sub>2</sub>O

9.5 ExpMinVol l/min

493 VTE ml

21 f<sub>total</sub> 1/min

Male 174 cm

6 R<sub>insp</sub> cmH<sub>2</sub>O/l/s

31.5 C<sub>stat</sub> ml/cmH<sub>2</sub>O

120 l/min Vol

8 cmH<sub>2</sub>O PEEP/CPAP

60 % Oxygen

Controls

Alarms

Monitoring Utilities Events System

HAMILTON MEDICAL

# The universal ventilation solution

## HAMILTON-C2 - The compact ventilation solution

The HAMILTON-C2 mechanical ventilator is a universal ventilation solution for all patient groups. The HAMILTON-C2's compact design and independence from external power and air supplies allow for maximum mobility throughout the hospital. The integrated high-performance turbine guarantees optimal performance even with noninvasive ventilation.

- General purpose device for all patient groups, from neonates to adults
- More than 6 hours of battery operating time
- Independence from gas cylinders or compressors
- Compact design for maximum mobility
- High-performance NIV ventilation



I am particularly excited about the turbine-driven line of ventilators that Hamilton Medical provides. Evidence shows that these machines are more responsive to the patients' inspiratory demand than the gas-driven machines.

Thomas Berlin, Director of Respiratory Care,  
Florida Hospital, Orlando (FL), USA

# Intelligent ventilation for various situations

## Enhanced safety for your intensive care patients

The Ventilation Cockpit of the HAMILTON-C2 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.

## Integrated high-performance turbine

The integrated high-performance turbine provides pneumatic performance that can match any compressed-air-based intensive care ventilator. A peak-flow rate of up to 240 l/min even allows the HAMILTON-C2 to provide noninvasive ventilation.

## Mobility for intrahospital transport

The high-performance turbine enables the HAMILTON-C2 to be completely independent from compressed air, and its integrated battery allows you to ventilate your patients during intrahospital transport for more than six hours without the need of an external power source. The compact design of the HAMILTON-C2 makes handling of the ventilator much easier.



Noninvasive ventilation



Intrahospital transport

# Performance

## From neonates to adults

The HAMILTON-C2 provides a tidal volume range of 20 – 2000 ml for adult and pediatric patients, or optionally 2 – 300 ml for neonates. This allows for the effective, safe, and lung-protective ventilation of all patient groups.

## Automatic synchronization

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

## Pressure, volume, and flow measurement

The proximal flow sensor 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.



Neonatal ventilation



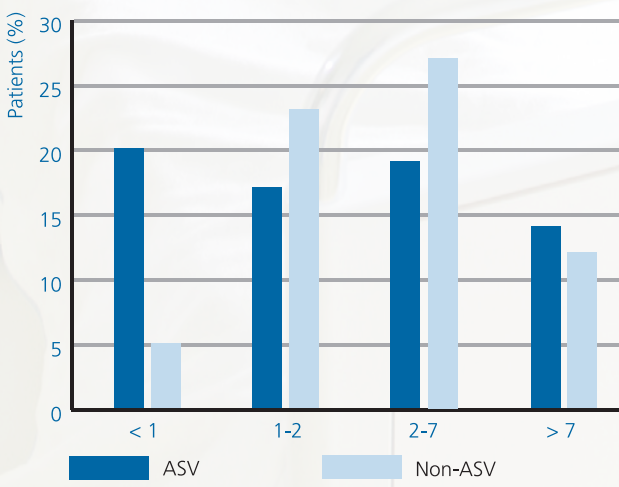
Invasive ventilation

## Product overview

- 1 Integrated handle
- 2 Patient interfaces and ports
- 3 Press & turn control knob
- 4 Ventilation Cockpit
- 5 360° visible alarm lamp
- 6 CO<sub>2</sub>, Nurse call (optional communication board)







Patients in the medical intensive care unit could be extubated earlier following the introduction of ASV.<sup>5</sup>

Time to Extubation Readiness (d)



# 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 groups<sup>4), 5)</sup>

# Ease of use

## Intuitive operation

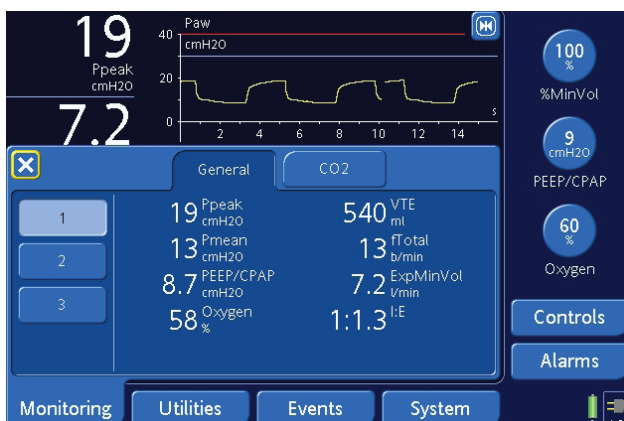
In close cooperation with users and ventilation experts, our engineers have designed the HAMILTON-C2 user interface to allow intuitive operation and direct access to important settings. All Hamilton Medical ventilators are operated according to the same principles, which makes switching between different devices very easy.

## Easy-to-understand monitoring

Ventilators display large amounts of data that is often difficult to interpret. The configurable touch screen display, referred to as the Ventilation Cockpit, consolidates the diverse monitoring data, and presents it numerically and in various graphics panels. These easy-to-understand views provide an at-a-glance overview of the patient's current ventilation status, and offer a reliable basis for therapy decisions.

## More time for your patients

In ASV mode, the ventilator continuously adjusts to the patient's breathing activity and lung conditions. This means fewer user interactions are required and fewer alarms are generated<sup>1)</sup>, giving you more time for your patients.



Monitoring window

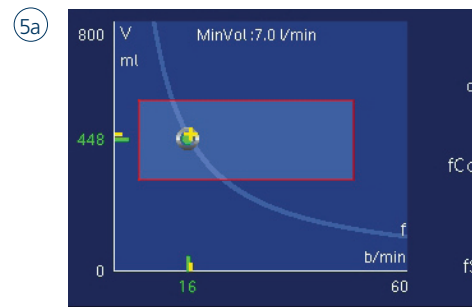


More time for your patient



## The Ventilation Cockpit

- ① Dynamic lung - Provides a real-time display of lung compliance, resistance, and breathing activity
- ② Direct access to the most important settings
- ③ The four most important monitoring parameters
- ④ Configurable waveforms for flow, pressure, 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)





“

What ASV does for us as therapists is it allows us to make sure that we are crafting the breath in the absolutely best possible way for that patient at that time.

Craig Jolly, Adult Clinical Education Coordinator  
University Medical Center, Lubbock (TX), USA

# Increased efficiency

## Integrated commercial considerations

Ventilators are capital goods that need to be evaluated for cost efficiency. Factors including 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 purchase price and operating costs.

## Reduction of treatment costs

Each eliminated ventilation day significantly reduces treatment costs on average by 1,500 USD.<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 can result in costs of up to 57,000 USD per case.<sup>2)</sup>

## Better use 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, consistent operating concepts across devices, and the free e-learning offerings from Hamilton Medical, the effort for education and training is also reduced.

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 Pettler AH. *Anesth Analg.* 2003 Dec;97(6):1743-50

# Attention to detail

## Operation via touch screen or press & turn knob

You can operate the HAMILTON-C2 via the touch screen or by using a single knob. Hard keys provide direct access to the most important functions.

## Customizable user interface

You can configure the display layout with different waveforms, loops, trends, or intelligent panel graphics to suit your institution's needs and protocols. Nurses and clinicians can have their own preferred layout. Access the Monitoring window with the touch of a button at any time during active ventilation.

## Free and open e-learning on mechanical ventilation

Join over 15,000 users on the Hamilton Medical College e-learning platform. It provides free and open e-learning modules on the basics of mechanical ventilation, as well as on Hamilton Medical products and features. Register now at [college.hamilton-medical.com](http://college.hamilton-medical.com).

For some modules, a certificate is issued upon successful completion. You can even receive Continuing Respiratory Care Education (CRCE) credits from the American Association of Respiratory Care (AARC) for some modules.



Customizable user interface



Clinicians using the e-Learning platform

# Neonatal ventilation

## Tidal volumes as low as 2 ml

With the Neonatal option, the HAMILTON-C2 provides tidal volumes as low as 2 ml for effective, safe, and lung-protective ventilation even for the smallest patients.<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, ensuring the required trigger sensitivity. This provides improved synchronization and less work of breathing.

## Adaptive synchronization, even with uncuffed tubes

Leaks are one of the issues encountered in the ventilation of neonates as a result of using uncuffed tubes. The IntelliTrig leak compensation function automatically adjusts the inspiratory and expiratory trigger sensitivity to leaks. This enables adaptive synchronization with the neonate's breathing pattern.

## nCPAP-PS mode

The nCPAP-PS mode is designed in such a way that you set the desired CPAP and inspiratory pressure. Flow and pressure measurement recognizes patient efforts and supports each breath up to the desired inspiratory pressure. A backup rate guarantees minimum patient ventilation. Flow is adjusted automatically based on patient conditions and leaks. nCPAP-PS tries to avoid unintended peak pressures as well as apnea, enables highly efficient leak compensation, and helps to reduce oxygen consumption.



Neonatal ventilation with the HAMILTON-C2



Neonatal ventilation during intrahospital transport

<sup>1</sup> 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 every 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 life easier for the caregivers
- ✓ Increase efficiency and return on investment



Hamilton Medical AG  
Via Crusch 8  
7402 Bonaduz, Switzerland

+41 58 610 10 20  
info@hamilton-medical.com  
[www.hamilton-medical.com](http://www.hamilton-medical.com)