



# HAMILTON-T1

Intelligent transport ventilation



Swiss  
Quality

**HAMILTON**  
**MEDICAL**

Intelligent Ventilation since 1983





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CAPNOMETRY  
MAXIMEL  
MEDICAL

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# Intelligent transport ventilation

## HAMILTON-T1 - A fully featured intensive care ventilator for transport

The HAMILTON-T1 combines for the first time the functionality of a fully featured intensive care unit ventilator with the compactness and ruggedness required for transport. This is why the HAMILTON-T1 enables you to provide optimal ventilation therapy to all patient groups during transport, from the neonate to the adult. The HAMILTON-T1 provides:

- ✓ Approvals and certificates for use in ambulances, helicopters and airplanes
- ✓ Independence from gas cylinders or compressors
- ✓ More than 9 hours of battery operating time
- ✓ Noninvasive ventilation and integrated high flow oxygen therapy\*
- ✓ Adult, pediatric, and neonatal ventilation
- ✓ Advanced ventilation modes, including ASV® - Adaptive Support Ventilation



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We use the HAMILTON-T1 for intrahospital transport and transfers to other hospitals. This ensures that the patient receives the same quality of ventilation during transport as at the bedside.

Ralf Huth, Senior Physician Interdisciplinary Pediatric ICU  
Center for Pediatrics and Adolescent Medicine, Mainz, Germany



# Unlimited mobility

## Approved for all types of transport

The HAMILTON-T1 meets the transport standards EN 794-3 and ISO 10651-3 for emergency and transport ventilators, EN 1789 for ambulances and EN 13718-1 as well as RTCA/DO-160G for aircrafts. It reliably accompanies your patients within or outside of the hospital, on the ground, at sea and in the air.

## Independent from compressed air

The integrated high-performance turbine enables the HAMILTON-T1 to be completely independent from compressed air. This reduces weight and saves space, since you need neither gas cylinders nor a compressor. This allows even noninvasively ventilated patients to be transported successfully across greater distances.

## Lightweight, compact and sturdy

The compact design and light weight of the HAMILTON-T1 facilitate ventilator handling. The water-resistant housing offers impact protection and a shock-resistant, anti-reflective display. This makes the HAMILTON-T1 a rugged and reliable companion.



Approved for use in helicopters



Intrahospital transport

# Optimal performance

## The right ventilation mode for your patients

In addition to conventional and modern modes of invasive and noninvasive ventilation, the HAMILTON-T1 also offers the option of an integrated high flow oxygen therapy mode. Using the same device and breathing circuit, you can change the interface in just a few quick steps and adjust the therapy to best meet your patients' needs. This guarantees that during transport, your patients receive the same high level of ventilation care as at the bedside. In pressure controlled modes, an optional feature enables use of conventional speaking valves with the HAMILTON-T1.

## Adaptive synchronization

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

## Oxygen adjustable from 21% to 100%

The finely adjustable oxygen concentration enables you to resume the bedside settings one-to-one during transport. The adjustment to 21% even offers you the option of ventilating your patient with ambient air only.



Invasive ventilation during transport



High flow oxygen therapy

## Product overview

- 1 Handle available in different styles
- 2 Patient interfaces and ports
- 3 Press-and-turn knob
- 4 Ventilation Cockpit
- 5 360° visible alarm lamp
- 6 Worldwide compatible power supply (AC/DC)
- 7 Installation and mounting options (selection)
- 8 Hot-swappable battery
- 9 Transport rack with oxygen cylinder (optional)



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ASV has been very successfully used in clinical practice. Our crews who use ASV on a daily basis are very excited and report that the ventilator can almost be completely relied upon to do the job and the patient can be set up without rushing.

Dr. Olivier Seiler, Deputy Medical Director until 2014  
Rega Air Ambulance, Zurich, Switzerland



# More safety and comfort for your patients

## Enhanced patient comfort

Every 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. Since its introduction in 1997, ASV has become well established in intensive care units and 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 the 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

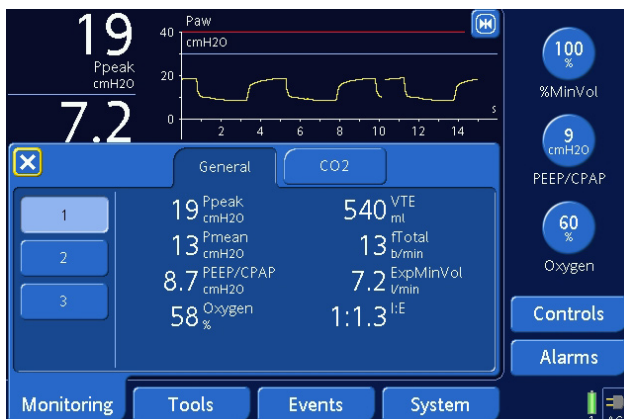
In close cooperation with users and ventilation experts, our engineers have designed the HAMILTON-T1 user interface to allow intuitive operation and direct access to important settings. All Hamilton Medical ventilators are operated according to the same principles, which makes switching between different 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.

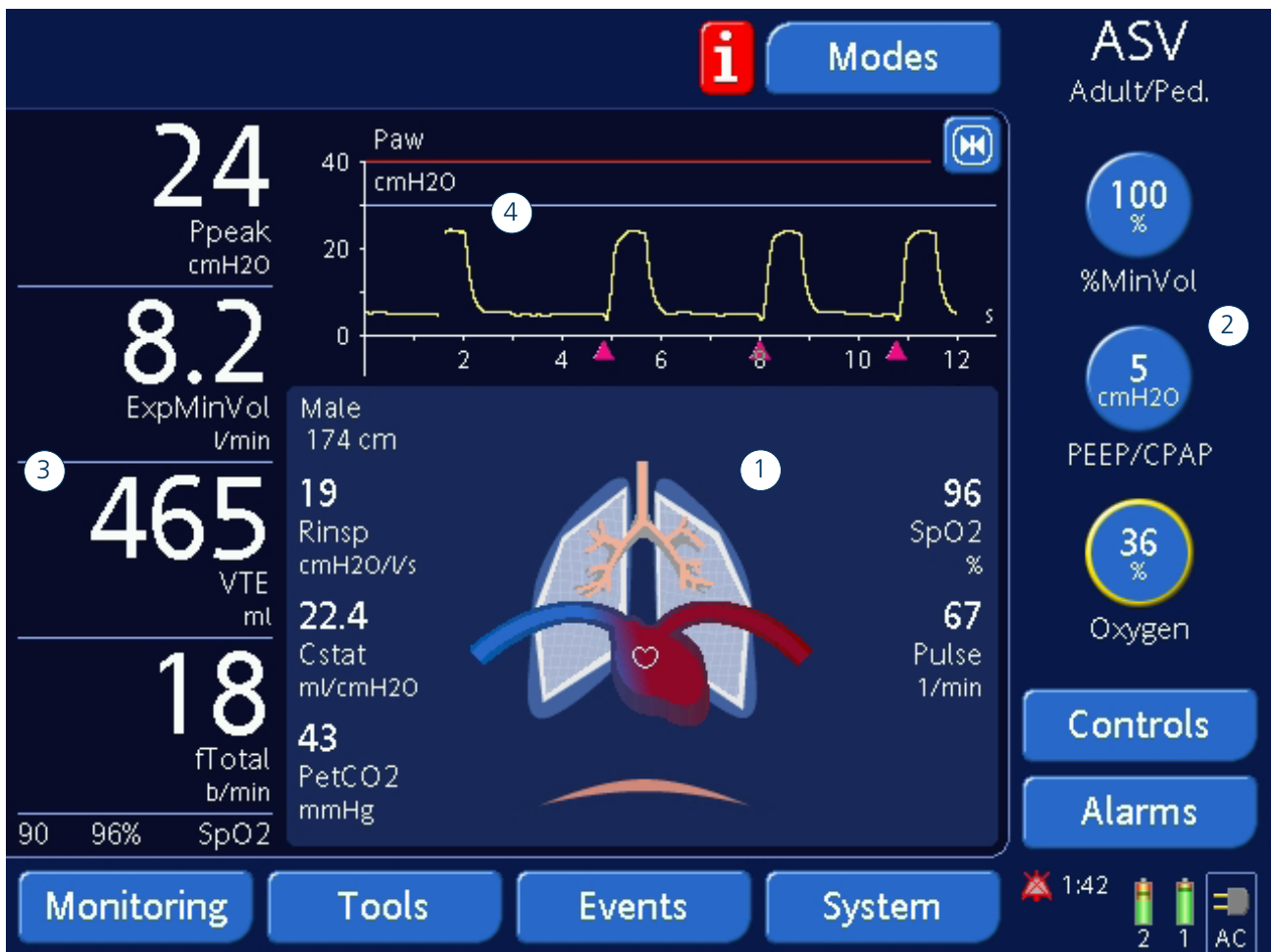


Monitoring window



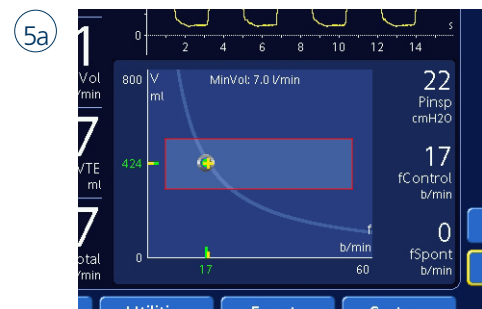
More time for your patient

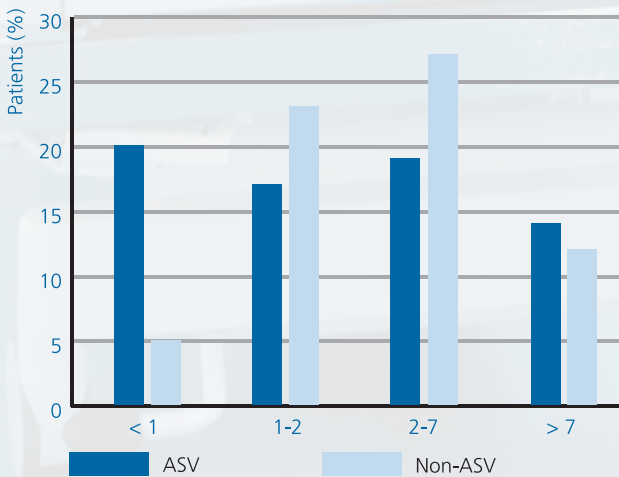




## The Ventilation Cockpit

- ① Dynamic lung - Provides a real-time display of lung compliance, resistance, breathing activity, SpO2 and pulse rate
- ② Direct access to the most important settings
- ③ The four most important monitoring parameters
- ④ Configurable waveforms for flow, pressure, SpO2 and CO2
- ⑤ Display options of the Ventilation Cockpit:
  - a) ASV Graph
  - b) Vent Status
  - c) Trends (not shown)
  - d) Loops (not shown)





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

Time to Extubation Readiness (d)



# 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

For each day where ventilation is no longer required, treatment costs are reduced by 1,500 USD on average.<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 then 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.

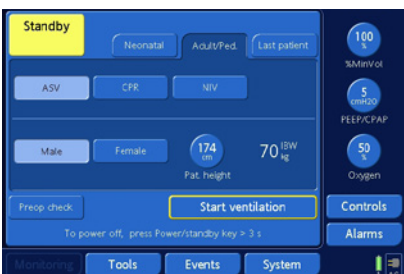
1 Dasta JF et al. *Critical Care Med.* 2005 Jun;33:1266-71 | 2 Cocanour CS et al. *Surg Infect.* 2005 Spring;6:65-72  
3 Iotti GA. *Intensive Care Med.* 2010 Aug;36(8):1371-9 | 4 Pettler AH. *Anesth Analg.* 2003 Dec;97(6):1743-50

# Attention to details



## 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.



## Quick startup

Individual modes and numerous settings can be stored in up to three quick startup settings. This may help you save valuable time when you have a limited window to start ventilation.

## More than 9 hours of battery operating time

A battery operating time of more than 9 hours is provided by one integrated and one hot-swappable battery. The battery operating time can be extended as required with additional hot-swappable batteries.



## Use with night vision goggles

Thanks to the night vision option the HAMILTON-T1 can be used with night vision devices without significantly affecting the pilot's visibility.



## Volumetric capnography

Proximal flow and CO2 measurement enables the HAMILTON-T1 to perform up-to-date volumetric capnography. This provides an important basis for the assessment of ventilation quality and metabolic activity. The volumetric capnography is optionally available.



# Neonatal ventilation

## Tidal volumes as low as 2 ml

With the neonatal option, the HAMILTON-T1 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 - Automatic adaptation, fewer interventions

The HAMILTON-T1's nCPAP mode is 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.



Neonatal transportation



Effective, safe, and lung-protective ventilation for the most fragile patients

<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



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