

HAMILTON·S1

Intelligent Ventilation



With INTELLiVENT®-ASV, the world's first fully closed loop ventilation.

The next era of Intelligent Ventilation

HAMILTON
MEDICAL

More safety for your patient

As the world population is growing and people are getting older and sicker, the number of ventilated patients in ICU is increasing¹. The estimated cost for intensive care and mechanical ventilation is expected to increase from 16 billion in 2003 to 60 billion by 2020². The clinical impacts will be significant: an increased number of older patients will lead to more complexity, while ICUs will be facing a lack of specialist staff³.

Get ready in your ICU

The 2009 Vienna Declaration⁴ by the ESICM Executive Committee stresses the importance of quality and safety for patient care, especially facing this demographic change in the future. The declaration pledged to do whatever is necessary to provide a safe ICU environment and to design safer and more efficient devices and drugs.

HAMILTON MEDICAL has the answer

As a manufacturer of ICU ventilators, we are committed to support this declaration. To do so, we follow the example of other high-risk industries such as aviation and nuclear power in embracing automation and user interface design.⁵ The HAMILTON-S1 provides you with:

- the world's first fully closed-loop ventilation solution INTELLiVENT®-ASV that fully automatically applies lung-protective strategies, reduces the risk of operator errors and encourages early weaning
- a unique Ventilation Cockpit that is designed to guide you when making decisions by visualizing complex information in an intuitive way
- PV-Tool Pro, the new enhanced, comprehensive lung diagnostic tool that provides information on lung conditions for an optimal PEEP setting, enabling optimal lung therapy, offering automatic calculation of LIP and UIP and advanced automatic functions.



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¹ U.S. Census Bureau, Systems Support Division, Last Revised: July 14, 2009

² Zilberberg M et al. BMC Health Services Research 2008;8:242

³ Prospects: The 2008 Revision. Committee on Quality of Healthcare in America. To Err is Human. Institute of Medicine, 1999. Angus D. JAMA 2000, Martin GS. CCM 2006, Poncet MC. AJRCCM 2007, Embriaco N. AJRCCM2007

⁴ <http://patientsafety.esicm.org/declaration.asp>

⁵ Drews FA, Westenskow DR. The right picture is worth a thousand numbers: data displays in anesthesia. Hum Factors. 2006 Spring; 48:59-71.

The HAMILTON-S1 was designed to provide Intelligent Ventilation, delivering:



Ease of use
Visualizing complex information in an intuitive way



Improved patient outcome
Fully closed loop ventilation promotes early weaning



Efficiency through innovation
Reduce the patient's time on the ventilator

Ease of use

Even today, conventional mechanical ventilation still requires a lot of expertise and manual adjustments. This can be challenging and stressful as a respiratory expert can't be at one bedside all the time. INTELLiVENT®-ASV, the unique application on HAMILTON-S1, guides you when making complex decisions, even if there is no respiratory expert available. What makes INTELLiVENT®-ASV revolutionary is that it does more than just make recommendations; it also performs ventilation adjustments automatically.

Understand all important information at a glance and make the appropriate decision

In mechanical ventilation, monitoring means curves, numbers and more numbers. But what do they tell us about the patient's status? INTELLiVENT®-ASV reduces complexity by graphically displaying the patient's status, current treatment, and required support in a single window. It provides transparency by implementing and supporting protocolized care so you can always be sure that INTELLiVENT®-ASV is making the proper decisions.

Provide patient-centered care with fewer resources

Unlike conventional modes, which require you to set many parameters manually, INTELLiVENT®-ASV relieves you from routine adjustments by following patient's demand at all time.

You can trust a proven technology

INTELLiVENT®-ASV is based on ASV® technology from HAMILTON – ASV®, Adaptive Support Ventilation – which provides large improvements compared to conventional ventilation modes. ASV® was the first step on the way to INTELLiVENT®-ASV, the world's first fully closed loop solution.

Studies show that INTELLiVENT®-ASV

- ventilates virtually all intubated patients – whether active or passive, and regardless of their lung disease¹
- requires less user interaction, adapts to the patient's breathing activity more frequently, and causes fewer alarms²
- works comparable to experienced clinicians³
- adapts to changes in the patient's lung mechanics over time⁴

¹ Arnal JM et al. Int Care Med 2004;30:84.

² Petter AH et al. Anesth Analg 2003;97:1743-50.

³ Iotti GA et al. Int. Care Med 2010; 36:1371-9

⁴ Arnal JM et al. Int Care Med 2006;32: 120.



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Simply by body height setting

To start INTELLiVENT®-ASV you set your patient's height and gender. An initial classification of the patient's condition helps to achieve a faster adaptation, but is not mandatory. Then, just press "Start".



Only three control parameters

Automatic controllers are available for MinVol%, PEEP and Oxygenation. With INTELLiVENT®-ASV, you can choose between manual and automatic adjustment to allow for full automation or for scenarios where control of the individual inputs is desired. The Automatic mode is indicated by a pulsing circle. At any time, you can override the settings or switch individual settings back to manual.



Configurable Ventilation Cockpit

The Horizon, Map and Guide for Ventilation and Oxygenation, navigates you and your patient through the ventilation therapy. Since the panel is user-configurable, it helps you enforce your ICU's weaning protocol.

Improved patient outcome and safety

INTELLiVENT®-ASV can help reducing the burden of routine tasks in mechanical ventilation and reducing false positive alarms, giving you more time and providing increased safety for your patients. While conventional ventilators deliver only user defined breaths to the patients, INTELLiVENT®-ASV automatically adapts ventilation and oxygenation on a continuous basis according to the changing patient status. It takes respiratory monitoring, lung physiology, capnography and pulse oximetry into consideration. It determines whether the therapy should remain stable, needs to be increased or should be decreased. And most importantly, it had the potential to reduce the patient's time on the ventilator up to 50%¹.

Increased safety of operation with INTELLiVENT®-ASV

With the Ventilation Cockpit panel you get an intuitive visualization of the most important parameters and settings related to patient-ventilator dependency. INTELLiVENT®-ASV relies on noninvasive sensors for SpO₂ using pulse oximetry and mainstream capnography for CO₂. A newly developed reliability indicator for SpO₂ gives you a quick visual status for the signal quality so the user can verify that INTELLiVENT®-ASV is getting the best input data.

Improve patient assessment

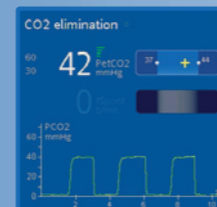
INTELLiVENT®-ASV protocolizes therapy, which means you always know what changes have occurred with the patient and ventilator settings. Just refer to the trend function and you can see the current status of your patient, their developments in the last 24 hours, and see if they are currently on track.

Guidance in complex decision making

INTELLiVENT®-ASV provides 24/7 optimized ventilation to the patient. No matter how many ventilated patients or respiratory specialists your hospital may have, INTELLiVENT®-ASV ensures optimized protocolized care at all times.

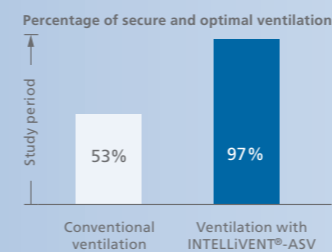


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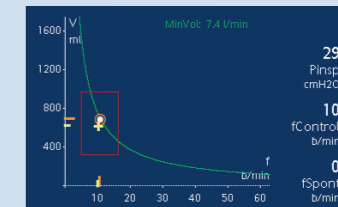
Supporting protocolized care
INTELLiVENT®-ASV provides transparency of what the device is doing by using standardized therapy concepts:

- ARDSnet,
- OpenLung concept,
- permissive hypercapnia



Comparing conventional ventilation with INTELLiVENT®-ASV

In a clinical study, post cardiac surgery ICU patients with INTELLiVENT®-ASV showed a significantly higher optimal ventilation time than patients with conventional ventilation³.



Understanding changes in the patient and how INTELLiVENT®-ASV reacts
The INTELLiVENT®-ASV target graphics screen shows how the adaptive lung controller moves towards its targets. It shows both the target and actual parameters for tidal volume, frequency, pressure, and minute ventilation.

¹ Sulzer CF et al. Anesthesiology. 2001 Dec;95:1339-45

² Gruber et al., Anesthesiology. 2008; 109:81-7

³ Lellouche F et al., J. Respir. Crit. Care Med. 2010;181:A6035

Efficiency through innovation

Critical care is expensive – and so is ventilation. Each extra ventilator day in the USA costs \$1,522.¹ And the risk of ventilator-associated pneumonia compounds these costs: a study showed that preventing just one case of VAP can save \$57,000.²

HAMILTON-S1 with its unique application INTELLiVENT®-ASV lets you optimize clinical resources and skills while reducing cost of ownership and management overhead. And most importantly, it can help you reduce the patient's time on the ventilator.

Know when to consider taking the patient off the ventilator

While in use, INTELLiVENT®-ASV provides you an intuitive way to monitor the patient's status and imminent therapy adjustments and takes over routine adjustments resulting in a smaller number of false positive alarms and less stress. INTELLiVENT®-ASV reduces complexity by graphically displaying the patient's status, current treatment, and required support in a single window.

Studies show that notifying caregivers about the patient's recovery from respiratory failure can significantly reduce the duration and total cost of ventilation.³

Start weaning at intubation

The fully closed loop ventilation system INTELLiVENT®-ASV automatically promotes free breathing for patients in all ventilation modes and phases. It encourages spontaneous activity right from the start of ventilation and promotes weaning from first deployment. The results: shorter ventilation times.⁴

Reduce training costs

The HAMILTON-S1's intuitive interface simplifies ventilator setup. That translates into easy training and a reduced risk of operator error.



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Integrated nebulizer

An integrated synchronized Aereoneb® nebulizer helps to conserve expensive medications. It improves drug delivery efficiency and offers the potential to reduce drug and personnel costs associated with in-patient treatment while maintaining the integrity of ventilator-dependent care.



Efficient information at a glance INTELLiVENT®-ASV gives you a unique, intuitive and efficient way to monitor the patient's Heart-Lung Interaction. Information about the hemodynamic stability of the patient is displayed in a single window, providing a graphic representation of the current status.

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 Ely W et al. N Engl J Med. 1996 Dec 19;335:1864-9

⁴ Sulzer CF et al. Anesthesiology.2001 Dec;95:1339-45

A comprehensive ventilator

Apart from its unique features, the HAMILTON-S1 with INTELLIVENT®-ASV includes everything you expect from a state-of-the-art ventilation solution:

- a choice of manually and/or fully controlled modes for invasive and noninvasive ventilation
- an extensive monitoring package
- the ability to ventilate adult, pediatric, and neonatal patients

For a complete overview of all features, functions, and simulation software, please refer to:

www.hamilton-medical.com/S1

www.hamilton-medical.com/intellivent-asv

Configurable Ventilation Cockpit

The Ventilation Cockpit allows you to configure your patient's monitored data the way you want. Choose any mode for manual or automatic ventilation, select from various layouts to display a combination of Intelligent Panels, including the Dynamic Heart-Lung Interaction (HLI), Vent Status, and INTELLIVENT®-ASV target graphics, plus traditional waveforms.



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Touchscreen and single-knob operation

You can operate the HAMILTON-S1 with a touchscreen or with its single knob. Backlit hard keys simplify night-time use.

Alarm lamp

Even when you are at a distance or if several devices are operating in the same room, you can immediately identify an alarming ventilator by the alarm lamp at the top.

Serial interface for PDMS or patient monitor

The serial RS-232 interface provides a port for connection to hospital monitors and Patient Data Management Systems (PDMS).

DVI interface with VGA output

When you need the HAMILTON-S1 for training or a presentation, the standard DVI interface lets you connect the ventilator to a flat panel display or a digital projector.

Extended battery backup option

With the extended battery option, your ventilator can run for an indefinite time on hot-swappable batteries. Each battery affords 1 hour of operating time, augmenting the 2.5 hours of power provided by the standard internal battery.

USB interface for storage media

Do you need a screenshot for a presentation or to capture the patient's status? Simply press the Print screen key and your screenshot will be saved to the external storage media – for easy transfer and viewing on a PC.

Aeroneb nebulizer

An integrated synchronized aeroneb nebulizer provides efficient, synchronized nebulization during the inspiratory phase.

Capnostat5 and Pulse Oximetry

Reliable noninvasive CO₂ and SpO₂ sensors for physiological input with graphical signal quality indication.



Flexible device configuration

To adapt the HAMILTON-S1 to your user environment, you can configure the device in several ways:

- to a trolley, with the Ventilation Cockpit on top or in front
- as a shelf-mounted version with the Ventilation Cockpit on the unit's side or on the shelf
- In the interest of infection control, you can also place the Ventilation Cockpit outside the patient's room

For further information about the HAMILTON-S1/
INTELLiVENT®-ASV, please contact:

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