

ASV

Intelligent Ventilation



Adaptive Support Ventilation

HAMILTON
MEDICAL

Adaptive Support Ventilation

Adaptive Support Ventilation (ASV) is an easy-to-use and extremely safe ventilation solution for the respiratory management of your intubated patients. ASV is unique to HAMILTON MEDICAL ventilators, a standard on every platform and since 1998 successfully on the market.

This intelligent ASV mode guarantees that the patient receives set minute ventilation, whether spontaneously breathing or mechanically ventilated, by the dynamic calculation of optimal breathing patterns. ASV automatically fine-tunes settings to the patient's needs at the lowest possible pressures. It applies lung-protective strategy rules, promotes faster recovery and helps to reduce the incidence of false alarms.

In intensive care, subacute care and even in transport care, you look for more than world-class ventilatory performance. You demand ventilators that deliver reliable data and easy-to-follow user guidance for better clinical decisions and improved patient outcomes, together with low operating costs throughout the working life of your investment.

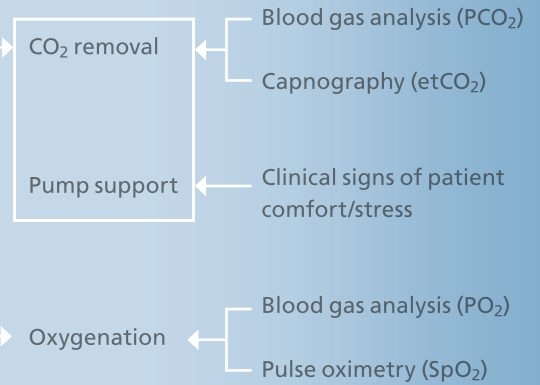
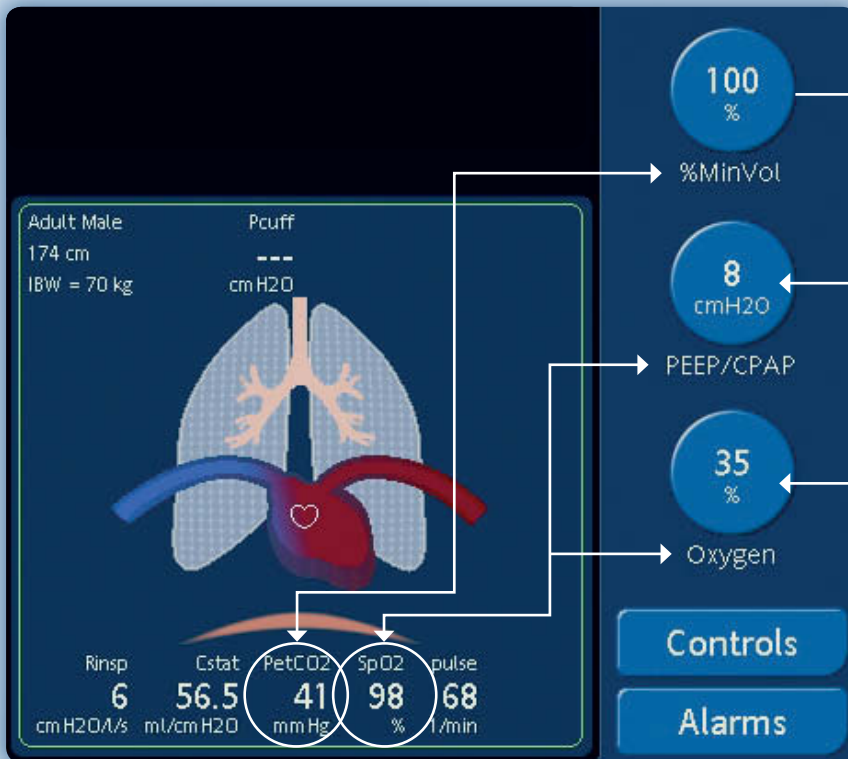
ASV technology from HAMILTON MEDICAL is an outstanding ventilation solution that assures a combination of:

- Ease of use
- Improved patient outcome
- Efficiency through innovation

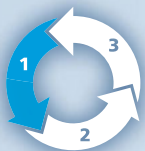
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ASV optimizes levels of ventilatory support and CO₂ removal allowing the clinician to concentrate on the patient rather than on the device. ASV applies on a breath-by-breath basis an "assess, optimize and achieve" concept:



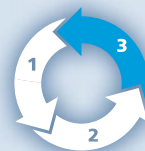
Conventional ventilators are set manually and need constant assessment by the clinician. ASV automates this process by closed-loop control, making it the world's first Intelligent Ventilation mode.



1. Assess breath by breath the patient's lung mechanics.



2. Optimize breath by breath the tidal volume/respiratory frequency combination based on lung mechanics.



3. Achieve optimum tidal volume/respiratory frequency by automatically adjusting mandatory rate and inspiratory pressure.

Ease of use

Using ASV couldn't be easier. Unlike other modes, it requires that you set very few controls – the intelligence of ASV does the rest.

How easy is it to use?

Our ASV systems are easy to use, with “friendly” yet powerful user interfaces that enable clinicians and care teams to monitor the patient with maximum information¹.

Provide patient-centered care with fewer resources

ASV contributes through simple yet intelligent interfaces to shorter training periods and improved staff utilization. Unlike conventional modes which require you to set many parameters, ASV requires attention to just one: minute ventilation.

Adaptive technology for everyday use

Patients' lung mechanics change constantly during ventilation. Clinicians, however, don't always have the time to monitor and adjust settings for each patient, minute by minute and hour by hour. ASV helps by adapting to the changing conditions and needs of each patient², from intubation to extubation³. ASV delivers the optimal tidal volume safely at the lowest pressure possible, combining the benefits of pressure-controlled ventilation with a volume guarantee⁴.

Ventilation with ASV is that simple



¹ Vignaux L et al. Intensive Care Med 2009;35:1687-91

² Iotti G et al. Intensive Care Med 2010;36:1371-9

³ Arnal JM et al. Intensive Care Med 2008;34:75-81

⁴ Sulemanji D et al. Anesthesiology 2009;111:863-70

ASV

Intubate

Start ASV

Set Body Wt, %MinVol, high Pressure limit, and start ASV

Adjust

%MinVol for blood gases and/or clinical status

Consider reducing %MinVol

If blood gases and clinical status warrant this

Extubate

Understand changes in the patient and how ASV reacts

The ASV graph shows how the adaptive lung controller moves toward its targets. It shows both the target and actual parameters for tidal volume, frequency, pressure, and minute ventilation.



- 1 Minute volume curve showing target volume
- 2 Safety frame showing limits for lung protective ventilation
- 3 Current tidal volume / respiratory frequency
- 4 The optimal combination of tidal volume / respiratory frequency with which the patient will be ventilated

Ease of use

Visualizing complex information in an intuitive way



Improved patient outcome

Intelligent Ventilation with ASV means fewer days on the ventilator^{1,2} and the use of earlier assisted ventilation mode^{3,4}. Clinicians can spend more time with the patient and ensure shorter stays in the ICU.

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.⁵

Is it safe?

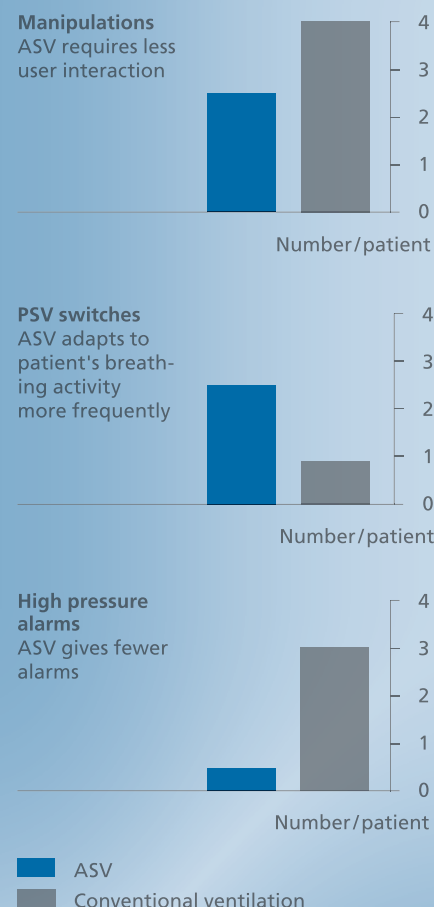
ASV is an extremely safe ventilation solution for the respiratory management of your intubated patients. It employs lung-protective rules and adjusts the ventilatory pattern based on the patient's pulmonary mechanics and spontaneous respiratory activity to maintain preset minute ventilation⁶.

ASV guides the patient in a favorable breathing pattern, avoiding potentially detrimental patterns, from fully supported ventilation to extubation.⁷

Can I use it for all patients?

In a study, ASV was reportedly used for 98 % of the ventilatory time in mixed population of critically ill patients⁸.

ASV performance in every day use⁹



¹ Gruber PC et al. Anesthesiology 2008;109:81-7

² Sulzer CF et al. Anesthesiology 2001;95:1339-45

³ Kirakli C et al. Eur Respir J. 2011;38:774-80

⁴ Chen CW et al. Respiratory Care 2011;56:976-83

⁵ Sulemanji D et al. Anesthesiology 2009;111:863-70

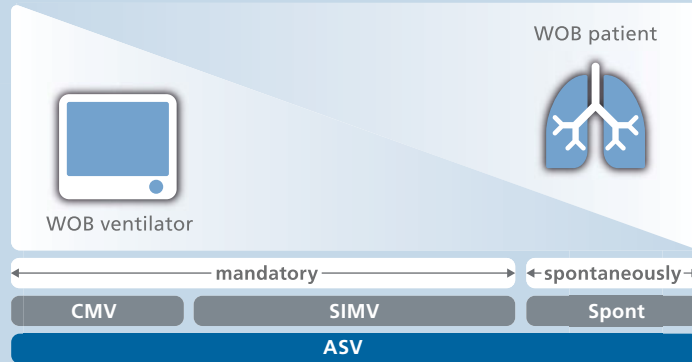
⁶ Branson R et al. RC 2004;49:742-60

⁷ Arnal JM et al. Int Care Med 2008;34:75-81

⁸ Arnal JM et al. Int Care Med 2004;30:S84

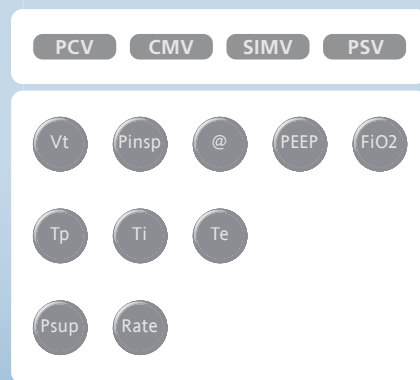
⁹ Petter AH et al. Anesth Analg 2003;97:1743-50

A single ventilation mode from intubation to extubation

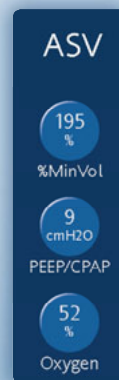


ASV is the only ventilation mode on the market which follows the patient from intubation to extubation. The patient is always optimally supported with controlled breaths or pressure support depending on his condition.

Conventional ventilation



Ventilation with ASV



To conventionally ventilate a patient, various modes are necessary and many different parameters need to be set and adapted. ASV makes ventilation easier, by providing one mode for all patient conditions and only three parameters to control ventilation as well as oxygenation.

Improved patient outcome
ASV promotes early weaning



Efficiency through innovation

Start weaning at intubation

The unique closed-loop ventilation system ASV automatically promotes spontaneous breathing for patients in all ventilation modes and phases. It encourages spontaneous activity right from the start of ventilation and promotes weaning from first deployment¹. Studies show the results: a shorter length of ventilation^{1,2} and a shorter weaning time.^{3,4}

Decision support

ASV technology and HAMILTON MEDICAL graphical interfaces, recognized as one of the best in the field⁵, give clinicians "at a glance" confirmation of critical parameters and patient status as a valuable aid to clinical judgment.

Is it efficient?

Studies show that ASV

- can be used to ventilate virtually all intubated patients whether active or passive and regardless of the lung disease⁶
- requires less user interaction, adapts to the patient's breathing activity more frequently and causes fewer alarms⁷
- adapts to changes in the patient's lung mechanics over time⁶
- works comparable to experienced clinicians⁸
- allows shorter weaning times^{3,4}
- allows shorter ventilation times^{1,2}

ASV adapts to lung mechanics by automatically applying lower tidal volumes in ARDS patients.⁶

Dynamic Lung

The Dynamic Lung visualizes the patient's lung conditions and helps to see the change in resistance and compliance as well as the patient's spontaneous trigger activity.

The Ventilation Status Window visualizes the dependency of the patient on the ventilator and indicates to you when the patient is ready for extubation.

¹ Gruber PC et al. Anesthesiology 2008;109:81-7

² Sulzer CF et al. Anesthesiology 2001;95:1339-45

³ Kirakli C et al. Eur Respir J. 2011;38:774-80

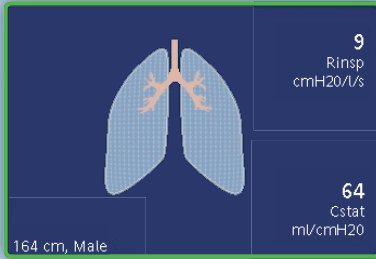
⁴ Chen CW et al. Respiratory Care 2011;56:976-83

⁵ Vignaux L et al. Int Care Med 2009;35:1687-1691

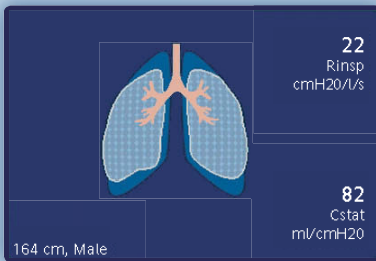
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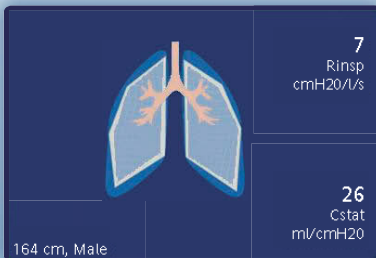
⁸ Iotti GA et al. Int Care Med 2010;36:1371-9



Normal lung



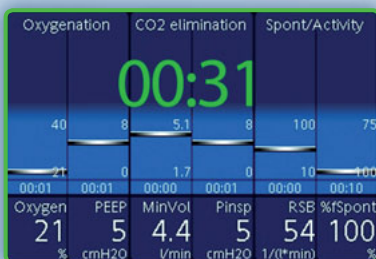
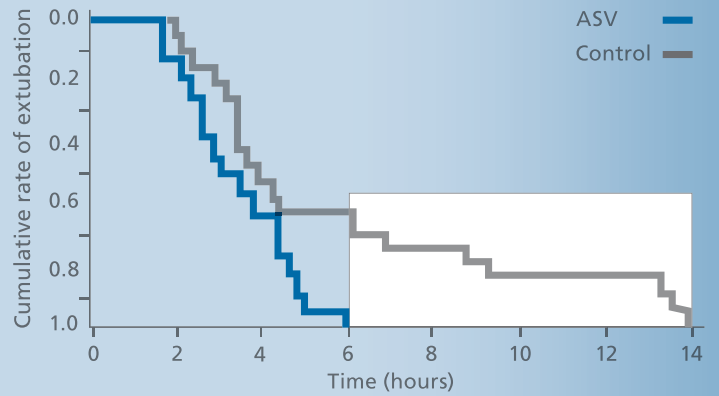
COPD patient



ARDS patient

Reduce time on the ventilator by over 50%

Controlled study² show that while less user interaction⁷ is required and fewer alarms⁷ occur, ASV also facilitates shorter time on the ventilator: 6 hours with ASV as compared to 14 hours with conventional ventilation.



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



Your ventilation solution provider

HAMILTON MEDICAL was founded from a passion with the goal of improving the lives of patients on respirators and the people who care for them. Since 1983, our commitment to innovation has resulted in creative solutions such as ultra-fast valve technology, on-airway flow sensing, lung function graphics monitoring, pulmonary parameter monitoring, the world's first closed-loop ventilation mode, Adaptive Support Ventilation (ASV), and the systematic evolution of ASV: INTELLiVENT®- ASV.

This innovation has led HAMILTON MEDICAL to develop intensive care ventilators that automatically adjust to the patient's needs. HAMILTON MEDICAL developed the first closed loop control technology – a microprocessor which provides our patented Intelligent Ventilation technology and reduces the patient's ventilation time significantly. Weaning from a HAMILTON MEDICAL ventilator with ASV takes only half the time of a competitor's ventilator without ASV^{1,2}, thus reducing the risk for infections and lung damage. Thanks to our award winning³, easy to use control panel, consistent across all HAMILTON MEDICAL ventilator platforms, each HAMILTON MEDICAL ventilator is user friendly and has minimal maintenance costs due to normal wear and tear.

HAMILTON MEDICAL is proud to be one of the top 3 global providers for ventilators and the supplier with the largest and the most modern ventilator portfolio worldwide.

HAMILTON MEDICAL is also a founding member of the Patient Centered Acute Care Training program (PACT), established by the European Society of Intensive Care Medicine (ESICM).

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³

- ECRI Institute, 2011, nominates the best intensive care ventilators, www.ecri.org

- Swiss Innovation Award, 2011, Finalist Technology, www.swiss-innovation.com

- Medical Design Excellence Award, 2010, Silver, www.MDEAwards.com

- TheScientist 2009, ranking within the Top 10 Innovations, www.the-scientist.com

- Sparks Industrial Design Award, 2009, Bronze, www.sparkawards.com
Design Award Winners, 2008, Silver, www.businessweek.com

ASV



Systematic evolution of ASV: INTELLiVENT®-ASV

INTELLiVENT®-ASV is the world's first and only fully closed loop ventilation technology for oxygenation and ventilation, with automatic %MinVol, FiO₂ and PEEP, it covers all applications from intubation until extubation with the known simplicity from HAMILTON MEDICAL. Based on the systematic evolution of ASV over the last decade and on scientific evidence, it's in sync

with daily clinical practice. The automatic adjustments follow protocolized care measuring lung physiology, respiratory monitoring, capnography (etCO₂) and pulse oximetry (SpO₂). INTELLiVENT®-ASV reduces complexity by giving guidance on complex decision making, by visualizing complex information in an intuitive way. INTELLiVENT®-ASV is available on the HAMILTON-S1 and the HAMILTON-G5.

HAMILTON MEDICAL

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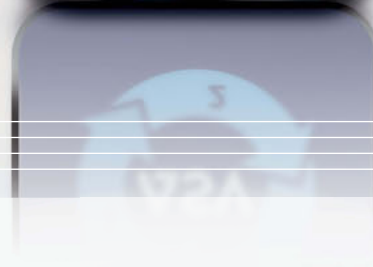
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