HAMILTON-MR1

Intelligent Ventilation from ICU to MRI

Swiss Quality

HAMILTON MEDICAL

Intelligent Ventilation since 1983


Modes
ASV
Monitoring
Utilities
Events
System
HAMILTON-MR1
HAMILTON MEDICAL
MR

Intelligent Ventilation from ICU to MRI

HAMILTON-MR1 – The MR Conditional ventilator

The HAMILTON-MR1 guarantees uncompromised continuous ventilation care from the ICU to the MRI scanner and back. Its reliability and high performance, with advanced lung-protective strategies and patient-adaptive modes, make the HAMILTON-MR1 the ideal choice for any critical care department that needs to transport ventilated patients to the MRI department.

- ✓ MR Conditional (up to 50 mT)
- ✓ Integrated TeslaSpy gaussmeter
- ✓ Adult, pediatric, and neonatal ventilation
- ✓ More than 9 h of battery operating time
- ✓ Independent air supply
- ✓ Advanced ventilation modes including ASV® - Adaptive Support Ventilation®

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You can take your patients from the ICU down to the MRI suite and not have to change a thing about the ventilation, even when they are on an advanced mode. That is a true advantage because you are not risking lung de-recruitment and a patient setback, which would keep him in the hospital longer and make it more uncomfortable for him.

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

Perfectly adapted

Integrated gaussmeter for more safety

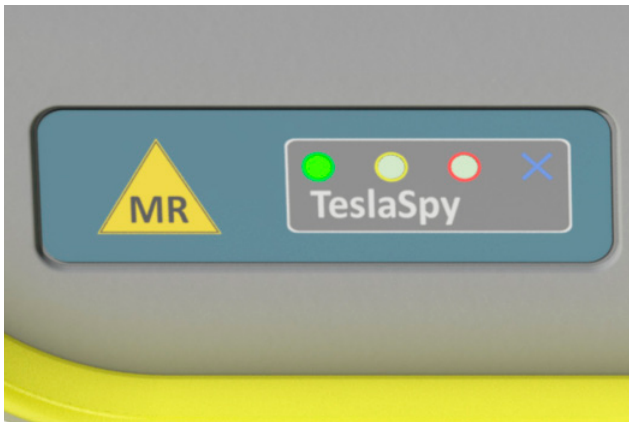
Positioning a medical device too close to the MRI scanner can have fatal consequences. The integrated gaussmeter, TeslaSpy, continuously monitors the magnetic field and gives you an audible and visual signal if you are getting too close. For maximum safety, TeslaSpy continues monitoring even when the ventilator is switched off.

Close to the patient

The HAMILTON-MR1 is the first ventilator able to be used at a magnetic field strength of 50 mT (equivalent to 1m distance for a 3T static magnetic field scanner), without creating any MR image artifacts.

Ideal for clinical transport

The small and rugged housing of the HAMILTON-MR1 makes it easy to handle and optimal for clinical transport. With its integrated turbine, full range of modes, and powerful internal batteries, the HAMILTON-MR1 accompanies your patient from the ICU to MRI and back, providing uncompromised ventilation in a compact design.



TeslaSpy continuously monitors the magnetic field and gives you an audible and visual signal if you are getting too close

The HAMILTON-MR1 accompanies your patient from the ICU to MRI and back

Optimal performance

From neonates to adults

The HAMILTON-MR1 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. The HAMILTON-MR1 is the first MR-compatible ventilator that has been optimized for neonatal ventilation.

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 for invasively and noninvasively ventilated patients.

The right ventilation mode for your patient

The HAMILTON-MR1 offers modern and classic ventilation modes for both invasive and noninvasive ventilated patients. This guarantees that before, during, and after the MRI procedure, your patients receive the same high level of ventilation care as at the bedside.

TeslaSpy continuously monitors the magnetic field and gives you an audible and visual signal if you are getting too close

The HAMILTON-MR1 accompanies your patient from the ICU to MRI and back

Product overview

1. Integrated TeslaSpy
2. Patient interfaces and ports
3. Push & turn control knob
4. Ventilation Cockpit
5. 360° visible alarm lamp
6. Power supply and connectors

6

1

4


Modes
ASV
Adult/Ped.
195
%
%MinVol
9
cmH2O
PEEP/CPAP
52
%
Oxygen
43
Rinsp
cmH2O/l/s
25.6
Cstat
ml/cmH2O
Controls
Alarms
System
1:03
AC
2 MIN.
HAMILTON MEDICAL
5
2
3

Time to Extubation Readiness (d)

Patients in the medical intensive care unit could be extubated earlier following the introduction of ASV.[5]

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.[1), 2)]

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.[3)]

Decreased ventilation time

Clinical studies show that

- ASV supports earliest possible spontaneous breathing by the patient [4), 5)]
- ASV shortens the ventilation time in various patient populations [4), 5)]

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

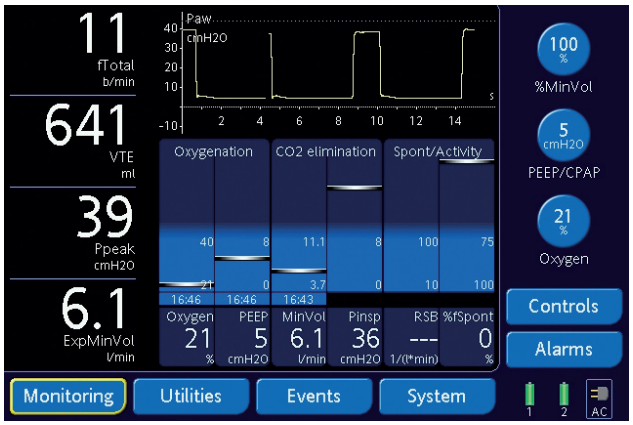
In close cooperation with users and ventilation experts, our engineers have designed the HAMILTON-MR1's user interface to allow intuitive operation and direct access to important settings. All Hamilton Medical ventilators are operated according to the same principles, which makes switching between different 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 graphic 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

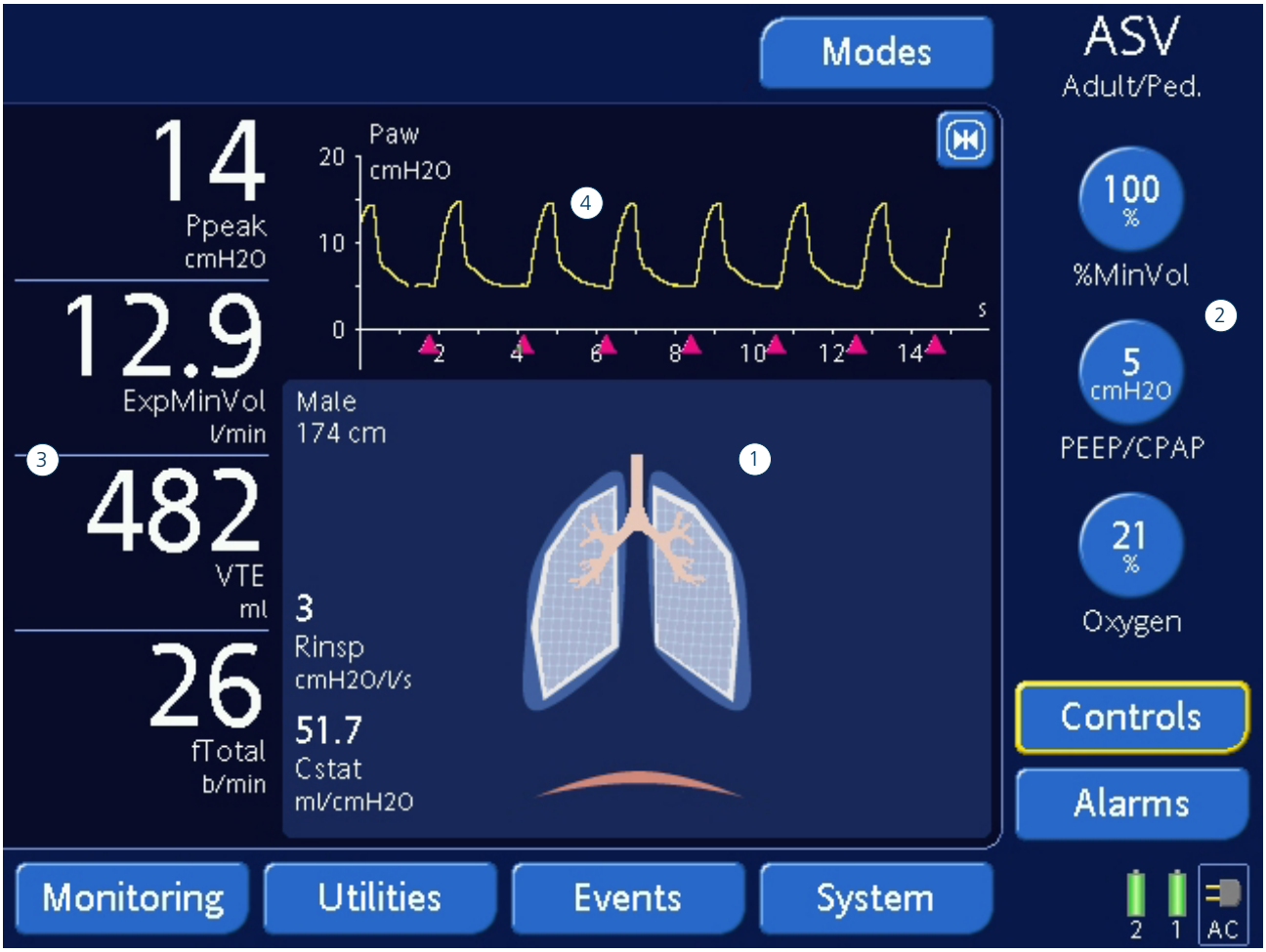
In ASV mode, the ventilator continuously adjusts to the patient's lung condition and breathing activity. This means fewer user interactions are required[1)] and fewer alarms are generated[2)], giving you more time for your patients.



At-a-glance overview of the patient's current ventilation status

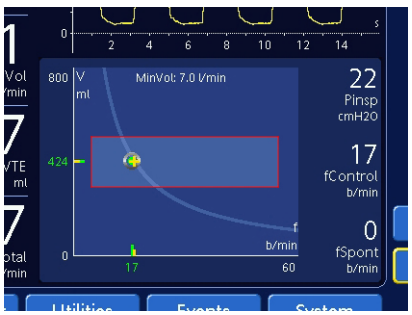
Intuitive operation and direct access to important settings

1 Beijers AJ. Intensive Care Med. 2014 May;40(5):752-3. | 2 Zhu F. Anesthesiology. 2015 Apr;122(4):832-40.

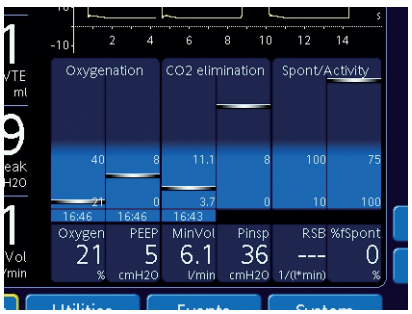


The Ventilation Cockpit

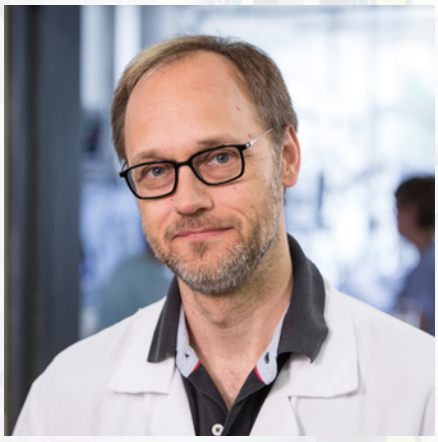
5a



5b



1. Dynamic Lung - 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 and pressure
5. Display options of the Ventilation Cockpit:
   a) ASV Graph
   b) Vent Status
   c) Trends (not shown)
   d) Loops (not shown)



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Until now, we ventilated our ICU patients during MRI scanning with an anesthesia ventilator. Therefore, we had to consult an anesthetist every time to handle the equipment. With the HAMILTON-MR1, we are now completely independent.

Dr. Adrian Wäckerlin, Head of Intensive Care
Cantonal Hospital Grisons, Chur, Switzerland

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 purchase price and operating costs.

Reduction of treatment costs

Each eliminated ventilation day significantly reduces treatments costs – on average by 1,500 USD.[1)] 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 up to 57,000 USD per case.[2)]

Improved 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.[3), 4)] This frees up time for other aspects of patient care. Thanks to 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 Petter AH. Anesth Analg. 2003 Dec;97(6):1743-50.

Perfection in every detail

Operation via touch screen or push & turn knob

You can operate the HAMILTON-MR1 via the touch screen 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 alarm is easily identified by the top-mounted 360° visible alarm lamp. The optional nurse call capability provides additional support for optimal alarm detection.

Usefull gadgets to make your life easier

The HAMILTON-MR1 trolley comes with an auto-lock brake, which locks the trolley wheels as soon as you let go of the handle to make sure it does not roll toward the MR scanner by accident. Two hooks on each side of the trolley to conveniently stow the breathing circuit and the oxygen hose are also included.

Operation via touch screen or push & turn knob

The auto-lock brake locks the trolley wheels as soon as you let go of the handle

Neonatal ventilation

Tidal volumes as low as 2 ml

With the neonatal option, the HAMILTON-MR1 provides tidal volumes as low as 2 ml for an effective, safe, and lung-protective ventilation of even the smallest preterm infants.[1)] 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 potential leaks. This enables adaptive synchronization with the neonate's breathing pattern.

nCPAP - Automatic adaptation, fewer interventions

The HAMILTON-MR1'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.

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

Highly efficient leak compensation

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 life easier for the caregivers
- ✓ Increase efficiency and return on investment

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