SERVO-U ventilator

The power of you

GETINGE GROUP

This document is intended to provide information to an international audience outside of the US.

SERVO-U
The power of you

Protective ventilation

SERVO-U® delivers many effective options for protective ventilation. All of them more accessible, understandable and easy to implement. Which means more patients in all phases of ventilation – controlled, supported, non-invasive and during spontaneous breathing trials – can benefit from advanced lung protective strategies.

Inspired by you

SERVO development has always been based on collaboration with intensive care users from around the world. SERVO-U takes this tradition even further. Never before have so many users been involved to such a high degree at all stages of development, a design that makes it possible for more clinical staff to access and use advanced lung protective strategies.

Innovation leaders

>40 years

SERVO ventilators have been under continuous development since their introduction in 1971

Used worldwide

>100.000

The SERVO family exceeds 100.000 units worldwide

Medical Design Excellence Awards® 2015 GOLD WINNER

design for experience awards

reddot award 2015 winner

Reduce your workload

On-screen help from pre-use check throughout the entire treatment.

See what you need

Unique diagnostic tools guide you at every stage, from controlled to assisted ventilation and extubation.

Deliver optimal support

Reinforce the patient's own efforts and activate the diaphragm for earlier weaning.

Secure your investment

Reliable performance, low maintenance, less training time and reduced need for different ventilators.

"Very self-explanatory, even gives suggestions of how and what to troubleshoot.

– Respiratory Therapist

Reduce your workload with SERVO-U

Easy to learn and use

The intuitive touch screen makes SERVO-U easy to learn and use. Help menus, recommendations and prompts facilitate quick learning and adaptation by ICU staff. Training is easy to accommodate at bedside or on large screens for group presentations.

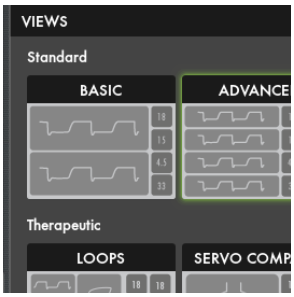
The ergonomic design of SERVO-U with the ability to rotate the screen 360° allows you to place the ventilator to the left or right of the bed. You can also mount SERVO-U on a ceiling supply unit, trolley or shelves. SERVO-U is easy to move thanks to its compact size, low weight and accessory details.

The SAFETY SCALE™ parameters helps you tailor ventilation parameters in a quick, intuitive and safe way.

Alarm management
The light frame with its 360° visibility makes it easy to see an alarm from all vantage points. On-screen checklists help you manage each active alarm and avoid undesired alarms.

Context-based guidance
SERVO-U provides informative text guidance for everything from pre-use check to initial parameter setting and throughout the entire treatment.

SERVO-U is the next step forward in the evolution of protective ventilatory care.



Choose the view that suits your workflows best:
– Basic, Advanced and Loops
– SERVO COMPASS®
– Distance and Family

30 s

Capture screen shots and record actual events for 30 s, 15 s pre- and 15 s post initiating of recording.

Alarm light frame

Color coding

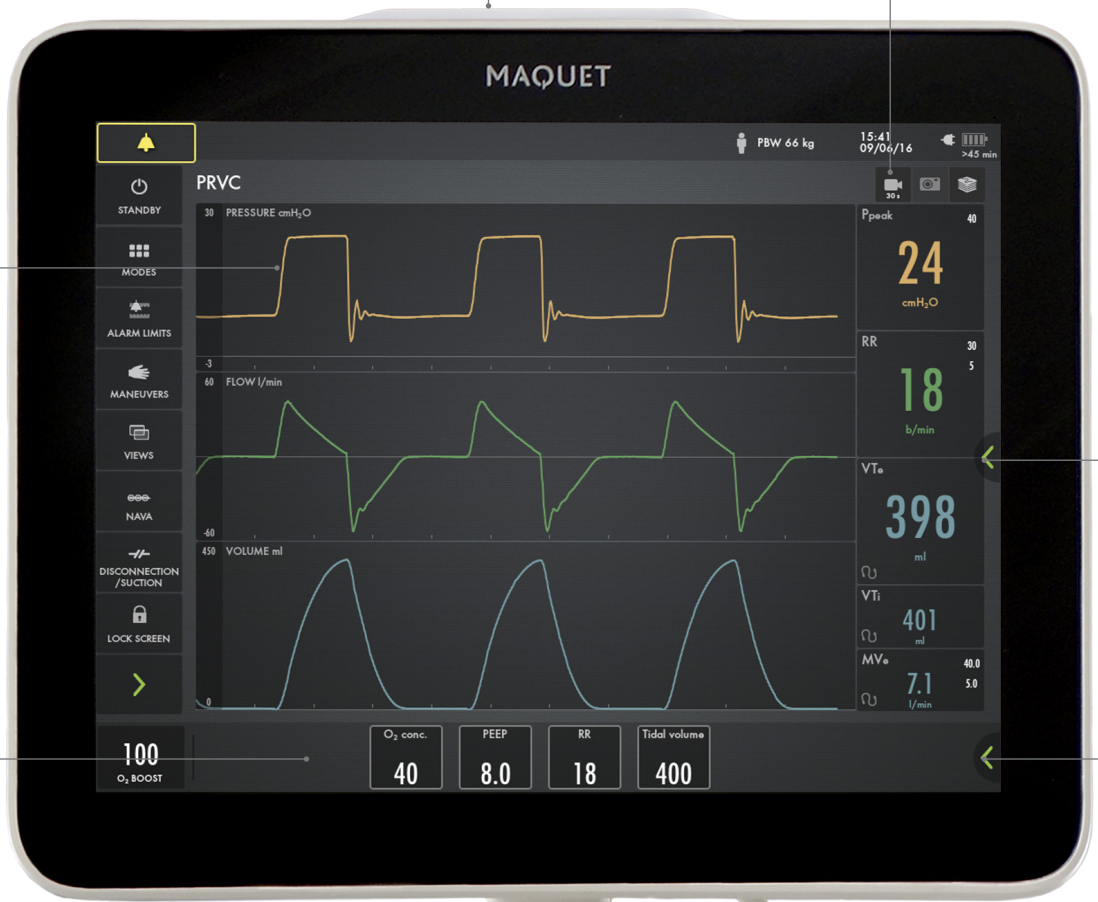
Additional values

Direct access to important settings

Additional settings

360° rotation horizontally

Basic view activated



See what you need at a glance

Guidance for controlled ventilation

It is sometimes necessary to take full control of the patient's breathing. But with full control comes the responsibility to mitigate the risks related with ventilation. Barotrauma, volutrauma and atelectrauma are all potential consequences of ventilation, but their incidence can be reduced by the choice of ventilator settings.[1]

SERVO-U calculates, displays and trends parameters affecting survival for easy on-screen follow-up, continuously presenting driving pressure and tidal volume per kilogram of predicted body weight.[2,3]

Making sure the whole clinical team can follow the same targets for the patient can be equally important. With SERVO COMPASS ventilation targets are set for volume and pressure, and the ventilation provided is clearly visualized, notifying staff if and when adjustments are needed.

SERVO COMPASS

1. Insert patient data
2. Insert targets
3. Monitor and adjust

Get guidance by a glance at the ventilator screen on how the patient stays within the ventilation targets.

29%

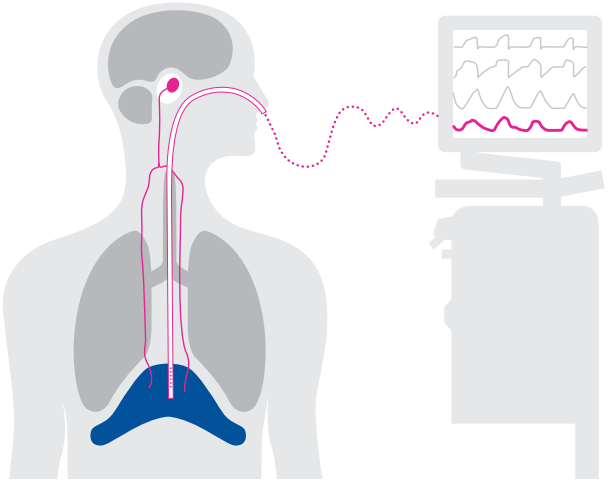
of patients experienced frequent early and delayed weaning failures due to diaphragm dysfunction[4]

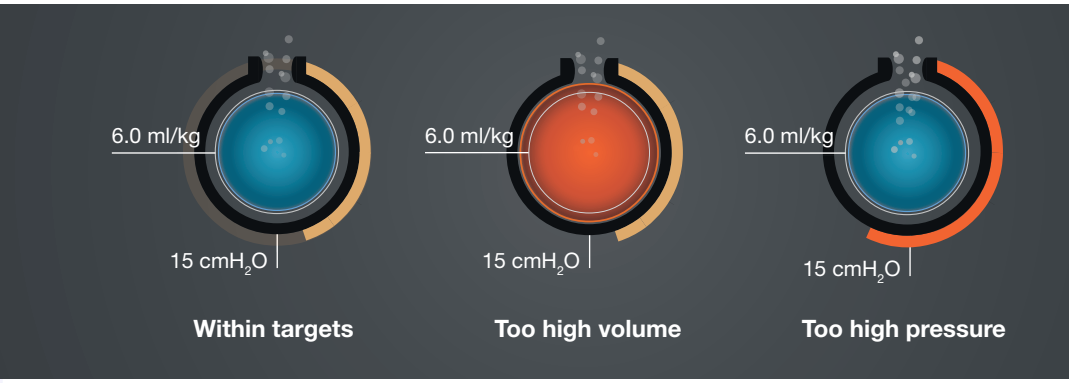
Guidance for assisted ventilation

It is important to monitor breathing efforts in spontaneously ventilated patients. With SERVO-U the patient's diaphragm activity can be visualized on screen, indentifying difficulties such as over-assist, over-sedation and asynchrony. Early and better informed interventions makes it possible to optimize weaning. This visualization of the Edi, the electrical activity of the diaphragm, is already refered to by many clinicians as the vital sign of respiration.

Edi – the vital sign of respiration

The electrical activity of the diaphragm (Edi) is measured with the help of small electrodes sensors on the patient's feeding tube. Edi is influenced by a number of respiratory dynamics, such as diaphragm force, lung stretch and deflation, arterial blood gases, sedation and voluntary inputs.





Deliver the ventilation your patient needs

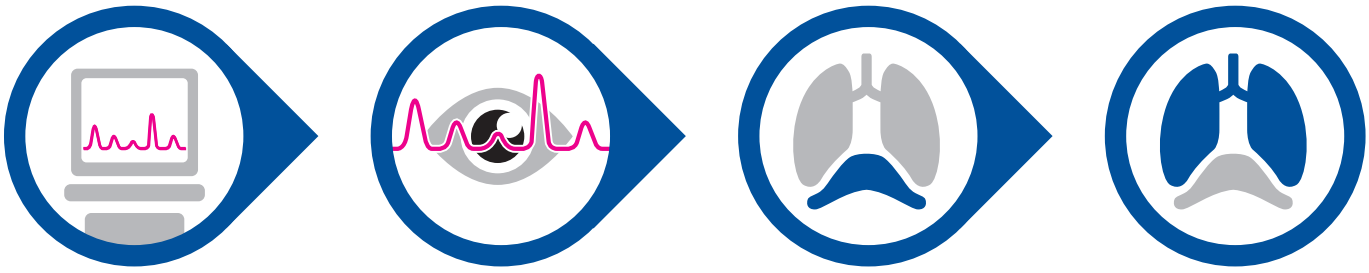
For many ICU patients, the best ventilatory support is one that reinforces the patient's own efforts, letting the patient participate and be active with a suitable workload.

Personalized ventilation

The diaphragm is the "heart" of the respiratory system and is designed to be active continuously [5]. After just 48 hours of inactivity due to mechanical ventilation, it will decrease more than 20% in diaphragmatic thickness [6].

Neurally Adjusted Ventilatory Assist (NAVA®) delivers what the patient wants by responding to the Edi, personalizing support by allowings the patient's body to select tidal volume and respiratory pattern. NAVA promotes lung protective spontaneous breathing[7,8,9] with higher diaphragmatic efficiency,[10,11] helping you keep the diaphragm active and reducing the risk of ventilator induced diaphragm dysfunction. It promotes fewer periods of over- and under-assist,[12,13] automatically protecting the lungs from asynchrony while simplifying weaning.

Personalized ventilation may also help you improve the patient's ICU experience by reducing sedation, increasing comfort[14,15,16] and improving sleep quality.[17,18]



A recent study showed that 29% of patients experienced frequent early and delayed weaning failures due to diaphragm dysfunction[4]. Personalized ventilation will help you see and activate the diaphragm at an appropriate level, protecting the patient from over-assist, over-sedation and patient ventilator asynchrony.

Non-invasive support

Non-invasive respiratory support can reduce the need for intubation and resulting complications such as ventilator-associated pneumonia[19], excessive sedation[20], delirium[21] and ICU-acquired weakness[22]. Non-invasive support allows patients to remain active, a strategy now adopted in many ICUs.[23] With SERVO-U you have several opportunities to support your patients with non-invasive therapies.

NIV NAVA follows the Edi, which means it is independent of leakage in patient interfaces and provides a high level of comfort.

Conventional NIV provides automatic leakage compensation that enables the ventilator to sense the patient's efforts and deliver support, reducing the need for manual adjustments.

High Flow therapy delivers heated and humidified gas to the patient with a set flow and oxygen level, supporting the patient's own efforts and minimizing limitations for the patient.

5.5%

annual growth in number of patients under-going prolonged weaning[24]

Secure your **investment**

Solid foundation for the future

The interchangeable hardware modules (A) also lower your overall costs as features can be moved between your SERVO ventilators.

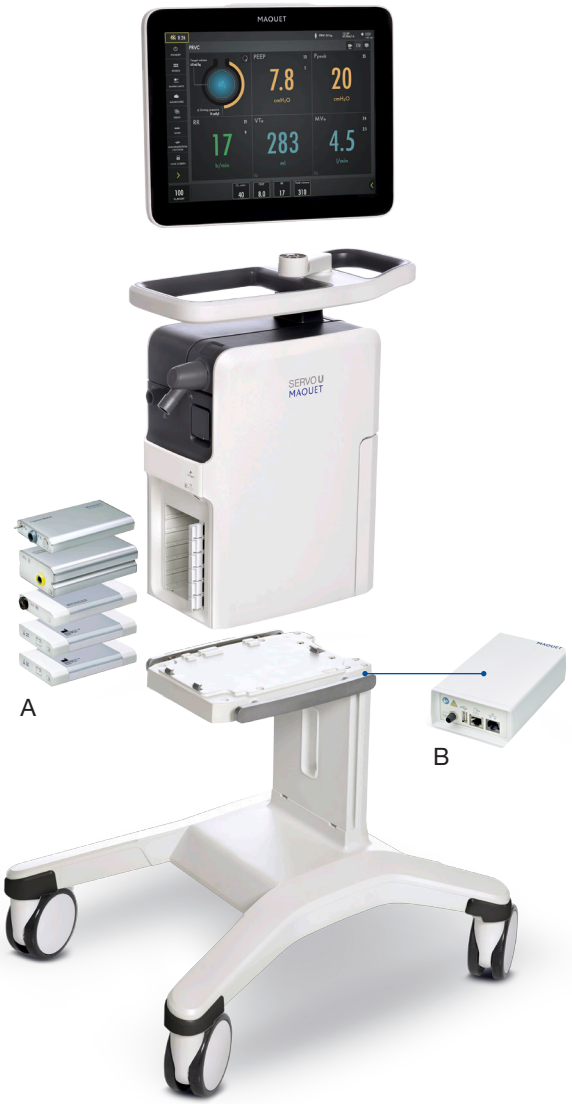
MCare Original Service

MCare is a scalable service program adding value to SERVO-U from day one and throughout its lifecycle. Extended information and support from MCare Remote Services and MCare Portal help you monitor and access information on your fleet.

MCare assures you ongoing access to the full line of original consumables and parts, designed to keep your SERVO-U performing at its best.

Connected to the work environment

Connectivity is essential to drive efficiency and outcomes in healthcare. SERVO-U connects to a number of PDMS systems and patient monitors. SERVO-U can also use MSync (B) (optional) as HL7 converter, which makes the system conform to IHE technical framework.



INVASIVE VENTILATION	
Inspiratory tidal volume	
Adult	100–4000 ml
Pediatric	10–350 ml
Neonatal	2–50 ml
Inspiratory flow	≤200 l/min
PEEP	1–50 cmH_2O
Pressure above PEEP	
Adult	0–(120-PEEP) cmH_2O
Pediatric / Neonatal	0–(80-PEEP) cmH_2O
NON-INVASIVE VENTILATION	
PEEP	2–20 cmH_2O
Pressure above PEEP	0–(60-PEEP) cmH_2O
Leakage compensation	
Adult	Inspiratory up to 200 l/min Expiratory up to 65 l/min
Pediatric / Neonatal	Inspiratory up to 33 l/min Expiratory up to 25 l/min Nasal CPAP up to 20 l/min
GENERAL SPECIFICATIONS	
Screen	15” TFT LCD Touch screen
Dimensions user interface	W 366 x D 50 x H 300 mm
Dimensions patient unit	W 300 x D 205 x H 420 mm H incl. user interface 826 mm
Weight	– 23 kg (Patient Unit 15 kg, User interface 4 kg – 35 kg with mobile cart
Batteries, hot swappable	6 (2 included)
Battery backup time	at least 3 h (with 6 batteries)
Integrated nebulization	Aerogen
Integrated CO_2 analyzer	Capnostat 5 plug in module
Integrated respiratory vital sign	Edi plug-in module
CONNECTIVITY	
External device interfaces	2 x RS-232C ports, USB, remote alarm, MCare remote services
IHE technical framework	MSync HL7 converter

References:

1. Slutsky AS, Ranieri VM. Ventilator-induced lung injury. N Engl J Med. 2014 Mar 6;370(10):980.
2. Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory distress syndrome. The Acute Respiratory Distress Syndrome Network. N Engl J Med. 2000 May 4;342(18):1301-8.
3. Amato et al. Driving pressure and survival in the acute respiratory distress syndrome. N Engl J Med. 2015 Feb 19;372(8):747-55.
4. Kim et al. Diaphragm dysfunction (DD) assessed by ultrasonography: influence on weaning from mechanical ventilation. Crit Care Med. 2011 Dec;39(12):2627-30.
5. Perry SF, et al. The evolutionary origin of the mammalian diaphragm. Respir Physiol Neurobiol. 2010 Apr 15;171(1):1-16.
6. Schepens T, et al. The course of diaphragm atrophy in ventilated patients assessed with ultrasound: a longitudinal cohort study. Crit Care. 2015 Dec 7;19:422.
7. Blankman P, et al. Ventilation distribution measured with EIT at varying levels of PS and NAVA in Patients with ALI. Intensive Care Med. 2013 Jun;39(6):1057-62.
8. Brander L, et al. NAVA decreases ventilator induced lung injury and non-pulmonary organ dysfunction in rabbits with acute lung injury. Intensive Care Med. 2009 Nov;35(11):1979-89.
9. Patroniti N, et al. Respiratory pattern during neurally adjusted ventilatory assist in acute respiratory failure patients. Intensive Care Med. 2012 Feb;38(2):230-9.
10. Cecchini J, et al. Increased diaphragmatic contribution to inspiratory effort during neurally adjusted ventilatory assistance versus pressure support: an electromyographic study Anesthesiology. 2014 Nov;121(5):1028-36.
11. Di Mussi R, et al. Impact of prolonged assisted ventilation on diaphragmatic efficiency: NAVA versus PSV. Crit Care. 2016 Jan 5;20(1):1.
12. Yonis H, et al. Patient-ventilator synchrony in Neurally Adjusted Ventilatory Assist (NAVA) and Pressure Support Ventilation (PSV). BMC Anesthesiol. 2015 Aug 8;15:117.
13. Piquilloud L, et al. Neurally adjusted ventilatory assist improves patient-ventilator interaction. Intensive Care Med. 2011 Feb;37(2):263-71.
14. Kallio M, et al. Neurally adjusted ventilatory assist (NAVA) in pediatric intensive care – a randomized controlled trial. Pediatr Pulmonol. 2015 Jan;50(1):55-62.
15. Piastra M, et al. Neurally adjusted ventilatory assist vs pressure support ventilation in infants recovering from severe acute respiratory distress syndrome: nested study. J Crit Care. 2014 Apr;29(2):312.e1-5.
16. De la Oliva P, et al. Asynchrony, neural drive, ventilatory variability and COMFORT: NAVA versus pressure support in pediatric patients. Intensive Care Med. 2012 May;38(5):838-46.
17. Delisle S, et al. Effect of ventilatory variability on occurrence of central apneas. Respir Care. 2013 May;58(5):745-53.
18. Delisle S, et al. Sleep quality in mechanically ventilated patients: comparison between NAVA and PSV modes. Ann Intensive Care. 2011 Sep 28;1(1):42.
19. American Thoracic Society; Infectious Diseases Society of America. Guidelines for the management of adults with hospital-acquired, entilatorassociated, and healthcare-associated pneumonia. Am J Respir Crit Care Med. 2005;171(4):388-416.
20. Kress JP, Pohlman AS, O'Connor MF, Hall JB. Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. N Engl J Med. 2000;342(20):1471-1477.
21. Ely EW, Shintani A, Truman B, et al. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. JAMA. 2004;291 (14):1753-1762.
22. Kress JP, Hall JB. ICU-acquired weakness and recovery from critical illness. N Engl J Med. 2014; 370(17):1626-1635. Slutsky AS. Neuromuscular blocking agents in ARDS. N Engl J Med. 2010;363(12):1176-1180.
23. Kress JP, Hall JB. ICU-acquired weakness and recovery from critical illness. N Engl J Med. 2014; 370(17):1626-1635.
24. Zilberberg MD, de Wit M, Shorr AF. Accuracy of previous estimates for adult prolonged acute mechanical ventilation volume in 2020: Update using 2000–2008 data. Crit Care Med. 2012 Jan;40(1):18-20.

Read more about SERVO-U in pediatric intensive care here: www.criticalcarenews.com/mx-5796

This document is intended to provide information to an international audience outside of the US. The product SERVO-U may be pending regulatory approval to be marketed in your country. Contact your local Maquet representative for more information.

The views, opinions and assertions expressed in the brochure are strictly those of the interviewed and do not necessarily reflect or represent the views of Maquet Critical Care AB.

GETINGE GROUP

Maquet Critical Care AB
171 54 Solna, Sweden
Phone: +46 (0)8 730 73 00

www.getingegroup.com

MAQUET
GETINGE GROUP

ARJOHUNTLEIGH
GETINGE GROUP

GETINGE
GETINGE GROUP

Getinge Group is a leading global provider of innovative solutions for operating rooms, intensive-care units, hospital wards, sterilization departments, elderly care and for life science companies and institutions. With a genuine passion for life we build quality and safety into every system. Our unique value proposition mirrors the continuum of care, enhancing efficiency throughout the clinical pathway. Based on our first-hand experience and close partnerships, we are able to exceed expectations from customers – improving the every-day life for people, today and tomorrow.