

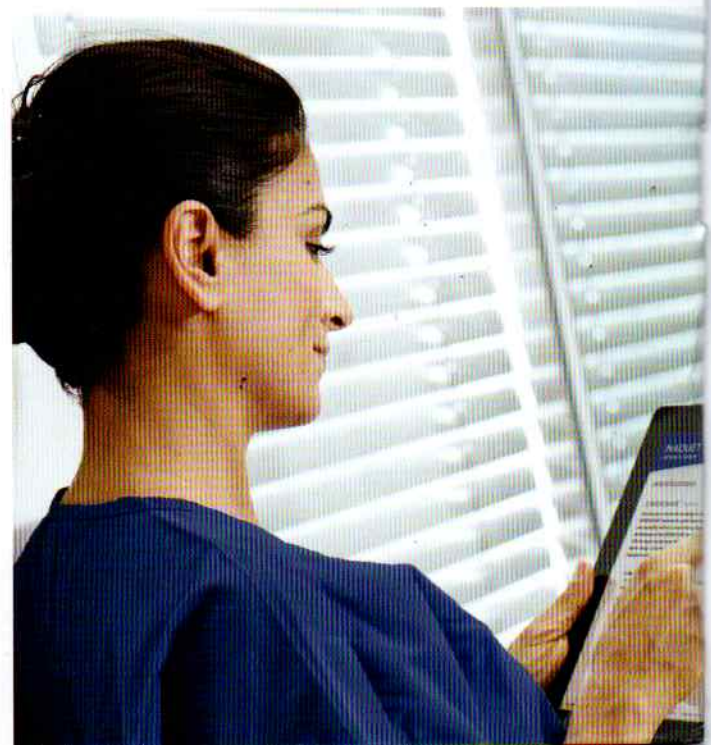


Servo-i Ventilator

One system, multiple options

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

GETINGE 





One system, multiple options



At Getinge we've been developing market-leading ventilators for more than 40 years. Today the Servo family installed base exceeds 100,000 units world-wide. We understand your need for ICU-quality ventilation that is easy to use – to help limit errors, save time, and contribute to better outcomes.

Servo-i delivers a high level of clinical performance for a variety of situations and for all patients. This helps clinicians provide cost-effective care throughout the hospital. Servo-i is also easily upgradeable as your needs change and ensures lasting value for you and your patients.

>100 k

The Servo family exceeds 100,000 units worldwide

>40 years

The Servo ventilator has been continuously refined since it was introduced in 1971

ASDA
DESIGN of the
DECADE
Gold Award





A single ventilator to customize treatment

– for every patient, everywhere

A flexible solution

The Servo-i ventilation platform can satisfy the ventilatory needs of every patient, from neonatal to adult. It can handle the most acute phases of respiratory distress through recovery to the weaning phase. It continuously delivers outstanding ventilator treatment as gently as possible, thanks to its ventilator performance, monitoring capabilities, treatment options and tools.

Available everywhere

Servo-i makes excellent ventilation quality available in practically all environments: from ICUs to NICUs, via intrahospital transport to MR examinations and hyperbaric chambers. Allowing you to choose treatment

options based on patient needs without having to worry about less or worse ventilatory capabilities, or having staff trained on different ventilators for each special application.

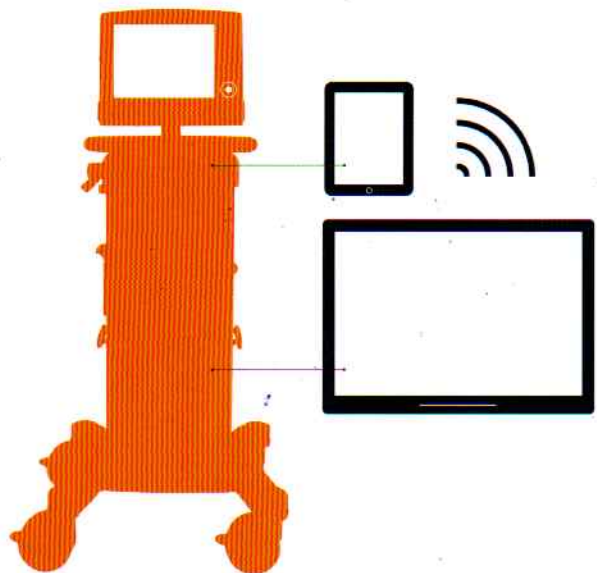
Controlled with ease

Servo-i is easy to learn and use. The system provides the information you need when you need it, allowing a fast and appropriate response from the user. An intuitive interface and simple, logical menus give easy access to all settings. You can reach the most important parameters through direct access knobs. You are always informed, in control and able to react.



Connected to the environment

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



A complete spectrum of treatment opportunities

All-in-one platform

Servo-i features all the modes you would expect from an advanced ventilation system in one adaptable platform. It also presents a wide range of tools to help you stabilize your patient and wean them off the ventilator.

Stress Index

In patients with ALI and ARDS, it is difficult to identify harmful ventilatory patterns, most importantly Barotrauma, i.e. overdistension of the airways and lungs. Stress Index helps the clinician detect and prevent such potentially high-risk scenarios in adults, by analyzing changes in the compliance of the respiratory system during the constant flow of controlled breaths.^{1,2}

Open Lung Tool

(OLT) is an option that assists during lung recruitment and PEEP titration. Measured and calculated values on-screen, including dynamic compliance, make it easier to assess recruitment efficacy. The OLT also provides a breath-by-breath trend of vital ventilation parameters.

Heliox, the low density gas mixture of helium and oxygen, is a widely-recognized therapy that minimizes turbulence and improves CO₂ elimination. Easing the work of breathing for patients from neonate to adult.³ The Heliox option can be used in all invasive and non-invasive modes and ensures automatic adjustment of monitoring and flow delivery when switching from air to Heliox and back.

Automode

Starting in controlled ventilation and automatically switching to supported ventilation when the patient is triggering. Automode supports a smoother safer patient transition between start and steady states, which may reduce workload for clinicians.



Lung recruitment with the help of OLT.

NAVA

– personalized ventilation

The vital sign of respiration

The diaphragm is the “heart” of the respiratory system designed to be continuously active.⁴ The Edi* is a bedside diagnostic tool that allows you to monitor and safeguard the patients’ diaphragm activity.^{5,6} The Edi guides weaning⁷ and helps you to prevent muscular exhaustion during weaning trials, even after extubation.⁸

Deliver what the patient wants

NAVA^{9,**} follows the Edi, and allows the patient to select tidal volume and respiratory pattern. NAVA promotes lung

protective spontaneous breathing^{10,11,12} with higher diaphragmatic efficiency,^{13,14} and fewer periods of over and under-assist.^{15,16} The patient’s ICU experience is improved by reducing sedation, higher comfort scores^{17,18,19} and improved sleep quality.^{20,21}

For all patient groups

Edi and NAVA assures that breathing efforts from all patient categories are effectively assessed and responded to. NIV NAVA is also independent of leakage in patient interfaces, which may prevent respiratory failure and intubation.^{22,23,24}



Servo-i visualizes diaphragm activity on screen for you to monitor and trend.



See diaphragm activity (Edi), reduce sedation and deliver breaths synchronized in time and assist (NAVA).



Seeing diaphragm activity helps you keep the diaphragm active and reduces the risk of ventilator induced diaphragm dysfunction.



NAVA mode automatically protects the lungs from asynchrony and over-assist while simplifying weaning.

*Edi = Electrical Activity of the Diaphragm

**NAVA = Neurally Adjusted Ventilatory Assist

Designed to meet your needs

Cost-effective care

Servo-i is a single system offering a broad range of treatment options, which means it is always ready to adapt to your changing clinical needs. Uptime is maximized thanks to the following features:

- Same system for invasive and non-invasive ventilation of adult, pediatric and neonatal patients, at the bedside and during intra-hospital transport, MR examinations and in the hyperbaric chamber.
- Interchangeable modules can be used on all Servo-i systems (CO₂ Analyzer, Y Sensor and Edi plug-in modules, batteries and expiratory cassettes)
- Plug-in modules and extra batteries can be inserted/removed during ventilation
- Semi-automatic pre-use check of entire system including breathing circuit
- Getinge Care Remote Services
- Original consumables and parts

The system can be used more frequently and in more situations, saving time, ensuring continuous care and simplifying training and maintenance.

Servo-i ventilatory configurations

	Infant	Adult	Universal
Hyperbaric oxygen therapy (HBO)	x	x	*
MR environment use	■	■	■
Alarm output connection	■	■	■
Nebulizer	■	■	■
Y Sensor monitoring	■	■	■
CO ₂ Analyzer	■	■	■
Heliox	■	■	■
STRESS INDEX	x	■	■
OPEN LUNG TOOL	■	■	■
Automode	■	■	■
NIV NAVA	■	■	■
NAVA	■	■	■
NIV	■	■	■
Nasal CPAP	■	x	■
Bi-Vent/APRV	■	■	●
VS	■	■	●
PRVC incl. SIMV (PRVC) + PS	●	●	●
VC incl. SIMV (VC) + PS	●	●	●
PC incl. SIMV (PC) + PS	●	●	●
PS/CPAP	●	●	●

● Standard Configuration

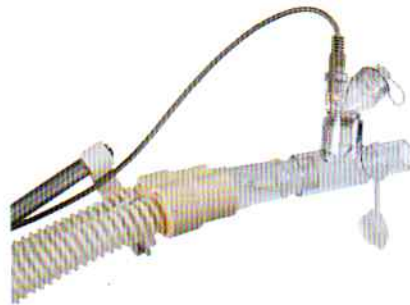
■ Options

x Not Applicable

* Please find Servo-i HBO information in separate sales flyer.



Dockable gas trolley enhances mobility within the hospital



Aerogen Solo Nebulizer



Servo Duo Guard filter



Compressor Mini – quiet and compact, ideal for bedside use



Servo-i interchangeable expiratory cassette

Designed for convenience

Servo-i comes with a number of value-adding features that enhance its convenience. Plug-in modules such as the CO₂ Analyzer, Edi Module and batteries, are interchangeable between systems: the same module can be used with other Servo ventilators. Servo-i has a one-piece cleanable and interchangeable expiratory cassette, so the system can be ready for the next patient almost instantly.

Getinge also offers a wide range of accessories and consumables tested with the Servo-i to guarantee optimal ventilation performance and patient comfort. The range includes active and passive humidifiers, patient breathing systems, NIV masks and the unique Servo Duo Guard filter.

Intermittent and continuous Aerogen nebulization is integrated and available for use with reusable or disposable units. All alternatives offer high performance in aerosol delivery without affecting the ventilatory settings, making it possible to provide treatment to everyone, including the smallest patients.

The Servo-i mobile cart carries all accessories and makes it easy to position the system to the right or left of the patient. The Compressor Mini provides added flexibility in hospitals with no regular piped air supply.



Protect your investment with Getinge Care

A Getinge Care service agreement maximizes the longterm value of your investment. Our four levels of service packages are designed with your hospital's success in mind to ensure your Getinge equipment always delivers peak performance.

Maximizing uptime does not have to break your budget. By following a routine preventive maintenance schedule, Getinge Care keeps things running smoothly with minimal interruption. And if something should need urgent attention, our certified field service representatives will be there to deliver original parts, maximizing the lifespan of your equipment.



Invasive ventilation

Inspiratory tidal volume	
Adult	100–4000 ml
Infant	2–350 ml
Inspiratory flow	≤200 l/min
PEEP	0–50 cmH ₂ O
Pressure above PEEP	
Adult	0–(120-PEEP) cmH ₂ O
Infant	0–(80-PEEP) cmH ₂ O

Non-invasive ventilation

PEEP	2–20 cmH ₂ O
Pressure above peep	0–(62-PEEP) cmH ₂ O*
Leakage compensation	
Adult	Inspiratory, up to 200 l/min Expiratory, up to 65 l/min
Infant	Inspiratory, up to 33 l/min Expiratory, up to 25 l/min Nasal CPAP, up to 20 l/min

General Specifications

Screen	12.1" TFT color
Dimensions user interface	W 355 x D 53 x H 295 mm
Dimensions patient unit	W 300 x D 205 x H 415 mm
Weight	–20kg (Patient Unit 15 kg, User Interface 5 kg) 41 kg with Mobile Cart
Batteries, hot swappable	6 (2 included)
Battery backup time	At least 3 h (with 6 batteries)
Integrated nebulization	Aerogen module
Integrated CO ₂ analyzer	Capnostat plug-in module
Integrated respiratory vital sign	Edi plug-in module

Connectivity

External device interfaces	2xRS232, remote alarm, Getinge Care remote service
IHE technical framework	MSync HL7 converter

* Software version 8.0. For earlier software versions:
0–(32-PEEP) cmH₂O

References

1. Terragni PP, et al. Accuracy of Plateau Pressure and Stress Index to Identify Injurious Ventilation in Patients with Acute Respiratory Distress Syndrome. *Anesthesiology* 2013 Oct;119(4):880-9.
2. Fanelli V, et al. Pulmonary atelectasis during low stretch ventilation: open lung" versus "lung rest" strategy. *Crit Care Med* 2009 Mar;37(3):1046-53.
3. Rodrigo G, et al. Heliox for treatment of exacerbations of chronic obstructive pulmonary disease (Review). *The Cochrane Library* 2008;2.
4. Perry SF, et al. The evolutionary origin of the mammalian diaphragm. *Respir Physiol Neurobiol*. 2010 Apr 15;171(1):1-16.
5. Ducharme-Crevier L, et al. Interest of Monitoring Diaphragmatic Electrical Activity in the Pediatric Intensive Care Unit. *Crit Care Res Pract*. 2013;2013:384210.
6. Emeriaud G, et al. Evolution of inspiratory diaphragm activity in children over the course of the PICU stay. *Intensive Care Med*. 2014 Nov;40(11):1718-26.
7. Bellani G, Pesenti A. Assessing effort and work of breathing. *Curr Opin Crit Care*. 2014 Jun;20(3):352-8.
8. Barwing J, et al. Electrical activity of the diaphragm (EAdi) as a monitoring parameter in difficult weaning from respirator: a pilot study. *Crit Care*. 2013 Aug 28;17(4):R182.
9. Sinderby C, et al. Neural control of mechanical ventilation in respiratory failure. *Nat Med*. 1999 Dec;5(12):1433-6.
10. 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.
11. 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.
12. 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.
13. 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.
14. Di Mussi R, et al. Impact of prolonged assisted ventilation on diaphragmatic efficiency: NAVA versus PSV. *Crit Care*. 2016 Jan 5;20(1):1.
15. 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.
16. Piquilloud L, et al. Neurally adjusted ventilatory assist improves patient-ventilator interaction. *Intensive Care Med*. 2011 Feb;37(2):263-71.
17. 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.
18. 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.
19. 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.
20. Delisle S, et al. Effect of ventilatory variability on occurrence of central apneas. *Respir Care*. 2013 May;58(5):745-53.
21. 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.
22. Bellani G, et al. Clinical assessment of autospontaneous end-expiratory pressure by diaphragmatic electrical activity during pressure support and neurally adjusted ventilatory assist. *Anesthesiology*. 2014 Sep;121(3):563-71.
23. Doorduyn J, et al. Automated patient-ventilator interaction analysis during neurally adjusted noninvasive ventilation and pressure support ventilation in chronic obstructive pulmonary disease. *Crit Care*. 2014 Oct 13;18(5):550.
24. Ducharme-Crevier L, et al. Neurally adjusted ventilatory assist (NAVA) allows patient-ventilator synchrony during pediatric noninvasive ventilation: a crossover physiological study. *Crit Care*. 2015 Feb 17;19:44.

GETINGE 

Getinge is a global provider of innovative solutions for operating rooms, intensive care units, sterilization departments and for life science companies and institutions. Based on our firsthand experience and close partnerships with clinical experts, healthcare professionals and medtech specialists, we are improving the everyday life for people – today and tomorrow.

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

Manufacturer - Maquet Critical Care AB - 171 54 Solna, Sweden - Phone: +46 (0)10 335 00 00 - info@getinge.com

www.getinge.com