GETINGE

Servo-u® ventilator system

Personalized ventilation for better outcomes

Personalized ventilation for better outcomes

Every patient comes with special challenges. Whether it's a 300 gram newborn or a 300 kg adult, someone suffering from acute respiratory failure or chronic pulmonary disease, the needs and complexities will differ. That is why we are committed to innovating personalized ventilation solutions that help protect the lung and diaphragm, speed up weaning and support better outcomes.

CONTENTS

The Servo-u universal ventilator system

Servo-u delivers outstanding clinical performance across all patient categories and meets the latest international product standards for product safety, biocompatibility, electromagnetic compatibility, connectivity and cybersecurity.

50 years of Servo innovation

Based on 50 years of groundbreaking clinical innovation, Servo-u gives you many options for personalized lung protection and weaning. All are easy to understand, implement and use, making it simple to integrate advanced personalized ventilation strategies into your daily patient care. This truly universal ventilator lets you switch between invasive and non-invasive modes, as well as High Flow therapy, for treatment of all patient categories, from neonates to adults.

Less time on ventilation

Unique tools and therapies support you at every stage. For example, our Open Lung Tool® with Stress Index[1–3] and Transpulmonary Pressure tools allow you to assess lung stress. And our groundbreaking Neurally Adjusted Ventilatory Assist (NAVA®) ventilation mode shortens the time of weaning and mechanical ventilation[4] and increases the number of ventilator-free days[4–7] for adult patients in the ICU with acute respiratory failure, according to randomized controlled trials.

Freeing up hospital beds

All of this may translate to a significantly improved health economy, enabling hospitals to free up precious ICU beds and resources. Similar trials on pediatric and neonatal patients also show an increased rate of successful extubations[8, 9] and that NAVA shortens the time of mechanical ventilation.[9–11] In short, personalized ventilation that makes a difference.

Simple to learn, safer to use

Our Servo ventilator development has always built on close collaboration with intensive care clinicians around the world. The result is continuous innovation, higher levels of patient safety and a superior user experience.[12]

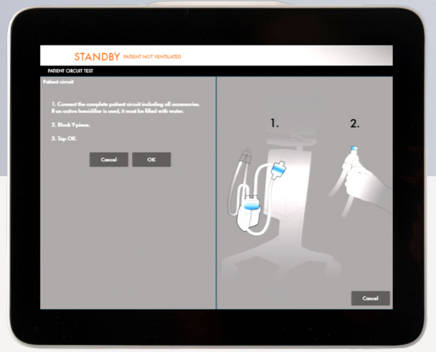
Intuitive touchscreen

The intuitive touchscreen makes Servo-u a breeze to learn and use. Help menus, recommendations and prompts help staff to orientate quickly and receive guidance. The interface also simplifies knowledge sharing, where it is easy to retrieve screenshots and recordings or connect to a larger screen.

Ergonomic design

Servo-u features an ergonomic design. The screen can be rotated through 360°, which means you can place the ventilator anywhere around the bed, depending on clinical requirements. You can also mount Servo-u on a ceiling supply unit or shelf. The system is light and compact, making it highly suitable for intra-hospital transport.

All you need, at your fingertips



Pre-use check automation

The Pre-use check and Patient circuit test are there to ensure optimal system performance. Upon completion of a set of automated calibrations and tests, the results including any identified recommendations, are presented to you.

Safety Scale® parameters

The system's Safety Scale tool makes parameter changes quick and intuitive, while dynamic images illustrate how those changes may affect ventilation.

Direct access to alarms

Tap the related numerical value field to quickly adjust a specific alarm setting, regardless of its status. Where applicable, this also allows permanent silencing or deactivation.

Context-based guidance

Servo-u provides informative guidance for everything from Pre-use check to initial parameter setting and throughout the entire treatment.

View configuration

Several views are available to tailor the information displayed to the user and the clinical situation: Basic, Advanced, Loops, Distance, Family, Servo Compass and Pes & PL.

Alarm management

The 360° lamp and active alarm parameter light up when an alarm is triggered to make it visually recognizable from any view point. On-screen checklists help you to manage each active alarm and reduce undesired alarms.

Workflow support

Smart workflows are available for special procedures, such as Disconnection, Recruitment maneuvers and Edi and Pes catheter placement and positioning.

Screenshots and recordings

You can take screenshots and record high-resolution waveforms for 30 s. Recruitment maneuvers are manually or automatically recorded and also saved in the Library.

Personalized lung protection, breath by breath

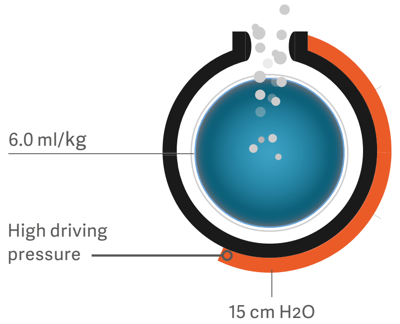
Recent clinical studies suggest that many ventilators lack effective bedside decision-support tools. It's a problem that results in protective ventilation strategies being delayed or inconsistently applied. Ultimately, this can harm the patient and worsen the outcome.[1, 13, 14]

To avoid these situations, Servo-u offers you the complete toolkit for personalized ventilation. It enables you to detect risks early and support timely and consistent implementation of personalized protective ventilation strategies, in line with the latest international guidelines.[14, 15]

In other words, the right support for each patient, at the right time.

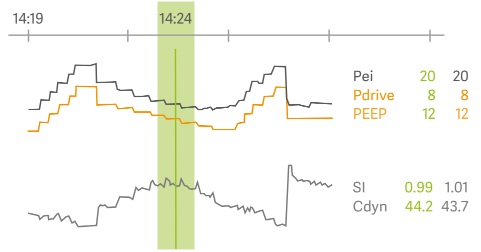
»These new tools have the potential to make a significant difference in terms of patient outcomes. They are far ahead of what we are using today!«[16]

Tools for lung protection



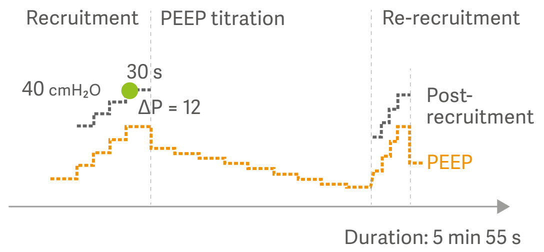
Servo Compass

Servo Compass® makes it easy to see when plateau/driving pressure or tidal volume per predicted body weight (VT/PBW) are off pre-defined targets and interventions are needed.[16] Precisely calculated Dynamic compliance (Cdyn) and Stress index (SI) complete the picture, helping you detect changes in lung volume and verify over-distension.[1–3]



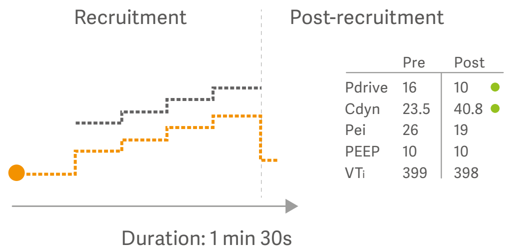
Open Lung Tool

Open Lung Tool trends (OLT trends) helps you assess lung mechanics and gas exchange – breath-by-breath, in real time and retrospectively. It provides flexibility and guidance when personalizing PEEP and driving pressure during recruitment maneuvers, prone positioning and extra-corporeal life support. Stress index, carbon dioxide elimination and transpulmonary pressure are also fully integrated.



Auto SRM

Auto SRM is an automatic workflow for Stepwise Recruitment Maneuvers based on the Open Lung approach.[17] The tool guides you smoothly through recruitment, decremental PEEP titration, re-recruitment and post-recruitment personalization of PEEP and driving pressure, based on optimal Cdyn. Diagnostic features include assessment of recruitability and additional decision support when patients do not respond to the recruitment maneuver.[18]



Auto RM

Auto RM allows quick recruitment after patient disconnection, suction or surgery. It keeps recruitment settings used in Auto SRM, and provides opportunity to delegate recruitment when fewer physicians are available, e.g. during the night. Post-recruitment summary is provided, with color coded results and a shortcut to OLT trends, in case additonal titration of settings based on breath-by-breath data is desired.

Transpulmonary pressure monitoring

Transpulmonary pressure represents the true distending pressure across the lungs, defined as the difference between alveolar and pleural pressures, with airway and esophageal pressures serving as surrogates for calculation.

Esophageal pressure

Esophageal pressure (Pes) measurement is a minimally invasive monitoring method that allows precise differentiation between the mechanical properties of the lungs and the chest-wall complex. This provides a foundation for determining transpulmonary pressure (PL). To simplify the process and improve accuracy, we have developed an automated maneuver to validate both the positioning and inflation of the esophageal catheter's air-filled balloon.

Transpulmonary pressure

Our diagnostic view displays real-time esophageal (Pes) and transpulmonary pressure waveforms, essential for evaluating both controlled and spontaneous ventilation. It simplifies the relationship between airway and transpulmonary pressures. Additionally, OLT trends combine transpulmonary pressure with driving pressure, stress index, and CO_2 elimination, offering a comprehensive breath-by-breath analysis.

Clinical context for Pes & PL

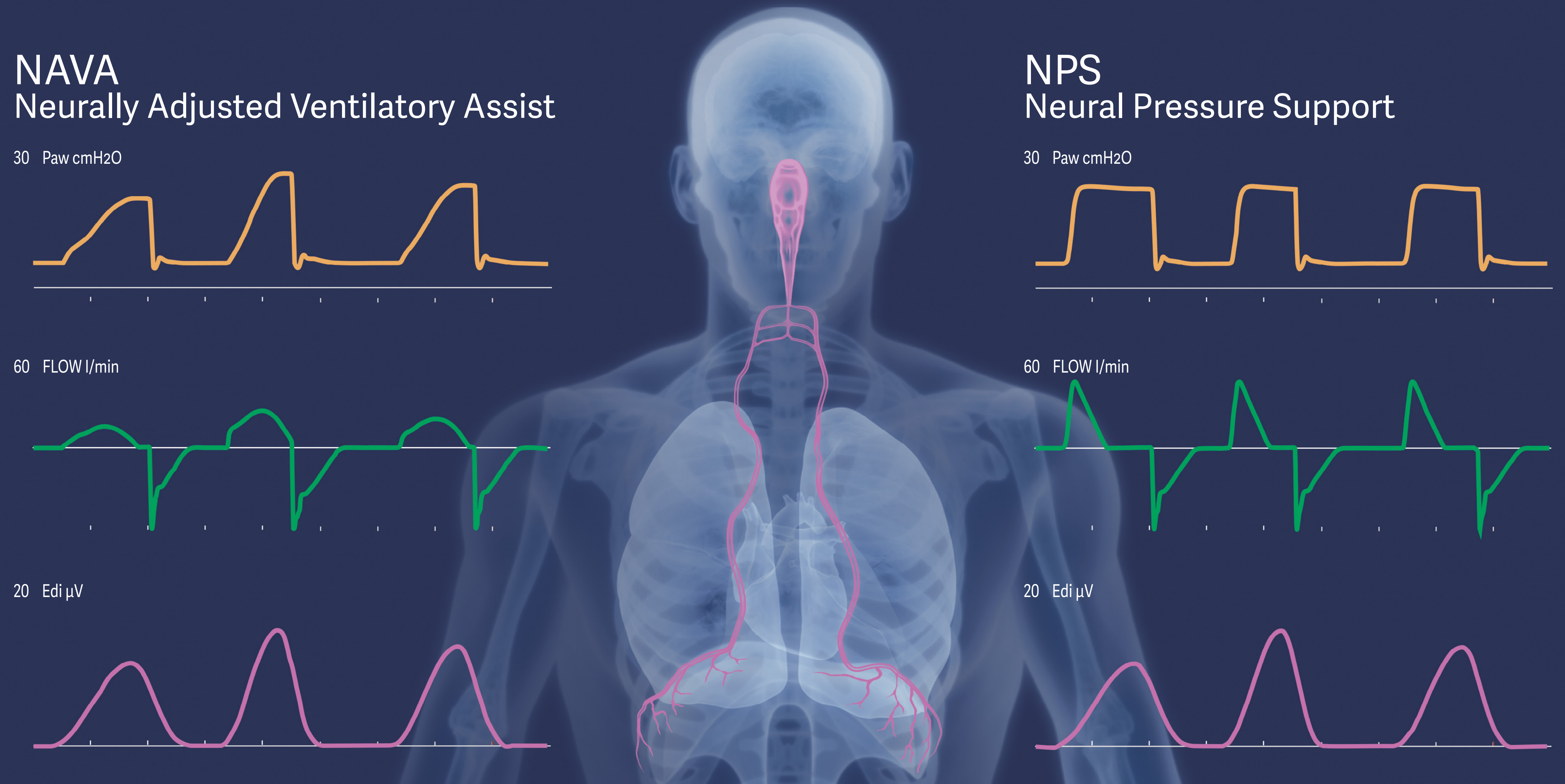
In ARDS patients, targeting PEEP to optimize transpulmonary pressure can improve compliance and oxygenation while reducing driving pressures, a factor associated with improved 28-day mortality rates.[19,20] For the most severe ARDS cases, transpulmonary pressure monitoring may provide critical guidance in avoiding ECMO or in adopting strategies that increase the likelihood of successfully weaning patients from ECMO support.[21–23]

Personalized weaning with Lung- and Diaphragm-Protective Ventilation

Recent clinical studies reveal that diaphragm weakness is prevalent (23–84%) in ICU patients and consistently associated with poor outcome.[24] Servo-u lets you monitor the patient's diaphragm activity (Edi) to personalize ventilation for successful weaning. It offers several options to start weaning your patients earlier and liberate them from the ventilator.

» NAVA shortens time of mechanical ventilation by almost 35%. «[4]

Unlocking the full power of synchrony



Monitor Edi – the vital sign of respiration, from day zero

Careful monitoring and management of the patient's respiratory drive (Edi) and inspiratory effort is recommended to minimize risk of ventilator induced diaphragm dysfunction (VIDD) and patient self-inflicted lung injury (P-SILI).[25, 26] Edi monitoring is available in all non-invasive and invasive ventilation modes, High-Flow therapy and in Standby.

Protect and activate the diaphragm to wean earlier

Early Edi respiratory drive and effort monitoring help safeguard diaphragm activity.[27, 28] With the Edi waveform continuously displayed on the ventilator, you can promptly identify issues such as diaphragm inactivity, over-sedation, patient-ventilator asynchrony, over- or under-assistance, and increased work of breathing during weaning trials.[28–35]

Protect the lungs and diaphragm with full synchrony

Neurally Adjusted Ventilatory Assist (NAVA) utilizes the patient's Edi signal to deliver personalized, lung-protective spontaneous breathing, with higher diaphragmatic efficiency, while minimizing periods of over- and under-assistance.[29–32, 36–38] It may also improve the patient's ICU experience by reducing the need for sedation, thereby enhancing comfort and sleep quality.[10, 11, 39–41] NAVA shortens the time of weaning and mechanical ventilation[4] and increases the number of ventilator-free days.[4–7]

Protect the lungs and diaphragm with partial synchrony

Neural Pressure Support (NPS) delivers time-synchronized pressure support (PS), which may reduce the incidence of premature expiratory cycling. This may minimize the risk of harmful eccentric diaphragm contractions, which are common with conventional flow-cycled PS.[42, 43] The faster pressurization rate compared to NAVA may offer advantages in managing restrictive ARDS and obstructive COPD patients, particularly those with high respiratory drive and excessive lung-distending forces.[42, 44]

A complete set of adaptive NIV modes for all patient categories

Non-invasive ventilation is used to reduce pulmonary complications, such as atelectasis and pneumonia, in patients with acute and chronic respiratory failure and to support weaning by preventing re-intubations.

The Servo-u NIV modes feature advanced leakage compensation to meet patients' inspiratory flow and expiratory pressure demands, even in cases of significant leaks. Trigger sensitivity, expiratory cycling, and ventilation monitoring are continuously and automatically adjusted.

The NIV workflow is supported by functions such as configuration and permanent silencing of alarms, waiting position, disconnect/reconnect management and a smooth and seamless transition between High Flow therapy, NIV, and back.

Neurally synchronized ventilation modes are designed to enhance patient-ventilator interaction, remaining unaffected by challenges such as leakage or Auto-PEEP. These advanced modes ensure precise synchronization with the patient's neural activity, promoting comfort and optimal respiratory support.[45–49]

NIV Control
- NIV PC

NIV Support
- NIV PS
- NIV NAVA
- NIV NPS
- Nasal CPAP

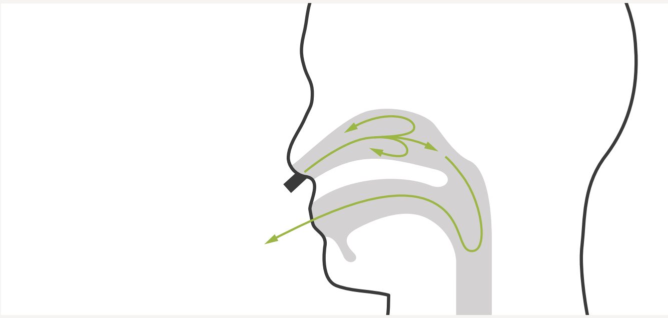
Breathing therapy
- High Flow

Improving care with integrated cost-efficient therapies

Integrated therapies expand the use of the Servo-u while limiting the need for stand-alone therapy devices. High Flow therapy, nebulization that does not affect breath delivery or Heliox therapy can be used by themselves or in combinations to provide a personalized and cost-effective respiratory therapy.[50]

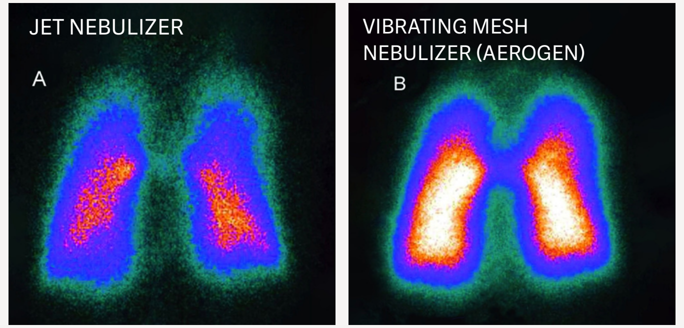
High Flow therapy

High Flow therapy is integrated, so there is no need to switch to stand-alone systems. It reduces the patient's work-of-breathing by providing an accurate flow of humidified oxygen, improving comfort and tolerance.[50]



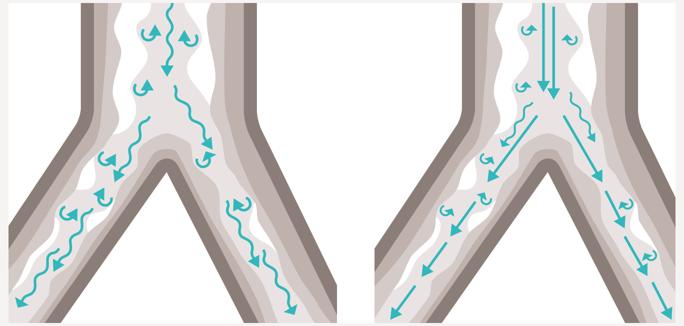
Aerogen® nebulizer

This fully integrated vibrating mesh nebulizer does not affect breath delivery and offers significantly higher lung deposition compared to jet nebulizers[51], it can be used with a broad range of pharmaceuticals, and its closed-circuit medication filling design helps mitigate the transmission of patient-generated infectious aerosols.[52] Additionally, its virtually silent drug delivery maintains a calm environment for your patients.



Heliox therapy

Heliox is a low-density mix of helium and oxygen that helps reduce the work of breathing (WoB), as well as plateau and driving pressure in patients with obstructed airways, such as adults with chronic obstructive pulmonary disease (COPD), or children with bronchiolitis or asthma. It improves aerosol deposition by up to 50% thanks to reduced gas turbulence and less aerosol-particle-impaction loss in the tubing and patient airways.[53–57]



Edi real-time respiratory drive monitoring will precisely quantify the effect of the above therapies.[58, 59]

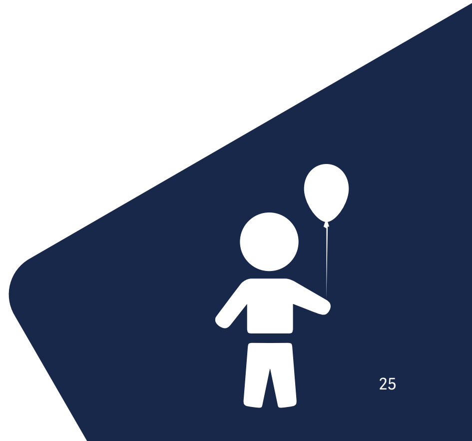
Pediatric patients

Every child admitted to a Pediatric Intensive Care Unit (PICU) deserves a chance at a healthy future, where the smallest details in care can make a big difference.

We are passionate about helping to improve the respiratory care of the most critically ill children, ensuring that both they and their families remain at the centre of attention as they await recovery from critical illness.

In the extended pediatric patient category, Servo-u now offers:

- A maximum inspiratory flow rate of 100 liters per minute to allow responsive and accurate ventilation with leak compensation for a wide pediatric patient range, from 2 to 50 kg.
- Advanced monitoring tools to empower bedside clinicians in decision-making for non-invasive ventilation (NIV), aiming to reduce sedatives and complications through improved synchrony.
- Invasive ventilation options to enhance gas exchange, reduce oxygen consumption, and support respiratory muscles.
- Research tools to increase knowledge in this area to identify strategies that can improve pediatric patient care.



Neonatal patients

In the Neonatal Intensive Care Unit (NICU), balancing gas exchange while minimizing work of breathing and discomfort in fragile premature infants is a critical challenge. Prioritizing lung, diaphragm, and brain protection is essential to improving long-term neurodevelopmental outcomes.

Non-invasive ventilation strategies

The increased usage of non-invasive ventilation modes is widely recognized as a preferred strategy to avoid potentially harmful intubation and its associated risks. Servo-u supports advanced patient monitoring and offers modes such as NIV NAVA, NIV PC, Nasal CPAP, and High Flow therapy, promoting gentle and effective respiratory care.

Baby-driven or volume-targeted ventilation?

When intubation is indicated, NAVA allows synchronization with the neonate, enabling them to control their ventilatory pattern and tidal volumes. This approach minimizes the risk of over- or under-assistance while improving oxygenation and blood gas levels.[60, 61] If instead a volume-targeted mode is preferred, PRVC adjusts inspiratory pressure automatically to accommodate changes in respiratory system mechanics. It also regulates controlled and assisted breaths separately, reducing tidal volume variation and driving pressure.

» Servo-u is the only universal ventilator offering both conventional and neural ventilation modes, providing tailored support to help premature babies breathe, sleep, and grow. «[16]

A sustainable solution based on efficiency and responsibility

Servo-u is a sustainable solution built with durable, responsibly sourced, high-quality components to ensure maximum uptime. Its modular design evolves with your clinical and technical needs, supported by expert knowledge. The result? Increased productivity, reduced waste, and a healthier environment for everyone.

Sustainability through efficiency

Optimized use of a ventilator system can improve patient outcomes and decrease healthcare costs. This makes it essential to prioritize the total life cycle costs required to maintain state-of-the-art clinical performance.

Lasting, high-performance operation

Servo-u shares parts and platforms with other Servo models, featuring hot-swappable batteries and a reusable expiratory cassette with a one-of-a-kind ultrasonic flow sensor for reliable measurements. All original parts and accessories are designed for durable, high-performance operation.

Biocompatibility

All Servo ventilators have been constructed with high-quality materials meeting stringent biocompatibility standards, carefully selected to support patient safety by minimizing the potential release of any sensitizing and allergenic chemicals.

Design for reprocessing

Servo ventilator parts are designed for reprocessing and long-lasting operation. This is a legacy we continue to honor, that started already with the original Servo ventilator.

A virtual twin of the physical ventilator

Servo TwinView provides medical staff with remote near real-time data from Servo ventilator systems. This can help facilitate streamlining work in the ICU, enhancing day-to-day workflows for clinicians and provide a better environment for patients.

Training and onboarding

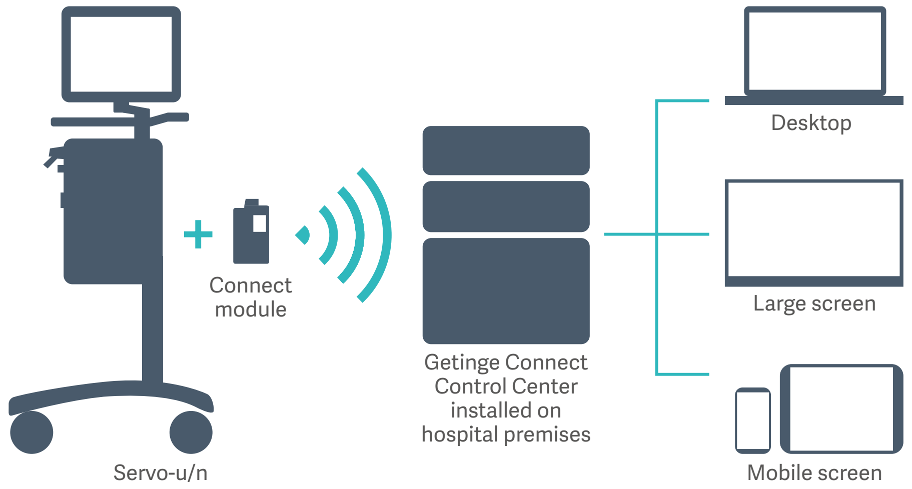
Students and supervisors can follow procedures in real time without disturbing patients. Real patient data contributes to a deeper understanding, and large groups can participate in discussions while familiarizing themselves with the ventilator user interface.

Rounding and handover

During the daily handover, Servo TwinView provides the ICU team with an extensive overview of the patients. Ventilator data is continuously updated, and clinicians can discuss information and plan treatments of critically ill patients without needing to enter the ICU rooms.

Planning and management

Using the List View, ICU coordinators get an overview of current ventilator availability, location and status, as well as patients soon to be released – supporting them in the overall planning of ICU procedures.



Service and support with Getinge Care

With almost 250 service centers globally, we are always close at hand. To maximize uptime, ask us about local service agreements.

Our Getinge Care package comes in four different levels of support depending on your needs. Whatever your specific situation, our skilled service technicians and staff, many of whom are clinicians, are always there to support you.

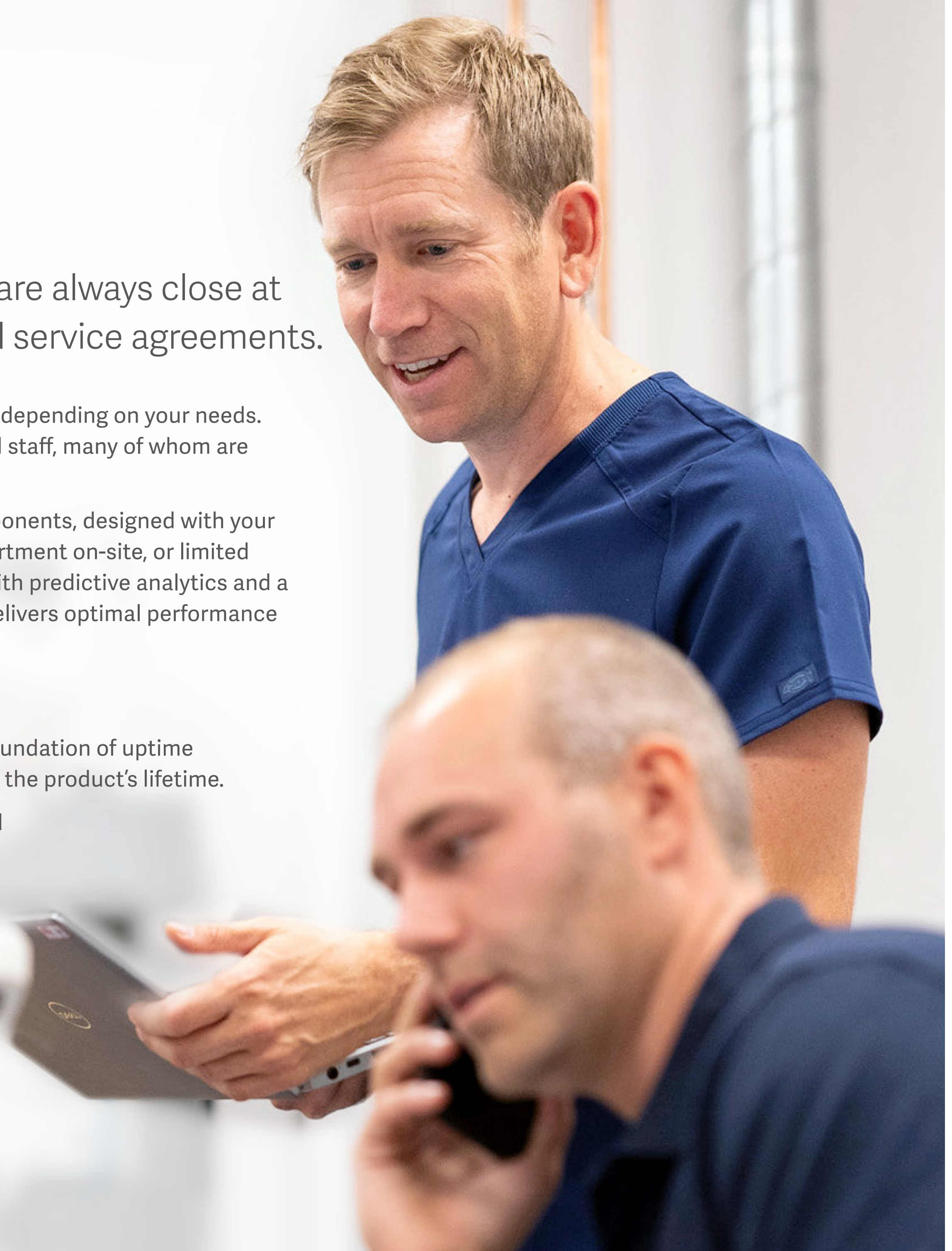
Getinge Care service plans are built with a variety of different components, designed with your hospital's success in mind. Whether you have a full biomedical department on-site, or limited in-house personnel, we have a service plan that suits your needs. With predictive analytics and a variety of preventive service plans, we make sure your equipment delivers optimal performance over its entire lifetime.

With Getinge Care you will receive:

Preventive maintenance with maintenances kits as an important foundation of uptime assurance helping keep your equipment up and running throughout the product's lifetime.

Original spare parts that are designed, manufactured, and validated to ensure performance, uptime and provide for patient safety.

Our certified and experienced technicians which are the backbone of our service offering. These highly-trained Getinge professionals are ready to promptly support you whenever needed.



FleetView – Device Lifecycle Management

Imagine having a seamless, remote overview and a unified maintenance plan for all Getinge devices across your entire organization.

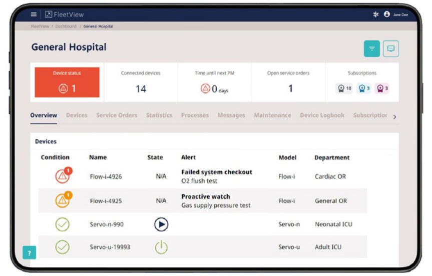
Connect devices, users, and operations

With FleetView, you can make that vision a reality. Most of our innovative products spanning all categories are primed for connection. Additionally, your installed base of Getinge devices can easily be integrated, enabling a comprehensive device data network, improving operational efficiency and staff satisfaction.

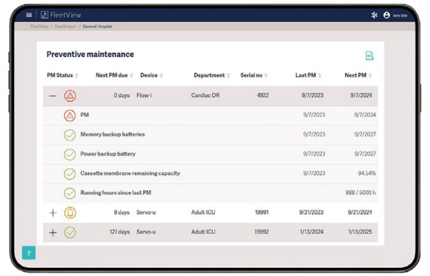
Maximize capacity and enable better care

In the ICU, FleetView provides a bird's-eye view of life-saving equipment performance and usage. By guaranteeing uptime and offering invaluable usage insights, it enables you to optimize capacity and facilitates increased focus on patient care.

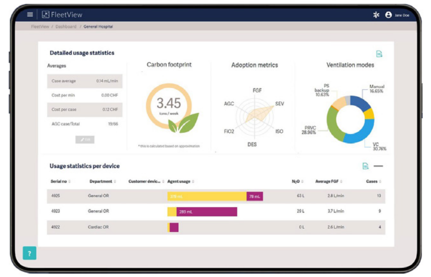
Usage statistics overview



Installed base overview



Preventative maintenance overview



Insights to support climate-friendly decisions

Connectivity and cybersecurity

In today's connected healthcare environment, selecting a medical device involves considering factors like safety, reliability, and trust.

The Servo-u is designed to work in today's connected healthcare environment. It provides for cable connections to a wide range of PDMS systems and patient monitors as well as wireless connectivity to hospital networks and Getinge servers, all while ensuring safeguards for the ventilator systems and transmitted data. Built to align with industry standards such as IEC 81001-5-1 and relevant regulatory frameworks, our devices are developed with long-term value and security in mind.

Guided by continuous feedback from healthcare professionals, the Servo-u combines user-friendly operation with advanced privacy and security features. Our commitment to being your trusted partner means delivering quality that safeguards patients, protects vital information, and enhances efficiency. With Servo ventilators, you choose peace of mind—where security and performance come together for you and those who rely on your care.

Overview of Servo-u technical specifications

Patient categories	Neonatal	Pediatric	Adult
Patient weight (kg)	0.3–8	2–50	15 and above
Tidal volume (ml)	2–50	10–400	100–4000
Max inspiratory flow (l/min)	33	100	200
PEEP (cmH2O)	0–50	0–50	0–50
Pressure above PEEP (cmH2O)	0–80	0–80	0–120
Respiratory rate (breaths/min)	4–150	4–150	4–100

Max leakage compensation			
Inspiratory (l/min)	33	100	200
Expiratory (l/min)	25	48	65

Ventilation modes

Invasive ventilation	PC
	PRVC
	VC
	Bi-Vent/APRV
	PS/CPAP
	VS
	NPS
	NAVA
	Automode® – PC - PS – PRVC - VS – VC - VS
	SIMV – (PC) + PS – (PRVC) + PS – (VC) + PS
Non-invasive ventilation	NIV PC
	NIV PS
	NIV NPS
	NIV NAVA
	Nasal CPAP

Breathing therapies

	High Flow
	Heliox
	Nebulization (Aerogen®)

Lung protection tools

Invasive ventilation	CO_2 analyzer
	Open Lung Tool (OLT) – Auto SRM – Auto RM – OLT trends
	Servo Compass
	Stress Index
	Transpulmonary pressure

Weaning tools

Invasive ventilation	Automode
	Edi monitoring
	Esophageal pressure
	P0.1, SBI, NVE

Connectivity specifications

External device interfaces	2 x RS-232C ports, VGA, USB, Remote alarm, Remote services
HL7	Contact your local Getinge representative
Wi-Fi	Getinge Connect module P10 provides wireless connectivity to hospital networks as well as Getinge servers

Miscellaneous information

Screen	15" TFT LCD touchscreen
Dimensions patient unit	W 300 x D 205 x H420 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 back-up time	At least 3 h (with 6 batteries)
Nebulization	Aerogen, integrated
O2 measurement	O2 sensor (permanent) or O2 cell (consumable)
Respiratory vital sign	Edi plug-in module
Esophageal pressure	Paux plug-in module
Y sensor	Hot-Wire Anemometer plug-in module
CO_2 analyzer	Capnostat 5 plug-in module
External device interfaces	2 x RS-232C ports, VGA, USB, Remote alarm, Remote services
Wireless	Connect module P10

Note: Not all modes/options are available in the standard configuration. Please contact your local Getinge representative for further information.
Refer to the Servo-u datasheet for additional technical specifications.

Customize your Servo-u

Servo-u offers a wide range of high-quality accessories and consumables to enhance patient care and simplify workflows for you and your ICU staff.

Accessories – tailored for ergonomic and streamlined care

Pendant and bed holders offer a robust, flexible solution for attaching the Servo-u to a hospital bed or other fixtures, with a tiltable screen and 360° rotation for easy viewing.

Storage drawer fits conveniently in the mobile cart, providing a handy storage option.

Support arm for patient circuit helps alleviate the weight of the tubing for the patient, with pre-adjusted, factory-set arm joints.

Gas cylinder holders attach easily to the ventilator, accommodating up to two 5-liter cylinders of oxygen, heliox or other medical gases.

Compressor Mini is a medical air compressor equipped with a Standby function for mounting on the ventilator mobile cart.

Fisher & Paykel 950™ is a premium performance humidification system that delivers benefits to patients and healthcare providers.

Edi module and cable enables monitoring of the patient's neural respiratory drive upon connection of an Edi catheter.

CO2 module enables connection of a Capnostat® 5 CO2 sensor for end-tidal and volumetric capnography.

Y sensor module offers proximal flow and tidal volume monitoring through a hot-wire anemometer, with minimal deadspace for the smallest patients.

Y sensor module also offers esophageal and transpulmonary pressure monitoring with a Pes catheter connected to its auxiliary pressure port.

Connect module P10 is used for wireless transfer of data through Wi-Fi to the hospital network and Getinge connectivity server.

Clip-on accessory holders facilitates the workflow of ICU staff by offering holders for cables, and the tools needed for the pre-use checks of the ventilator.

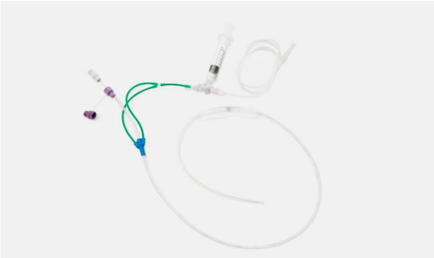
Consumables – approved and optimized for Servo-u

High-quality, durable tubes designed for optimal performance with Getinge mechanical ventilators, ensuring reliable airflow and patient safety.

Servo Duo Guard filter is a high-efficiency, single-use bacterial and viral filter designed to reduce cross contamination between patient and equipment.

Aerogen Solo Nebulizer facilitates effective aerosolized medication delivery into the lungs, where its unique vibrating mesh technology creates an ideal particle size spectrum.

NIV face masks for positive pressure non-invasive ventilation, designed to fit snugly ensuring high comfort with minimal leakage.



NutriVent™ Pes catheter kits ENFit is a nasogastric feeding tube provided with one or two balloons to esophageal and/or gastric pressures.

Edi catheter ENFit is a nasogastric feeding tube that detects electrical activity of the diaphragm (Edi), available in sizes for neonatal, pediatric and adult patients.

CO2 airway adapters are used with the Capnostat 5 sensor and allows the sensor to pass an IR beam through the airway adapter during ventilation without pathway disruption.

Y sensor neonatal is a hot-wire anemometer, with minimal dead space for the smallest patients.

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