



**LÖWENSTEIN MEDICAL**  
**elisa 600, 800, 800<sup>VIT</sup>**

Homecare  
Pneumology  
Neonatology  
Anaesthesia  
INTENSIVE CARE VENTILATION  
Sleep Diagnostics  
Service  
Patient Support

Intensive care ventilation.  
Simple, effective and lung  
protective.

LÖWENSTEIN MEDICAL  
Focus on the patient.

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# "There is no justification for complexity when things can be simple."

(based on Leonardo Da Vinci)

Until recently, there was a gap between scientific evidence and clinical practice in intensive care ventilation. Inadequate technical options and nontransparent evaluation of measurement results frequently stood in the way of the desired treatment. In many cases, the available procedures simply were not sufficient for broad, yet dependable use.

Drawing on more than 30 years of experience, Löwenstein Medical is now making the impossible a reality: Intensive care ventilation – simple, clear and verifiable. The simple solution adds safety, reduces training needs, and allows for the broad use of ventilation strategies. It is economical, minimises operating errors, and gives you more time to focus on the essential.

elisa 600, 800, and 800<sup>VIT</sup> stand for simplifying complexity.





# Instant View Technology

in control at all times





Don't miss the wood for the trees – instantly assess the current ventilation situation and identify developing problems.

Time is a scarce resource in everyday clinical practice. Increasing workloads, critical situations as well as normal routine place high demands on medical personnel. The cumbersome operation of complicated devices causes additional stress and creates sources of error. That calls for innovative technology which offers a clear overview of the required information in a structured format. Simply smart!

### InstantView Technology

The InstantView Technology gives you an intuitive grasp of the patient's situation. Trends and necessary interventions are immediately evident. Deviations are clearly obvious without the need to read individual measuring values.

0 %		MV spont.	100 %
<b>MV e<sub>L</sub></b>	1.8	<b>6.5</b>	7.2
<b>VT e<sub>ml</sub></b>	270	<b>540</b>	560
<b>PEAK<sub>mbar</sub></b>	Off	<b>16</b>	45
<b>PEEP<sub>mbar</sub></b>	3	<b>5</b>	7
<b>RR<sub>/min</sub></b>	12	<b>10</b>	33
<b>O2<sub>%</sub></b>	18	<b>21</b>	26
<b>etCO2<sub>mmHg</sub></b>	Off	<b>-</b>	60



# Easy Access Bar

precise operation even in stressful situations



New answers are needed for intelligent operation – the Easy Access Bar enables fast response.

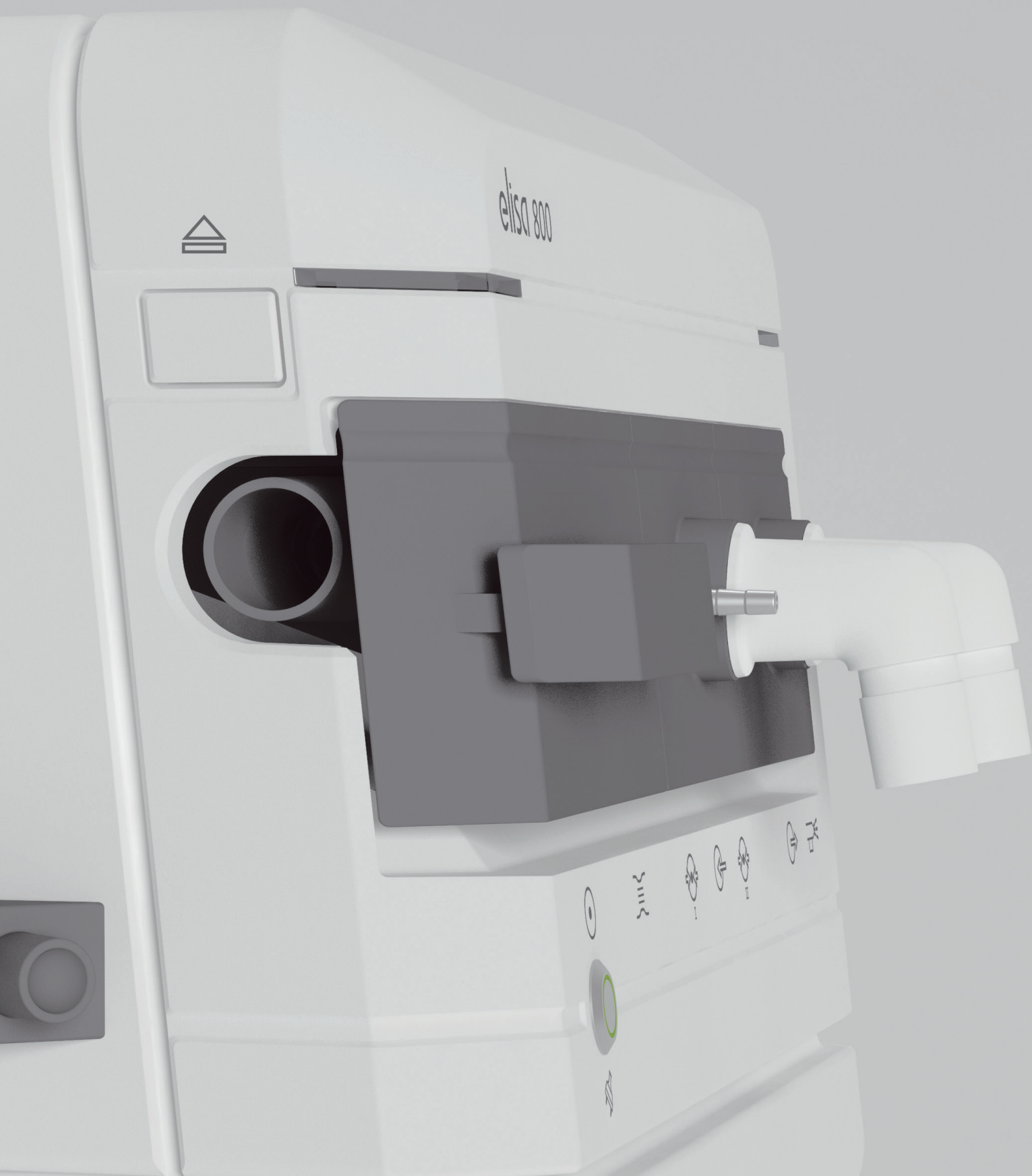


## Easy Access Bar

The Easy Access Bar of the elisa 600, 800 and 800<sup>VIT</sup> intensive care ventilators lets you choose the required settings with precision and ease, even in stressful situations. The touchscreen operation provides intuitively understandable, unmistakable feedback on the selected setting. Since all numerical values and setting parameters are consistently arranged in the same location, operating the devices becomes an easy routine that does not fail in critical situations.

The absence of conventional rotary knobs makes operation easy and verifiable. The fully disinfectable surface enables hygienic operation at minimal cost.







# A clean affair

a simple way to prevent nosocomial pneumonia

The device's numerous individual functions and architecture support compliance with suitable infection prevention measures.

Pneumonia is the most common nosocomial infection occurring in ventilation patients. It leads to extended hospital stays and increases lethality by up to 30%.

The elisa series features a number of functions to support the necessary measures for reducing nosocomial infections. The design of the modern intensive care ventilators eliminates hygienic problem zones such as dirt-collecting corners or rotary knobs and allows for easy cleaning and disinfection. The Valve Bar comprises all elements that can be directly or indirectly contaminated via the respiratory tract and makes it easy to quickly replace all patient-side connections to effectively prevent cross-contamination.



# PEEPfinder®

gold standard bedside lung diagnostics

The PEEPfinder makes the determination of the optimal PEEP range as easy as setting the respiratory rate.

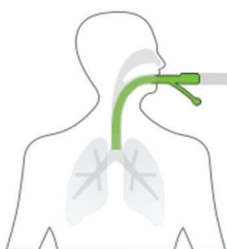
It is considered an established fact that the cyclic collapse and reopening of lung areas in patients with ALI significantly damages the pulmonary tissue and that alveolar cycling of lung areas in particular represents an independent risk factor for higher mortality.

The PEEPfinder® can be used to optimise the settings of the ventilator, thus supporting lung-protective ventilation. The manoeuvre is performed in a secure window and can be combined with a preoxygenation function.

The expanded, quasi-static PV tool supports the user's assessment of stress and strain. Intelligent algorithms and extensive safety features make it easier to determine the elastic properties of the lungs. A number of evaluation options are available for this purpose. Graphic evaluation support for detecting inflection points, stress indices, and storage of up to 10 reference loops facilitate the straightforward implementation of lung-protective ventilation.



## Alarmes ventil. désactivées



Boucle  
actuelle

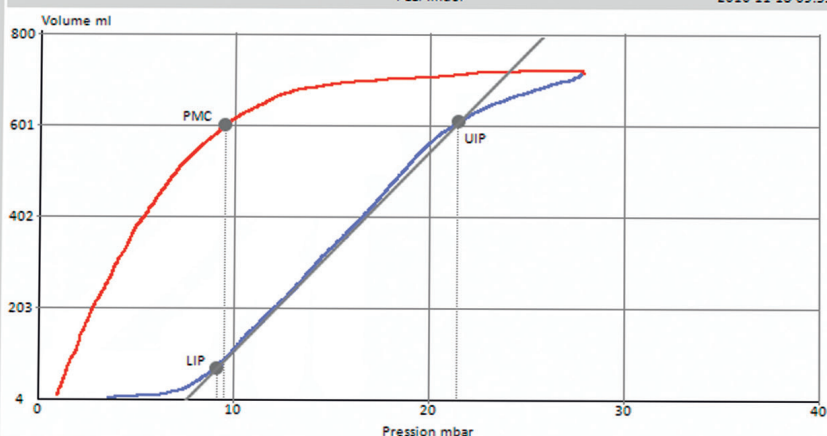
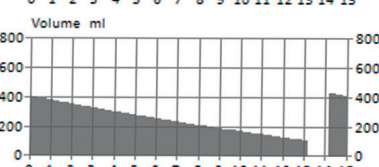
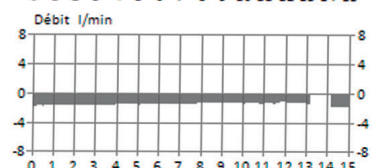
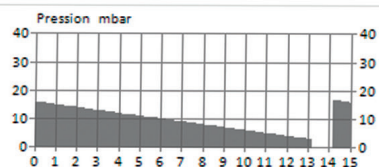
Tableau de  
données

Indice

Référence

PEEPfinder

2016-11-18 09:35:09



Pause insp.

Pause exp.

Soupir

Ventilation  
manuelle

PEEPfinder

Phase d'expiration en cours

01:08 min

O<sub>2</sub>  
100  
%

I Débit  
2,0  
l/min

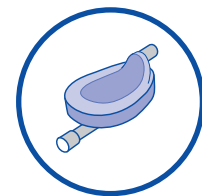
P Début  
3,0  
mbar

V Stop  
800  
ml

P Stop  
25  
mbar







# Volatile sedation meets intensive care ventilation

optimised ventilation with bespoke sedation

The use of volatile anaesthetics enables daily awakening trials, timely neurological assessment, and the avoiding of benzodiazepine hangover.

Daily awakening trials, propofol infusion syndrome, timely neurological assessment of ventilated, intensive care patients or reducing brief reactive psychosis – there are many reasons for the use of volatile anaesthetics in the context of intensive care treatment.

We have responded to this challenge and has entered new territory with the successful application of the new DIN EN ISO 80601-2-13 standard, “Particular requirements for basic safety and essential performance of an anaesthetic workstation.” This goes far beyond the scope of safe intensive care ventilator operation and the ef-

fects of anaesthetic gases on the materials of such devices. Rather, the new anaesthetic delivery function compensates the inspiratory and expiratory resistances of the Anaesthetic Conserving Device System® and thereby avoids extending the mean expiration time, reduces the risk of trapping, and guarantees the accuracy of volume measurement.



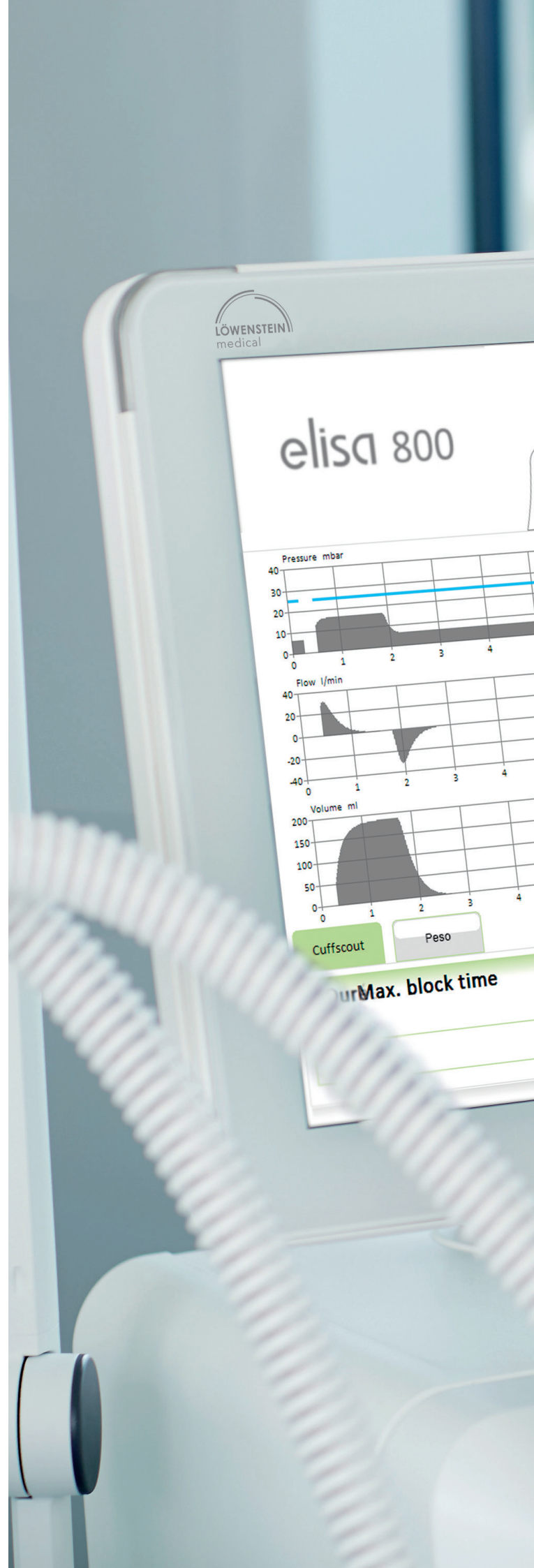


# Cuffscout®

simple cuff management to  
reduce VAP risk

The continuous monitoring and control of the blocked cuff is one of the measures to reduce the VAP risk of mechanically ventilated patients in the intensive care unit.

Intermittent cuff control with a pressure gauge, which is frequently applied in current practice, is not fully adequate to counteract this risk. For this reason, we have equipped our best-selling products with the new Cuffscout® function. It maintains and monitors the cuff pressure specified by the user. In addition, our devices immediately recognise defective cuffs and leaks and have an algorithm for cough detection to further simplify the individual cuff adjustment.





## BiLevel

Apnoea ventilation  
BiLevel  
Rate 10, P insp 12

MV spont.			0 %	100 %
MV e <sub>L</sub>	2,5	3,3	12,0	
VT e <sub>ml</sub>	150	260	Off	
PEAK <sub>mbar</sub>	Off	17	27	
PEEP <sub>mbar</sub>	3	5	7	
RR <sub>/min</sub>	6	12	50	
O2 <sub>%</sub>	25	21	35	
etCO2 <sub>mmHg</sub>	Off	-	60	



$\alpha$

Alarms

Ventilation

O2 Flush

Weaning-analyzer

P0.1

Hold

More functions

Enter

Auto

Static

Cuff const  
25  
mbar

I/On

Curve on

Max. block  
on

Curve off

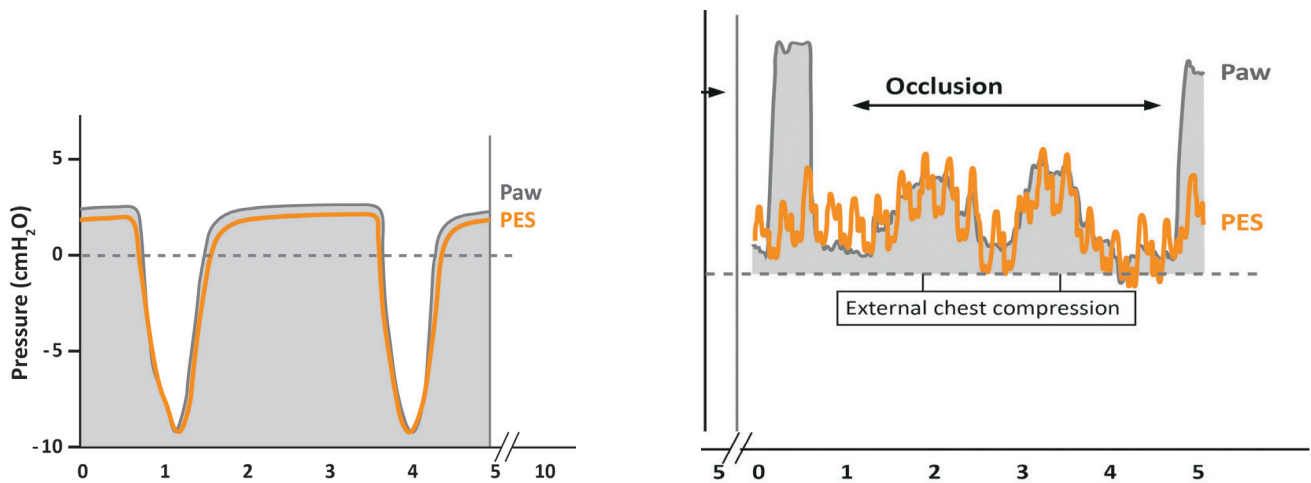
Max. block  
off

elise



# Chest Monitoring

more than just detection of stress and strain



Even in difficult clinical ventilation situations, the measurement of oesophageal or transpulmonary pressure allows lung-protective ventilation to be adjusted.





Alveolar overdistension and cyclic alveolar collapse are the primary causes of ventilation-associated lung injury. This is characterised by alveolar permeability dysfunction with oedema, alveolar haemorrhage, hyaline alveolar membrane formation, loss of surfactant function, and alveolar collapse. The lung damage caused by alveolar overdistension is produced by high pressure values. These are reflected in the transpulmonary pressure (difference between airway pressure and pleural pressure). Although inspiratory alveolar overdistension and expiratory collapse cause lung damage through shear forces, the limits of conventional lung protection can also be considerably exceeded with maximum plateau pressures of 30 mbar without the lung being overdis-

tended. The transpulmonary pressure measurement allows lung-protective ventilation to be adjusted without additional damage to the lung particularly in patients who require a large proportion of the ventilation pressure to extend the "stiff" lung (obesity, elevated intraabdominal pressure, etc.).



# Tools to assist the weaning process

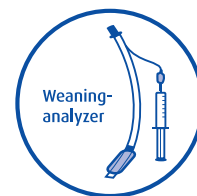
there are no simple answers when weaning fails

In the majority of ventilated patients, ventilator weaning is quick and can be successfully achieved by simple strategies. However, there is a steady rise in the number of ventilated patients that cannot be weaned off the ventilator or where the weaning process is very prolonged.

40 % of all ventilated patients undergo difficult or prolonged ventilator weaning, which takes up almost 50 % of intensive care time. Often, these are patients with severe respiratory dysfunction, where comorbidity makes the weaning process

more difficult. The necessary weaning strategy is complex, demanding and allows no simple answers. In addition to special modes for simple weaning, there are numerous tools and indices available for continuously assessing the weaning process and for the standardised assessment of weaning and extubation readiness.

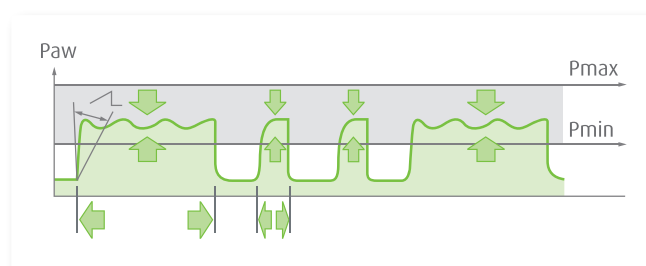




## Weaning modes

The right choice of ventilation type has high significance in the weaning concept and influences the duration and success of weaning. In addition to the whole range of conventional ventilation modes, elisa 600 and 800 also have two special ventilation types for efficient weaning of standard ventilation patients. Spontaneous breathing activity, necessary ventilation pressure for mandatory and spontaneous breathing activities, trapping risk, and lung parameters are continuously recorded, assessed and used to adjust the ventilation parameters.

Adaptive Lung Protection Ventilation (**ALPV®**) takes lung protective protection rules into account and guarantees the necessary CO<sub>2</sub> elimination. ALPV® can be maintained throughout the entire period of ventilation without changing the ventilation mode or adjusting the ventilation parameters.



Adaptive Lung Protection Ventilation continuously adapts to the weaning situation.

## Weaninganalyzer®

A huge challenge in weaning is to establish the right time for weaning readiness and extubation. The fact that up to 16 % of extubations are unplanned as so-called self-extubations with subsequent ventilation no longer being required in about 50 % of these patients illustrates the importance of the right time for planned extubation.

The Weaninganalyzer® contains protocols for daily standardised determination of weaning readiness ("ready to wean") and extubation readiness ("ready to extubate"). By monitoring clinical situations and assessing measurement values, daily SAT or SBT tests can be performed more easily, thus helping to reduce complications, reintubation rates, days in intensive care and treatment costs.

## Fastwean®

**Fastwean®** allows measurement values relevant to weaning to be assessed at a glance. Whether RSBI, occlusion pressure measurement P<sub>0.1</sub> or Negative Inspiratory Force – the measurement values are continuously displayed and assessed using a 'traffic lights' display.

Fastwean				
RSBI	-	98	-	
P <sub>0.1</sub>	-3.0	2,9	-	mbar
MIP	20.0	24	-	mbar
Vt sp.	300	318	550	ml
F sp.	11	18	30	/min
RCexp	31	41	6.0	s
SP02	-	-	-	%

Fastwean® supports differentiated assessment in the weaning process.



# Ventilator-integrated tomography (VIT®)

the imaging navigation system for intensive care ventilation

Electrical impedance tomography (EIT) for the first time offers a bedside method for reliable non-invasive determination of the regional lung function without radiation exposure.

The real-time images as well as the EIT-based special lung function parameters support clinicians with the regular evaluation of the variable pulmonary status in order to adjust the ventilation to individual patient needs.

In the **elisa 800<sup>VIT</sup>**, Löwenstein Medical combines both functions: Intensive care ventilation and EIT.

Assessment and monitoring of ventilation, stretch, regional compliance, regional tidal volume and size of available lung volume (functional lung size) can be performed continuously and easily, and the results applied to ventilation strategies.

The EIT, in turn, supports the implementation of lung-protective ventilation, therapeutic positioning, and weaning.

Powerful computers, innovative textiles and modern algorithms have all contributed to electrical impedance tomography graduating from the pure science stage to being part of clinical routine. Sensor densities that were too low, complicated assessment strategies, and pressure sores caused by sensor belts are now a thing of the past.

Changes in the dependent and non-dependent lung regions can be located at a glance, and ventilation settings can be adjusted under direct visual control.



# Options & choices

our modular system at a glance



## High-Flow O<sub>2</sub>

To supplement non-invasive ventilation, high flow oxygen therapy (HFOT) can be performed with a special nasal cannula to administer functional CPAP therapy with a sufficient oxygen supply.



## CPR mode

Special emergency mode for ventilation in resuscitation situations.



## ALPV®

The ALPV® mode combines the previous advantages of hybrid closed-loop ventilation with the current requirements of lung-protective ventilation. The pressure-controlled ventilation with volume guarantee (comparable to dynamic BiLevel) is combined with pressure-supported spontaneous breathing with volume guarantee (dynamic PSV) in such a way that a tidal volume of 6 ml/kg of ideal body weight results as the target value for mandatory and pressure-supported spontaneous breathing. At the same time, the device continuously monitors potential air trapping and offsets it as necessary. ALPV® is used as a weaning mode and generalist mode.



## Proportional PSV

Spontaneous breathing mode with proportional pressure support. The effective pressure support varies breath by breath, depending on the generated flow and the inspired volume to compensate for the flow and expansion-related resistances.



## Loop package

Up to six selectable loops form the basis of differentiated assessment and derivation of treatment decisions. At the same time, up to 10 reference loops can be saved and displayed to compare with the current ventilation situation for diagnosis.



## Scientific Data Tool

The Scientific Data Tool offers a solution for scientific data collections. All ventilation data and EIT measuring values can be recorded breath by breath. Our external software compiles the EIT and ventilation data, associated with the individual breaths, and converts it to an Excel table.



## Transport option

A bracket for attaching the unit to the bed and a kit for accommodating the compressed air and oxygen bottles make it easier to transport the intensive care ventilator with the patient bed within the hospital.



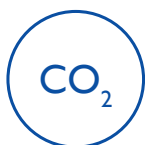
## PEEPfinder®

Thanks to state-of-the-art sensor technology and its high-resolution sampling rate, the PEEPfinder® features algorithms for the reliable determination of inflection points to establish the necessary PEEP and ventilation range. The intuitive display allows a verifiable review of measuring values, transparent PEEP settings, and the assessment of stress indices as well as static compliance.



### Mesh nebulizer

Targeted nebulizing of medications with ultrasound represents the current gold standard. Modern ultrasound technology does not interfere with ventilation therapy, can be refilled during ongoing operation, and is virtually noiseless. The synchronization of our technology with the patient's inspiration significantly reduces the drug consumption while maintaining the same efficacy. The integrated solution enables the direct operation via the intensive care ventilator without the need to rely on additional external devices.



### Optional CO<sub>2</sub>

Mainstream or side stream sensors complete the close monitoring of ventilation patients in routine clinical and emergency situations. Measuring values can be displayed numerically, as a curve or as a loop.



### Weaninganalyzer®

The Weaninganalyzer® accurately displays the patient's weaning process and offers a reliable forecast for initiating the weaning process and extubation readiness based on daily trials and real-time data.



### Independent power supply

Additional batteries and an external charger allow off-grid operation for a period of at least four hours.



### Automatic patient detection APD

As an additional safety function, users can activate the automatic patient detection (APD) feature on the configuration level to make it available. This prevents inadvertent switching to the standby function or turning the ventilator off as long as a patient is connected.



### Hygiene function

To reduce the risk of nosocomial infection, the ventilator has a hygiene management function, which monitors the timely replacement of accessories that are in direct contact with the patient (tubing system, valve bar, suction system, HME filter, nebulizer, and CO<sub>2</sub> adapter). Monitoring and display follow the respective department requirements without the need for complex RFID chips or expensive special tube sets.



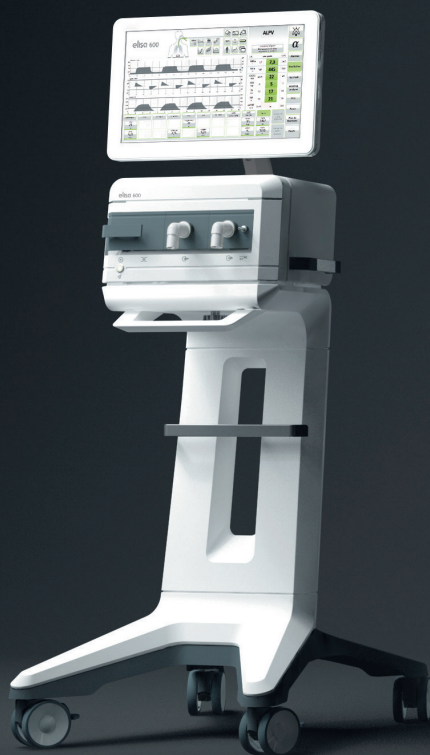
### NIV package

Special algorithms, adjustable byflow, optimised trigger technologies, customised alarm management and extensive leakage compensation replace the need for an additional NIV ventilator.



elisa  
flexible, scalable,  
ready for the future





elisa 600

elisa 800

elisa 800<sup>vit</sup>

NIV package (High-flow O<sub>2</sub>, NIV)

+

✓

✓

Extended diagnostic package (loops, PEEPfinder®)

+

✓

✓

Weaning package (ALPV®, MIP, Weaninganalyzer®, Fastwean®)

+

✓

✓

Neonatal package

+

✓

✓

Mesh nebulizer

+

✓

✓

Ventilator-integrated impedance tomography

—

+

✓

Cuffscout®

+

✓

✓

Chest monitoring package

+

✓

✓

CO<sub>2</sub> package

+

✓

✓

sensor  
not included

sensor  
not included

✓ integrated   + optional   — not available

