LÖWENSTEIN
medical

Intensive care ventilation

elisa 300, 500, 600, 800, 800^{VIT}

With people in mind

Intensive care ventilation.
Simple, effective
and lung protective.

elisa 300
elisa 500
elisa 600
elisa 600
elisa 800
elisa 800^{VIT}

Contents

The elisa code – agile system design for individualised ventilation therapy

In theory, things couldn't be simpler – air has to go in and out.

Clinical practice, in contrast, consists of a wide range of requirements for modes, setting parameters, diagnostic options, and therapeutic manoeuvres.
As a result, ventilators quickly become overly complex, subject to compromise or require intensive training.
The agile system architecture of the elisa family easily accommodates hospital standards while reducing operator errors and training expenses.

Whether customised rounds views, resuscitation mode or automatic spontaneous breathing trial – the user interface can be perfectly configured to suit your needs.

Innovative. Intuitive. Sustainable.
The elisa family.

DESIGN AWARD 2015

reddot award 2015

INDUSTRIE PREIS 2015 BEST OF

GERMAN DESIGN AWARD SPECIAL 2017

elisa –

because intensive care ventilation depends on individual factors

elisa 800^{VIT}

elisa 600 | 800 | 800^{VIT}
The premium range
in intensive care ventilation

The platform concept enables situation-based configuration. The flexible system architecture is adaptable for future requirements and accommodates medical and technical developments.

It offers a full range of diagnostic and therapeutic tools for personalized, intuitive ventilation – from common clinical standards to our ventilator-integrated impedance tomography (VIT), which continues to be unparalleled worldwide.

elisa 300 | elisa 500

The new compact range in intensive care ventilation with the latest turbine technology

DESIGN AWARD 2018

elisa 300

elisa 300 combines the benefits of the compact class with the features of a state-of-the-art universal ventilator. The devices support a full range of invasive and non-invasive ventilation therapy methods as well as high-flow O_2.

The innovative user interface and the comprehensive device configuration options are the basis for versatile application options in intensive care, intermediate care, emergency rooms or during intra-hospital transfer. The 12.1-inch display with a stunning colour performance is the key operating element to guarantee simple operation. Numerous functions provide support with routine tasks.

elisa 500

A powerful, noise-optimised turbine guarantees ample flow reserves with high peak flow.

The compact-class device elisa 500 features top-shelf performance characteristics, while offering a full therapeutic range of clinical ventilation options in turbine-driven devices.

The innovative user interface of the elisa family, along with extensive configuration options and a stunning colour performance of the 15-inch display, create the basis for a wide range of applications from the weaning unit to maximum care in the ICU.

As a modern universal ventilator for invasive and non-invasive applications, even the basic version of elisa 500 features special sensors, transpulmonary pressure measurement, and Cuffscout.

Instant View Technology

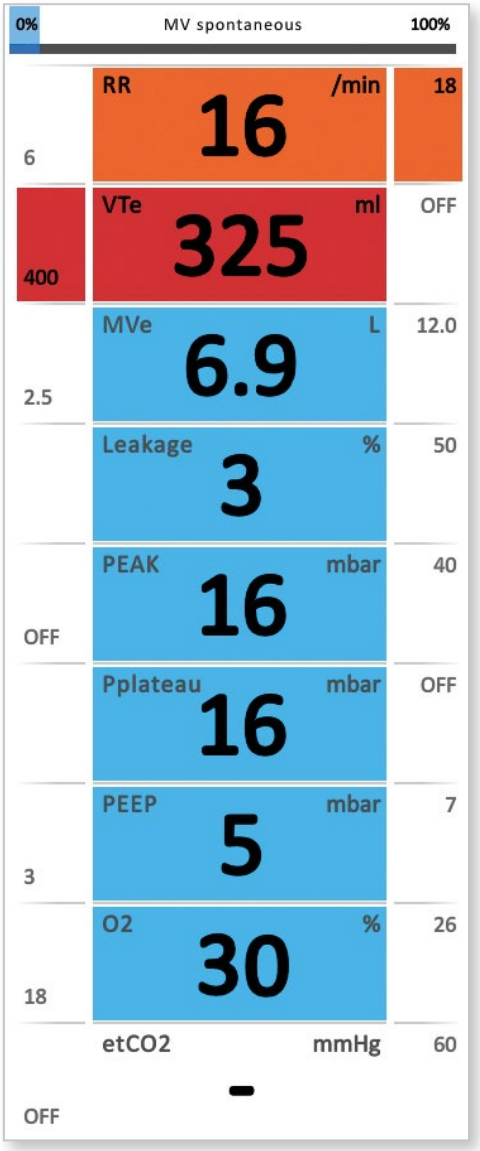
in control at all times

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!

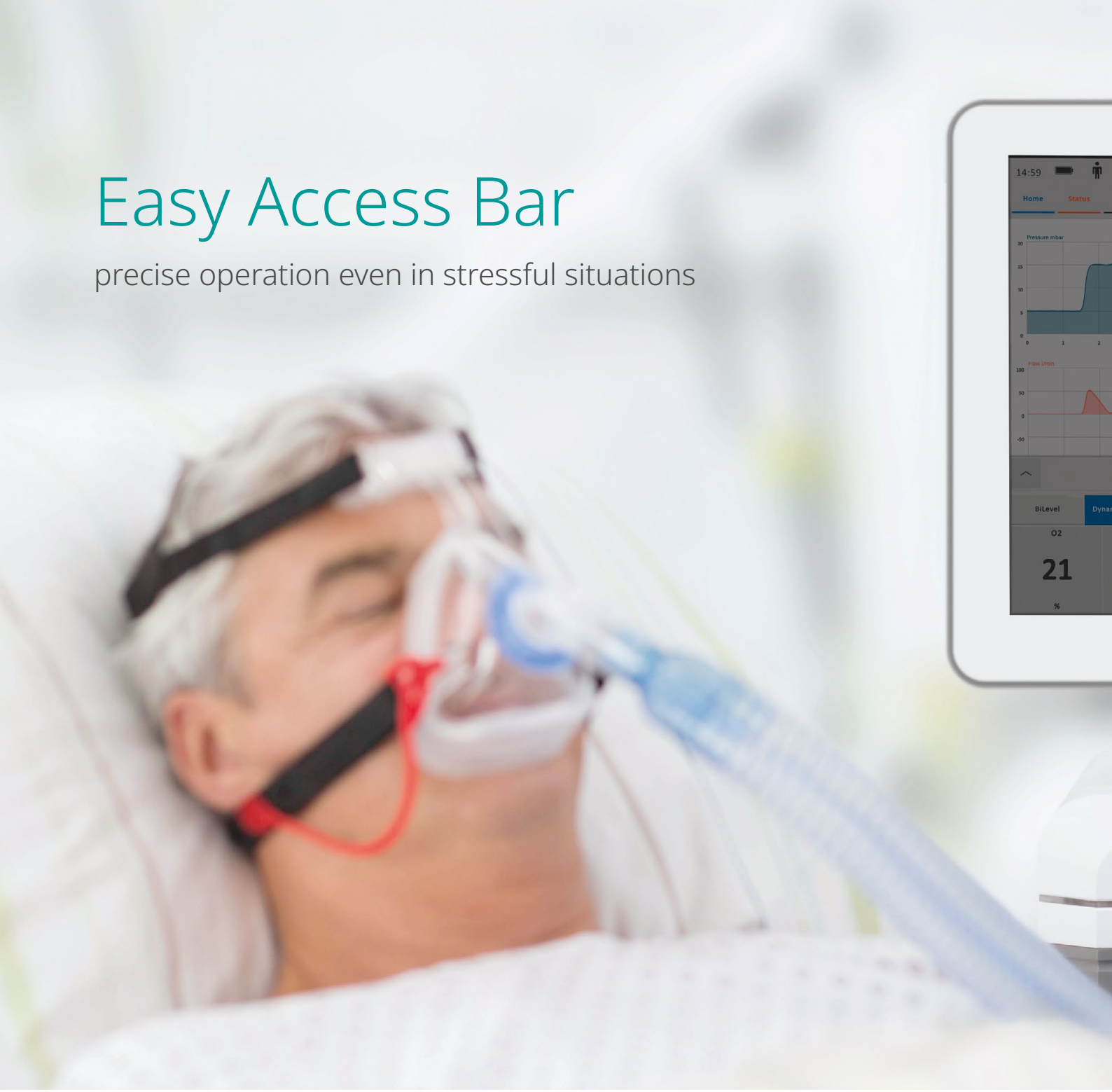
Instant View Technology

The Instant View 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.



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 intensive care ventilator family elisa 300 to elisa 800^{VIT} lets you choose the required settings with precision and ease, even in stressful situations. The touch-screen 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.

The configurable hygiene function supports the implementation of internal hospital hygiene standards without the need for complex RFID technology or the purchase of expensive special breathing circuits. It comprises all potentially critical parts such as nebulizers, HME filters, tube extensions, and suction systems.

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.


15:01
Dynamic BiLevel (IV)
Home
Status
Trends
PEEPfinder
2018-09-26
15:05:04
Volume ml
1000
750
500
250
0
PMC
7,8
LIP
12,6
0
10
20
30
40
Pressure mbar
The next PEEPfinder cannot be started before the expiry of the 60-second lockout time after the last manoeuvre.
Insp. Hold
Exp. Hold
Manual Breath
Sigh
Recruitment
O2
100
%
I Flow
2.0
l/min
P Low
3.0
mbar
Recr. time
2
s
V Stop
800
ml
P Top
25
mbar


Monitor
Patient

Volatile sedation meets intensive care ventilation

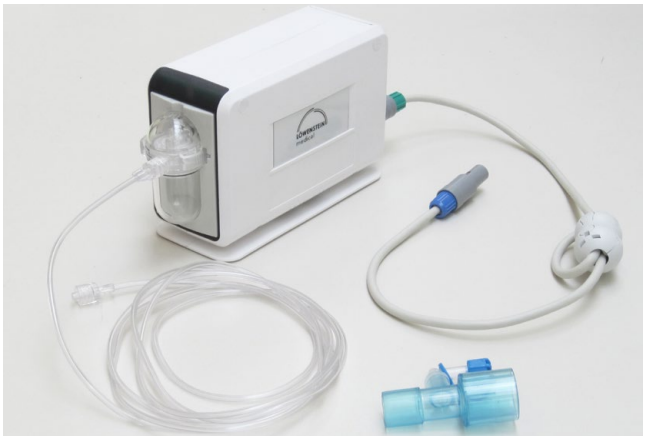
optimised ventilation with bespoke sedation

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

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

In response to this challenge, we have implemented an extensive strategy for "the basic safety and essential performance of anaesthetic workstations". This goes far beyond the scope of safe intensive care ventilator operation and the effects of anaesthetic gases on the materials of such devices. The anaesthetic delivery function compensates the inspiratory and expiratory resistances of the Anaesthetic Conserving Device System (Sedaconda) which avoids extending the mean expiration time, reduces the risk of trapping, and guarantees the accuracy of volume measurement.

In combination with the Leolyzer multi-gas sensor, elisa devices can directly measure and monitor anaesthetic gases with great precision.



Cuffscout

simple cuff management
to reduce VAP risk

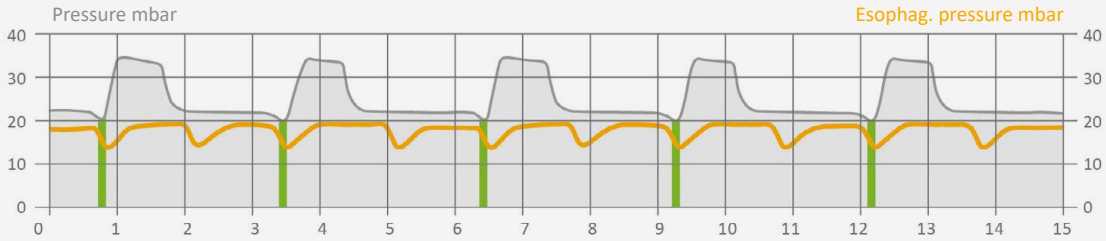
The continuous monitoring and control of the blocked cuff is one of the measures to reduce the VAP risk of mechanically ventilated patients in the intensive care unit.

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 feature a cough detection algorithm to further simplify the individual cuff adjustment.


Dynamic BiLevel (IV)
I-HOLD
PES
P01
STOP
0%
MV spontaneous
100%
PEAK
mbar
23
Pplateau
mbar
22
PEEP
mbar
5
Leakage
%
0
RR
/min
12
VTe
ml
OFF
40
7
3
50
50
6
Time s
Backup Dynamic BiLevel (Rate 10, Vt 400)
Patient
Alarms
Ventilation
Manoeuvre
Weaning
Functions
System
AnaConDa
Cuffscout
ASR
Peso
O2 Flush
Hygiene
On
Auto
Static
Cuff const.
25
mbar
Max. block on
Max. block off

Transpulmonary monitoring

more than just detection of stress and strain



The measurement of oesophageal or transpulmonary pressure values enables the adjustment of lung-protective ventilation, including in difficult clinical ventilation situations.

Adapting the ventilation therapy based on oesophageal pressure values is a simple, less invasive and valid method, which only requires the placement of an oesophageal catheter. The associated transpulmonary pressure measurement reflects the extent of mechanical stress on the alveoli in every breath and therefore enables the continuous assessment of the necessary PEEP, including with spontaneous breathing.

In the difficult weaning process, bedside monitoring of respiratory muscle activity in real time based on oesophageal pressure allows for assessing the level of synchronisation between the patient's respiratory efforts and the device insufflation time, which in turn makes it feasible to individually adapt the ventilation parameters (e.g. optimised insufflation time, pressure support or PEEP).

At the same time, the respiratory effort is quantified by measuring the work of breathing WOB. Based on these values, the level of muscle effort can be individualized to assist the patient under ventilation.

Tools to assist the weaning process

there are no simple answers when weaning fails

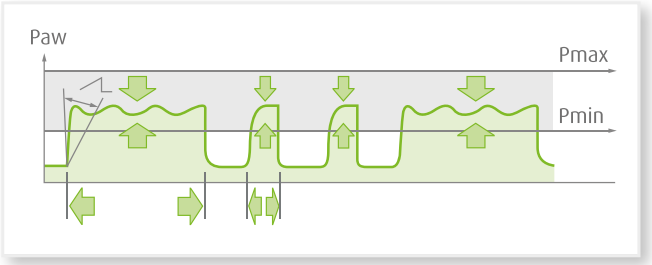
In the majority of ventilated patients, ventilator weaning is quick and can be successfully achieved by simple strategies. However, there is a steady rise in the number of ventilated patients that cannot be weaned off the ventilator or where the weaning process is very prolonged.

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_2 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.

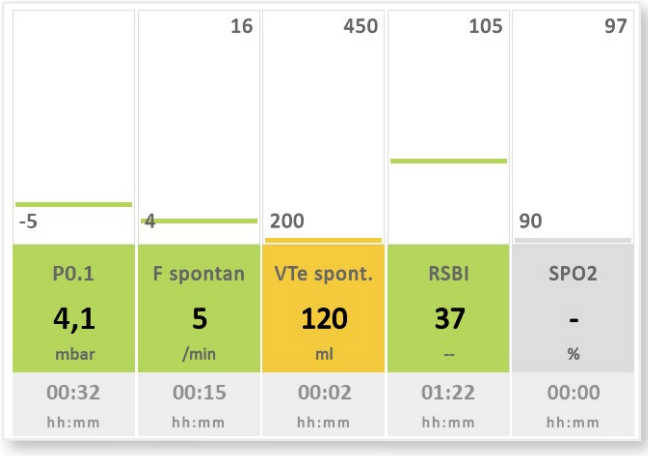
Weaninganalyzer

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.

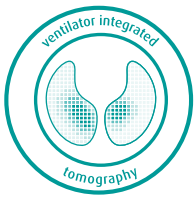
The Weaninganalyzer contains protocols for daily standardised determination of weaning readiness (“ready to wean”) and extubation readiness (“ready to extubate”). By monitoring clinical situations and assessing measurement values, daily SAT or SBT tests can be performed more easily, thus helping to reduce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

Fastwean

Fastwean allows measurement values relevant to weaning to be assessed at a glance. Whether RSBI, occlusion pressure measurement P.01 or Negative Inspiratory Force – the measurement values are continuously displayed and assessed using a ‘traffic lights’ display.



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 exposure to radiation.

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.

The elisa 800^{VIT} device combines intensive ventilation and EIT functions.
Assessment and monitoring of ventilation, stretch, regional compliance, regional tidal volume and the available functional lung size can be performed continuously and easily, and the results applied to ventilation strategies.

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 dependent and non-dependent lung regions can be identified at a glance to adjust ventilation settings under direct visual control.


Dynamic BiLevel (IV)
I-HOLD
PES
P01
0%
MV spontaneous
100%
PEAK
mbar
16
Pplateau
mbar
16
PEEP
mbar
5
Leakage
%
0
RR
/min
12
VTe
ml
400
OFF
40
OFF
7
3
50
50
6
OFF
18
Backup Dynamic BiLevel (Rate 10, Vt 400)
Patient
Alarms
Ventilation
Manoeuvre
Weaning
R
functional lung size %
93
% non-dependent
1
0
75
50
25
0
6
dependent %
15.0
15.0
15.0

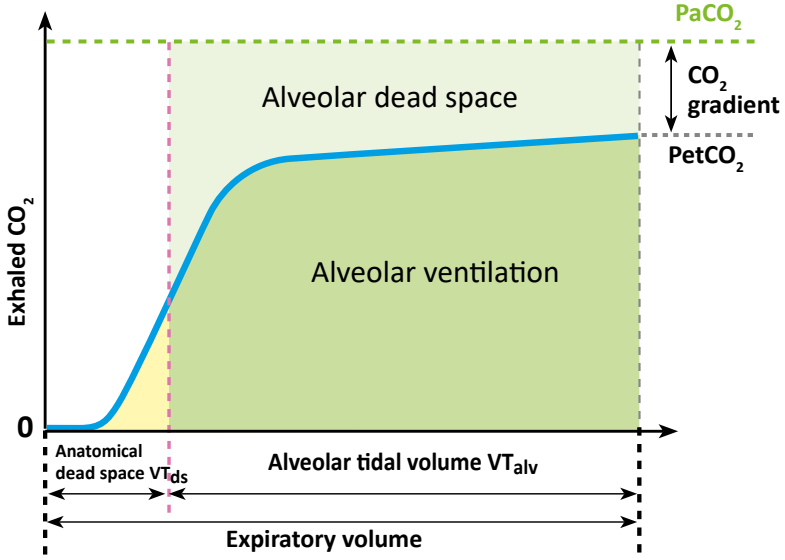
VCO_2 – efficiency of ventilation therapy

breath-by-breath, non-invasive bedside assessment

In the age of lung-protective ventilation modes, the ventilation efficiency can be optimised by precisely manipulating the proportion of dead space to tidal volume.

As a graphical representation of the expiratory CO_2 concentration, capnography is a key part of bedside monitoring regimens for ventilated patients. Capnography displays CO_2 kinetics in a non-invasive, real-time model. In daily clinical routine, it mainly serves to identify proper intubation and to adjust the minute volume to be applied. However, capnography can provide much more extensive additional information of high clinical relevance, especially in the still relatively unknown form of volumetric capnography. That includes monitoring and optimising the ventilation and assessing the gas exchange.

This information provides the treatment team with clinical parameters for bedside decision-making that previously had to be generated with more complex, invasive, and non-automated procedures.




13:04
BiLevel (IV)
Home
Status
Trends
Pressure cmH2O
Time s
Flow l/min
Time s
Volume ml
Time s
Vds
Valv
ml
Vte ml
140
Vds % Valv %
Time s
V'CO2 ml/min
Time s
elisa 800

LEOCLAC

automatic closed-loop control of oxygen therapy – the dose makes the poison

High concentrations of O_2 may lead to adverse events ranging from inflammation of the respiratory tract, resorption atelectasis and seizures to an increased in-hospital mortality rate.

During high-flow O_2 therapy and ventilation, oxygen saturation should be closely monitored and the inspiratory oxygen concentration continually adapted to the individual therapy range.

Based on the pulse oximetry function integrated in Leoclac, the inspiratory oxygen concentration can be continuously adjusted to the set therapy range. Leoclac can be combined with invasive and non-invasive ventilation modes as well as with HFOT and permanently evaluates the quality of the pulse wave to identify potential artefacts.

Leoclac is compatible with a wide range of SpO_2 sensor sizes and models. Heart rate, O_2 saturation and the pleth curve can be monitored independently of Leoclac. The closed-loop FiO_2 control can be easily assessed by referring to an intelligent graph.


10:42
BiLevel (IV)
Home
Status
Trends
I-HOLD
PES
STOP
0%
MV spontaneous
100%
SPO2
100
95
94
90
88
85
80
91%
33%
30
35
40
45
50
O2
RR
/min
12
6
50
VTe
ml
650
300
800
MVe
L
8,1
3,7
10,5
PEAK
mbar
19
OFF
40
Pplateau
mbar
19
OFF
PEEP
mbar
5
3
7
Leakage
%
0
50
O2
%
30
25
35
etCO2
mmHg
OFF
60
Backup BiLevel
(Rate 10, P Insp 12)
Patient
Alarms
Ventilation
Manoeuvres
Weaning
Functions
System

HIGHFLOW O_2

as the standard therapy

High-flow O_2 therapy represents a key link between invasive and non-invasive ventilation (NIV) as well as low-flow oxygen therapy.

As a non-invasive procedure, high-flow therapy not only stands out for its easy application and minimal patient restrictions, but also for its high level of acceptance, even by delirious or restless patients.

A comparatively high flow of heated, humidified inspiratory gas is applied via a nasal cannula. Depending on the indication and care environment, this inspiratory gas consists of air, an air-oxygen mixture or pure oxygen. Consequently, the effects of the therapy can be seen in elimination of CO_2 from the anatomical dead space with reduced work of breathing, a larger expiratory lung volume and, if applicable, a consistently high inspiratory oxygen concentration. Thanks to the system architecture of the elisa series, there is no need to replace the breathing circuit when switching between HFOT and non-invasive or invasive ventilation.

Neonatology

non-invasive procedures for our youngest patients

The physiology and pathophysiology of preemies and neonates vary widely depending on their respective development level, which is also reflected in the associated respiratory challenges. Non-invasive respiratory support methods with prongs and nasal masks have become the treatment of choice and close the significant gap between oxygen therapy and conventional invasive ventilation.

nCPAP

Nasal CPAP is the standard method for supporting lung ventilation and preventing alveolar collapse. In everyday clinical conditions, nCPAP offers the advantages of variable flow control, low invasiveness and ease of use.

nBiLevel

This mode was specifically designed for handling apnoea situations or as a treatment for apneic events and bradycardia. As an adaptation of the well-known NIPPV therapy, nBiLevel enables pressure-controlled non-invasive ventilation via prongs or a mask.

nHFOT

High-flow O_2 therapy (HFOT) also plays a key role in neonatology ventilation management after extubation. A flow of actively heated and humidified inspiratory gas that is specifically adapted to the needs of newborns offers the necessary oxygen concentration via prongs or a nasal mask to guarantee successful weaning.

Options & choices

our modular system at a glance

High-flow O_2

High-flow oxygen therapy (HFOT) is considered a supplement to non-invasive ventilation or is used in cases where conventional oxygen therapy does not provide adequate oxygenation. It involves offering a continuous flow with individually adjusted oxygen supply via a special nasal cannula.

CPR

CPR mode

Special emergency mode for ventilation in resuscitation situations.

ALPV

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 Bi-Level) 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.

PAPS

PAPS Proportional Adaptive Pressure Support

In contrast to the fixed pressure support with PSV, a spontaneously breathing patient receives proportional pressure support with PAPS. The effective pressure support is based selectively on the respective increased elastic and restrictive resistance values. A special algorithm determines the work of breathing due to higher flow and airway resistance on a breath-by-breath basis and regulates the adaptive pressure support required for compensation.

LOOP

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 Unit

In combination with the research version of elisa 800^{VIT}, the Scientific Unit offers a unique solution for generating scientific data. All ventilation data and EIT measuring values can be recorded breath by breath. Additionally, the Scientific Unit output includes selected ventilation data and raw EIT data at rates up to 50 Hz. All data exports bear a time stamp for easy data allocation. The EIT raw data can be converted with external software for further processing with standard tools.

Transport option

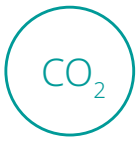
A bracket for attaching the unit to the bed and a kit for accommodating the compressed air and oxygen bottles make it easier to transport the intensive care ventilator with the patient bed within the hospital.

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, is virtually noiseless, and medication can be refilled during ongoing operation. 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_2

Mainstream and sidestream 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.

Mains 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. 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 (hospital-acquired) infection, the ventilator's hygiene management function monitors the timely replacement of accessories that are in direct contact with the patient (breathing circuit, valve bar, suction system, HME filter, and nebulizer head). Monitoring and display follow the respective department requirements without the need for complex RFID chips or expensive breathing circuits.

WOBOV Work Of Breathing Optimized Ventilation

WOBOV is a generalist mode that takes promoting spontaneous breathing, sufficient minute ventilation, an energetically optimal breathing pattern and compliance with specific lung protection rules into account. It continuously calculates the energetically optimal breathing pattern and adjusts the ventilation control (modified Otis formula) accordingly. If the ventilation is still insufficient, WOBOV gradually steps up mechanical support or the algorithm compensates the deficit up to the specified minute volume as needed.

PESO

Oesophageal pressure monitoring

Bedside monitoring of oesophageal pressure with a modified gastric tube reflects the changes in pleural pressure under ventilation. The resulting measuring values enable PEEP optimisation, avoidance of alveolar over-inflation with development of barotrauma, identification of patient-ventilator asynchrony, assessment of respiratory muscle effort, and measurement of intrinsic PEEP with spontaneous breathing.

Options	elisa 300	elisa 500	elisa 600	elisa 800	elisa 800^{VIT}
Transpulmonary pressure monitoring	–	✓	+	✓	✓
Cuffscout: cuff monitoring & control	–	✓	+	✓	✓
IAP: intraabdominal pressure monitoring	–	✓	+	✓	✓
LEOCAP: CO_2 mainstream sensor	+	+	+	+	+
LEOSTREAM: sidestream sensor	+	+	+	+	+
LEOLYZER: multi-gas sensor	+	+	+	+	+
SpO_2 sensor	+	+	+	+	+
SpO_2 sensor with LEOCLAC:	+	+	+	+	+
Nurse call	+	+	+	+	+
Ventilator-integrated impedance tomography VIT	–	–	–	–	✓
Research option	–	–	–	–	+

✓ integrated + optional – not available

	elisa 300	elisa 500	elisa 600	elisa 800	elisa 800^{VIT}
Options					
Non-invasive neonatal respiratory support (nBiLevel, nCPAP, nHFOT)	–	–	✓	✓	✓
Interfaces					
Number of PDMS interfaces	2	2	–	–	–
Number of universal interfaces (type BF) for external accessories or PDMS	2	4	2	2	2
Additional universal interfaces (type BF) for external accessories or PDMS	–	–	6 (+)*	6 (+)*	4 (+)*
Mesh nebulizer interface RS232	–	–	+	1	1
USB	2	2	2	2	2
HDMI or DVI (for servicing purposes)	1	1	1	1	1
Research interface	–	–	–	–	+
up to 5 additional interfaces via elisa@megs (PDMS, billing systems, NO-A Box)	+	+	+	+	+

✓ integrated + optional – not available

* Maximum expansion level. Please clarify the options possible for your unit with the service.

made in GERMANY

LÖWENSTEIN
medical

Sales + Service
Löwenstein Medical
Arzbacher Straße 80
56130 Bad Ems, Germany
T. +49 2603 9600-0
F. +49 2603 9600-50
info@loewensteinmedical.com
loewensteinmedical.com

Löwenstein Medical Innovation
Weißkirchener Straße 1
61449 Steinbach, Germany

With people in mind

p10318en2110

CE 0123