# Zeus® Infinity® Empowered Anaesthesia Workstation

Lung-protective ventilation functionalities, cost-saving gas delivery technology, decision-support tools and comprehensive monitoring. Zeus IE integrates them all into one advanced anaesthesia workstation. It can, hence, improve clinical outcome, workflow efficiency, and cost savings throughout the anesthesia process.
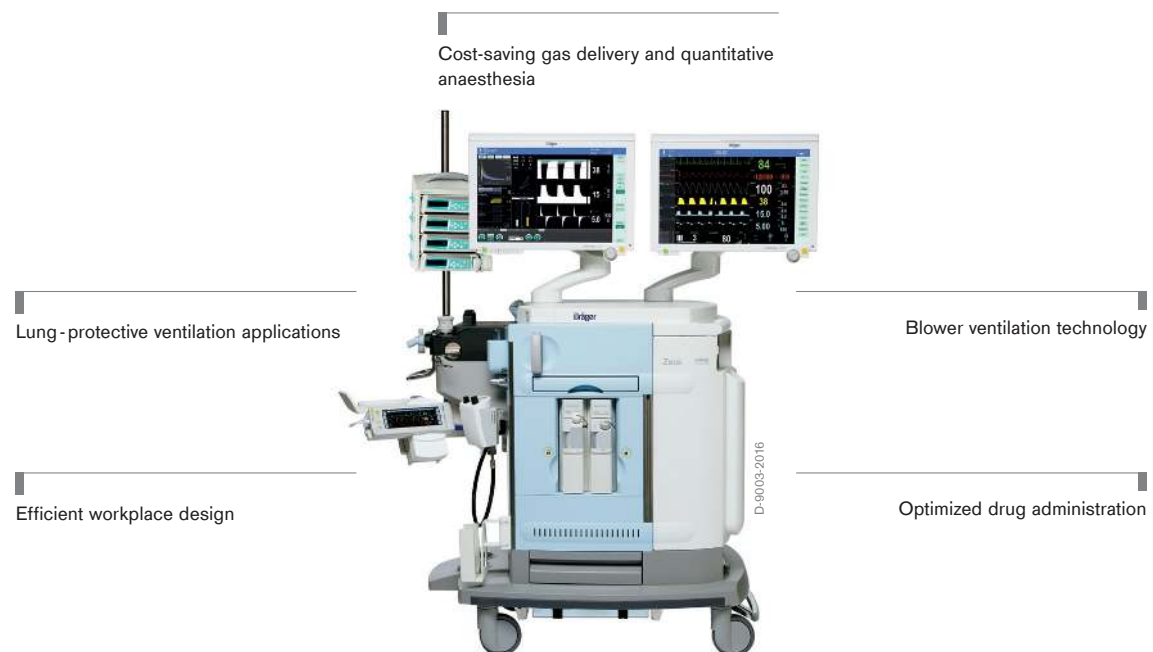
Cost-saving gas delivery and quantitative anaesthesia

Lung-protective ventilation applications

Blower ventilation technology

Efficient workplace design

Optimized drug administration

D-9003-2016

* Zeus® IE with opt. patient monitoring (IACS) and opt. mounting for infusion pumps

Dräger. Technology for Life®

Benefits

Cost-saving gas delivery and Quantitative Anaesthesia

The Zeus IE can be operated in conventional Fresh Gas Mode and in Auto Control mode (Target Control Anaesthesia - TCA).

Auto Control mode (TCA):

– Less user interactions are required as clinician sets only the targets for FiO_2 and expiratory anaesthetic agent
– Required amount of oxygen and anesthetic agent are delivered automatically according to the set targets
– Second gas analyzer supervises the measurement of patient gas analyzer to avoid overdosing (too deep anaesthesia) and underdosing of oxygen and anesthetic agents

Quantitative Anaesthesia (uptake mode):

– In wash-in and in steady-state, the system remains closed (metabolic flow). This means the patient uptake of oxygen and anaesthetic agent is replaced and therefore almost no waste of gases
– Lowest possible consumption of an anesthetic agent and oxygen to save costs per anesthesia procedure
– Complete rebreathing of patient gases for an optimized breathing gas acclimatization which can reduce post-operative pulmonary complications
– Reduced emissions of volatile anesthetic agents (greenhouse gases) which reduces considerably the ecological footprint of the entire hospital

Blower ventilation technology

The blower ventilator is a pressure source which requires no driving gas to operate. It reduces actively the inspiratory resistance to enable spontaneous breathing and hence reduces WOB, even in Man/Spont mode. The virtually unlimited flow enables very fast reaction times to even the weakest spontaneous breathing effort. The blower ventilator generates a circular flow that considerably reduces dead space at the Y-piece which is especially important when ventilating neonates:

– Facilitates and always supports the patient's spontaneous breathing on both pressure levels (BiPAP)
– Enables CPAP applicaton during Man/Spont to keep lungs of even obese and critically ill patients open
– Keeps the set PEEP level stable even in case of leakages

Lung-protective ventilation applications

Besides all traditional and sophisticated ventilation modes Zeus IE can be equipped with the following options which can enhance lung-protective ventilation applications in the OR. Lung-protective ventilation can contribute in the reduction of ventilator-induced lung injuries which can lead to postoperative pulmonary complications:
Smart Ventilation Control (SVC)

– Ventilation target set by clinician e.g. controlled, supported spontaneous breathing, or spontaneous breathing

Benefits

– Automated and smooth transition from controlled ventilation to spontaneous breathing during anaesthesia course
– Reduction of user interactions by automated adaptation of ventilator support until the patient is ready for extubation
– Compliant with recommendations of respective healthcare societies how to protect lungs of surgical patients (e.g. tidal volume is set in ml per kg of ideal body weight)
– Setting targeted $etCO_2$ range to avoid hypocapnia and hypercapnia
– Quick and easy start with ventilation by just setting patient height and ventilation target

Lung Recruitment tool

– Two automated methods: Single-step and multi-step recrutiment manoeuvres to improve oxygenation and to avoid anaesthesia induced atelectasis
– Single-step maneouvre applies the set pressure for defined time and compares the lung complicance values before and after the maneouvre to asses the recruitment result
– Multi-step maneouvre applies incremental and decremental pressures based on settings by clinicians
– Cursor function to determine optimal PEEP during decremental phase in multi-step recruitment
– Automatic adjustment of pressure high alarm to avoid redundant alarms during recruitment maneouvres
– Reminder function enables for ensuring periodical application of the maneouvres
– During multi-step maneouvre the clinician can manually start the decremental phase to inhibit further increase of airway pressure which can negatively influence the haemodynamics of the patient
– Functions and parameters (e.g. PV Loops and compliance trends) help to assess if and when to deploy recrutiment maneouvres

Optimised drug administration

Integrated SmartPilot® View is a software option to simulate and visualise the combined effects of analgetics and hypnotics. Beside displaying current depth of anaesthesia it provides a 20 minute prediction for the course of anaesthesia. This assists clinicians to optimize intraoperative drug administration accordingly. It can avoid over-dosage and hangover times after the end of surgery.

– Based on pharmacokinetic and pharmacodynamic patient models
– Isobole lines in 2D diagram representing areas of probability how patients will react to a defined pain stimulus, and indicating level of anaesthesia e.g. TOL 90, TOL 50, TOSS
– Communicates with DIVA (direct injection volatile agent) module to enable "what if" function to show the calculated effect of a volatile agent setting before it is even confirmed
– Displayed as split screen application on main screen

Efficient workplace design

It was the target during the development of Zeus IE to improve workflow efficiency and ease of use to enhance staff satisfaction. In this regard it offers a lot of features and functionalities:

Benefits

- 20" user interface to set and to monitor ventilation parameters, fresh-gas delivery, and agent dosing. Optional integration of Dräger patient monitor module to display also the vital parameters on the same screen:
  - All parameters at a glance to support desicion making
  - One source for data output to HIS
  - One interface for alarm management (setting and silence)
  - Only once patient data admission and profile selection

- Standardised Dräger operation philosophy
- Automated timer-based self-test needs no attendence and can save time in the morning before the OR day starts
- Leakage-assistant instantly informs the user of the leakage amount and helps to determine the possible leakage source in a short time without performing a complete leakage test
- Digital user manual is anytime accessible via the main screen
- Up to 16 user profiles (including start settings, alarms and screen layout) can be saved and transfered via USB
- Automatic adaption of daylight saving time

System Components

MT-3911-2008

DIVA

Together with the unique ventilation technology of Zeus® IE, the direct injection volatile agent dosing module DIVA, is the main component which maximizes the efficieny of Target Controlled Anaesthesia. The filling level of the DIVA dosing module can be displayed on the Zeus® IE screen. Filling level alarms remind you to refill the DIVA dosing module in time.

System Components

D-30739-2017

Infinity® Acute Care System

Transform your clinical workflow with Infinity® Acute Care System. Its multiparameter monitor integrates with its networked medical-grade workstation, giving you real-time vital signs, access to clinical hospital systems and data management applications for a comprehensive range of patient information and powerful analysis tools at the point-of-care.

D-9003-2016

IV Pumps

The Zeus® IE offers ergonomic mounting solutions for intravenous infusion pumps. The data of the most common types of IV pumps may be transferred to the integrated SmartPilot® View. Thus, you receive helpful information about drug dosage and the prediction of anaesthetic effect on your main screen.

D-7321-2011

Blower Unit TurboVent2

The blower unit TurboVent2 is the source for the outstanding ventilation performance of the Zeus® IE. In addition, it can easily be removed from the device and without further dismantling it can be autoclaved. Finally, the minimal system volume of the TurboVent2 accelerates the wash-in and wash-out of anaesthetic agent into the breathing system.

Accessories

D-14348-2017

WaterLock® 2

Perfect protection for precise gas measurement. Dräger WaterLock® 2 safely stops water and secretion from getting into the multi-gas sensor. The measurement system is optimally protected by Dräger's special membrane technology.

D-15157-2017

Drägersorb® 800+ – Soda Lime

Drägersorb® is high-quality soda lime developed by one of the leading manufacturers of anaesthesia equipment.

D-7156-2010

Dräger VentStar® Anaesthesia Breathing Circuits

Dräger VentStar® Anaesthesia Breathing circuits are high quality disposable hoses for different applications and different patient groups. The breathing circuits are tested and approved with the Zeus® IE to ensure the optimal performance of the combination. Due to the fact that the Zeus® IE is able to create a circular flow through the breathing hoses, changes in the gas concentration settings arrives the patient faster. Therefore, the Zeus® IE makes it possible to use pediatric hoses also for neonatal patients.

D-19411-2015

Tcore™ Temperature Monitoring System (Online Only)

Tcore™ – A new non-invasive technology Tcore™ employs a unique dual-sensor heat flux technology, which, following a short ramp-up time, calculates core body temperature continuously and accurately. A simple, self-adhesive sensor placed on the patient's forehead is all that's required. This single-use sensor can be connected through a battery-powered adapter to all current Dräger monitors*, eliminating the need for a dedicated display. * Exception: Vista 120 patient monitor

Related Products

Dräger PulmoVista® 500

Making ventilation visible. Put the power of Electrical Impedance Tomography (EIT) to work for you and your patients. With the PulmoVista® 500, you can visualise regional ventilation distribution within the lungs – non-invasive, in real time and directly at bedside.

Dräger SmartPilot® View

SmartPilot® View provides innovative state-of-the-art modelling technology and a comprehensive visualisation concept of complex drug effects to display current and predicted anaesthesia levels. This intuitive display provides support at all phases of anaesthesia.

Dräger Polaris® 600

Our OR light is state of the art: The Dräger Polaris® 600 makes your working day a lot easier – with intuitive controls and versatile configuration options. The future-proof system concept remains true to the philosophy of the product family providing you with simply good light.

TOFscan®

The TOFscan® monitor provides an easy, reliable way to measure the muscle relaxation status of an anesthetized patient. You will see a range of data points to support you in making treatment decisions and adjustments to the patient's neuromuscular blockade.

Related Products

D-35833-2015

Workplace Infrastructure & Planning

Zeus® IE is also offered as a ceiling variant according to your operating room layout. In combination with our expertise in complex processes and our advanced workplace designs, we work with you to develop the best concept. This way, we can offer tailored, flexible future-oriented solutions.

Technical Data

Gas delivery

Modes of operation	Fresh-gas control, auto control with insp. O_2 control
Fresh-gas flow	0.25 – 18 l/min (fresh-gas control); 0 – 18 l/min (auto control); closed system mode (uptake)
O_2 control	21 – 100 % (in fresh-gas control with AIR); Oxygen Ratio Controller
Carrier gases	N_2O and Air
O_2 flush	> 35 l/min
O_2 safety flow	0 – 12 l/min
Auxiliary O_2 flow tube	0 – 16 l/min (e.g. for regional anaesthesia)
External fresh-gas outlet	Optional

Anaesthetic agent delivery DIVA (Direct Injection of Volatile Agents)*

Mode of operation of DIVA modules	Fresh-gas control, auto control with expiratory agent control (2 plug-in slots for ISO, SEV, DES)
Max. filling volume	315 ml
Delivery range: Fresh-gas control (fresh-gas settings)	ISO: 0 – 5 kPa; SEV: 0 – 8 kPa; DES: 0 – 18 kPa
Delivery range: Auto control (expiratory agent settings)	ISO: 0 – 2.5 kPa; SEV: 0 – 5 kPa; DES: 0 – 12 kPa

Ventilator "TurboVent 2"

Electronically controlled and electrically driven blower, open for spontaneous breathing

Modes of operation	Man/Spon (with availability of CPAP); Volume Control (VC); VC-Autoflow; Pressure Control (PC/BIPAP); Synchronization for VC-Autoflow and PC; CPAP Pressure Support; Pause
Ventilation assistance system	Smart Ventilation Control (SVC) (optional)
Lung Recruitment Procedures	One-step recruitment maneouvre and Multi-step recruitment maneouvre (with cursor function which assists in best PEEP detection); reminder function for recruitment
Tidal volume	20 – 1,500 ml (volume mode)
Application range	Neonates, children, adults
Inspiration pressure Pinsp	PEEP – 70 hPa/mbar
Pressure support above PEEP (PSupp)	0 – 70 hPa/mbar
Breathing frequency	3 – 80 /min
Inspiratory time	0.2 – 10 s; (I:E 4:1 – 1:4)
Pressure rise time (slope)	0 – 2 s
Inspiratory flow	0 – 180 l/min
Pressure limitation Pmax	8 – 70 hPa/mbar
PEEP / CPAP	0 – 35 hPa/mbar / 0 – 10 hPa/mbar (Man/Spont)
Flow trigger	0.3 – 15 l/min
System leakage tightness	< 100 ml at 20 hPa/mbar (automatic measurement in system test)
Volume of soda lime canister	1.5 l for refillable absorber, 1.2 l for disposable absorber (Dräger CLIC)

Monitoring

Touch screen 20" colour; Display of up to 8 waveforms with mini trends; intelligent alarm management; central alarm display; comprehensive browser-based help system; monitoring of inspiratory and expiratory concentrations of O_2, N_2O, CO_2 as well as volatile agents; age- and altitude-corrected xMAC value; minute volume, tidal volume, breathing frequency; Peak, Plateau, Mean and PEEP breathing pressures; compliance and resistance (with trend); $MVxCO_2$-trend

Waveforms of CO_2, O_2, volatile agents, breathing pressure, inspiratory and expiratory flow or volume; virtual flow tubes; pressure-volume (PV) or flow-volume (FV) loop; gas and volatile agent consumption actual/summarised; O_2 uptake; graphical trend with cursor; tabular trend with time filter; DIVA filling level; gas supply pressures; battery status

Technical Data

Integrated SmartPilot® View (optional)

Left part of the Zeus IE screen can be configured to display SmartPilot® View. SmartPilot® View calculates and displays the anaesthesia effects (now and prediction for the next 20 minutes) of volatile and intravenous drugs based on pharmacodynamic and pharmacokinetic models.

* not included in standard configuration. They have to be ordered seperately.

Patient monitoring (optional)

ECG (6 lead); adjustable Multilead ST-segment analysis incl. alarm; non-invasive blood pressure (single, interval, continuous, venostasis); invasive blood pressure (max. 10 channels); cardiac output incl. haemodynamic calculations; pulse oximetry with plethysmogram; temperature measurement (2x), e.g. TCore; neuro muscular transmission (NMT); anaesthesia effect monitoring (BISx)

General

Data exchange	up to 6 USB ports
Serial interface	2 x RS232
Ethernet interface (1)	For access to hospital network, network printer, or remote inspection
Ethernet interface (2)	For access to hospital network printer, or remote inspection
Ethernet interface (3)	Infinity network connection
Power supply	100 – 240 V, 45 – 65 Hz
Battery backup	min. 30, typically 90 minutes
Dimensions (H x W x D)	165 x 110 x 70 cm
Weight	185 kg incl. 1 DIVA module

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