

Dräger Atlan® A350 Anesthesia Workstation (electronically controlled gas mixer)

Imagine the flexibility to have one anesthesia device platform with a high level of safety and performance. The comprehensive, yet scalable set of clinical features and proven ventilation quality make Atlan an ideal anesthesia workstation for even the most challenging patients and surgical procedures. The platform design gives full flexibility for spatial conditions. The A350 is equipped with an electronic gas mixer.

Image-guided pre-use checklist and comprehensive, fully automatic self-test

Tool-free and quick disassembly of breathing system; designed for effective cleaning and disinfecting

Heated breathing system, optimized for low- and minimal-flow anesthesia

High-performance E-Vent plus piston ventilator for precise VT delivery, active PEEP control and high trigger sensitivity

Large touch screen with configurable screen layouts and context-sensitive operating concept

Enhanced safety functions allow manual control, especially in emergency situations

Easy and convenient operation with the standardized user interface implemented into many Dräger devices

Large work surface, lockable drawer and additional shelves (optional) for optimal working conditions and supplies storage



Atlan® A350 workstation including Infinity® Acute Care System patient monitoring, C700 for Innovian® Anesthesia

Benefits

Lung Protective Ventilation

The electronically controlled, electrically driven piston ventilator technology of the Atlan A350 anesthesia machine helps to deploy lung protective ventilation measures designed to benefit perioperative lung function and help improve outcomes.

- Synchronized piston movement with the patient exhalation flow reduces the expiratory resistance and can help reduce work of breathing
 - The set PEEP is maintained even in cases of small leakage and during spontaneous breathing to help reduce the risk of developing atelectasis
 - Highly responsive trigger sensitivity to detect weak spontaneous breathing efforts of patients
 - Fresh-gas decoupling so that changes to the fresh-gas flow have no influence on the applied tidal volume, the ventilation pressures, and the accuracy of delivered VT, even with very small VTs e.g. down to 5 ml
 - Features and functionalities to optimize minimal- and low-flow application which can contribute to improved humidification of anesthetic gases, mucociliary clearance, maintenance of body temperature, and reduced fluid loss:
 - > Integrated active heating of breathing system to warm breathing gas and to reduce condensation
 - > Optimized breathing system architecture to enable fast changes in fresh-gas and agent concentrations
 - > Sample-gas recirculation to eliminate gas loss
 - Single- and multi-step lung recruitment option with reminder function to support recruitment maneuver deployment
 - AutoFlow option to help with the delivery of the set tidal volume with the lowest required pressure to avoid pressure peaks and unintentional high tidal volumes
 - High accuracy in APL valve setting and high precision of the APL valve performance with a near linear increase and decrease in pressure
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Decision Support

The Atlan A350 anesthesia machine offers options and combinations with other Dräger products to support clinicians in making informed decisions.

- Advanced Gas Monitoring option*:
 - > Indicator for efficiency of fresh-gas setting (Low Flow Wizard) and anesthetic agent consumption to support intuitive and convenient application of minimal- and low-flow anesthesia
 - > Access to gas and oxygen consumption and anesthetic agent uptake data to analyze the low- and minimal-flow practices
 - > MV x CO₂ parameter to monitor the qualitative display of CO₂
 - > Age adapted xMAC (calculated from the current expiratory measured values and the age-dependent MAC values)
- Advanced Ventilation Monitoring option:
 - > Display of patient lung compliance with trend, P-V and F-V Loops to assess the ventilation quality and to adapt ventilation settings accordingly
- Compilation of relevant ventilation and hemodynamic patient data in one view display to assess therapeutic effects of lung recruitment maneuvers**

* Only with integrated patient-gas measurement module

** Only with Dräger IACS patient monitoring

Benefits

Infection Prevention and Control

As medical devices are part of the infection chain in hospitals, special emphasis was placed on infection prevention designs to support hygiene measures within the OR.

- Tool-free and quick disassembly of breathing system with few parts to simplify and streamline reprocessing
- Smooth and rounded surfaces to ease cleaning/wipe disinfection
- Cable ducts and channels to reduce number of potential contamination sources
- Compatible with original Dräger single-use consumables to support hygiene standards
- Generates message* to remind personnel about the replacement of the RFID technology-based consumables (Infinity® ID breathing circuit, Infinity ID WaterLock 2 water trap, Infinity ID flow sensors, Infinity ID CLIC absorber)
- Compliant with ISO 17664 Processing of health care products

*Only with integrated RFID antenna

Workflow Efficiency

The design architecture of the Atlan A350 anesthesia machine allows it to be easily configured to meet the ergonomic and workflow needs of customers while at the same time helps maintain consistency for ease of use.

- With or without integrated patient-gas measurement module to offer flexibility and avoid redundant cost for clinics which utilize gas bench monitors
- Standardized Dräger user interfaces, operating principles, vaporizers, and accessories across other Dräger anesthesia devices and ventilators to reduce training efforts, to optimize fleet management and to potentially reduce the risk of errors
- Graphically illustrated walk-through pre-test checklist to enable easy and intuitive preparation of the machine for self-test
- Fully automated system self-test* (no user interaction needed) to enhance operational efficiency and to save up time for staff for other tasks
- Auto On function (to program a time when the system will be powered up and self-tested automatically) to reduce start-up time in the mornings and to save time for other tasks
- Export and import of machine configuration via USB to save manual efforts and time
- Large work surface, lockable drawer, and additional shelves (optional) for optimal working conditions and supplies storage
- Workplace illumination to improve readability and supply management during MIS cases
- Cable management channels to reduce cable clutter, connection failures and cleaning efforts
- Anesthetic agent and gas consumption measurement to display potential savings
- Generates message** to remind personnel about the replacement of the RFID technology-based consumables (Infinity ID breathing circuit, Infinity ID WaterLock 2 water trap, Infinity ID flow sensors, Infinity ID CLIC absorber)
- Generates message** when the RFID technology-based accessories (Infinity ID breathing circuit, Infinity ID WaterLock 2 water trap, and Infinity ID CLIC absorber) are incorrectly connected and are not present or are not locked properly to avoid potential failures
- Design flexibility enables different mounting positions of hardware components e.g. patient monitors, IV pumps, IT hardware and shelves etc. to offer customized workstation solutions

* Only with integrated patient-gas measurement module. The Pre-test check has to be performed by the user prior to the self-test

** Only with integrated RFID antenna

Benefits

Cybersecurity

The Atlan A350 anesthesia machine was designed with security in mind to combat dangerous and damaging cyber-attacks.

Implementing measures by considering the NIST security best practices framework:

- **Identify:** Dedicated documents with security relevant information are available for asset risk management (e.g. Software Bill of Material, MDS2 Form, comprehensive cybersecurity whitepaper)
- **Protect:**
 - > Secure Boot to ensure the integrity of the software running on the device
 - > Role based authentication and authorization to prevent unauthorized access to critical settings and data
 - > Hardened operating system by omitting all unnecessary software components and disabling all unused ports to minimize attack surface
- **Detect:** Security relevant events are detected, logged in a tamper proof security log file and IT-admin is notified via SNMP traps
- **Respond:** The system health monitor observes the system load carefully to react in case of suspected malicious events, i.e. disable network interface if load is unusually high
- **Recover:** System can reboot into last good known state if security event is detected. Dräger service can restore hard- and software quickly, clinical configuration can be transferred from other devices via USB drive

Atlan was developed as to our secure development lifecycle encompassing:

- Threat analysis to identify vulnerabilities during the development phase
- Automatic code analysis along software development
- Independent 3rd party penetration testing to discover residual vulnerabilities
- Execution only of signed (trusted) codes on the device
- Release of patches if relevant vulnerability was detected
- Continuous vulnerability monitoring along the lifecycle of the product

Data Analytics & Digital Services

- Networked Atlan A350 anesthesia machines together with Dräger Connect*, an innovative cloud-enabled digital business platform for digital solutions and services, can aggregate and process data into valuable information to optimize workflow and cost management

Gas Consumption Analytics: A comprehensive view of the total consumption of used medical and anesthetic gases from your connected Atlan A350 workstations per OR and in each OR block:

- Visualizes the consumption and related costs per anesthetic agent used in one department
- Indicates the average fresh-gas flow as well as anesthetic gas consumption and patient uptake ratio
- Displays average costs per minute and intervention function as economic performance indicators
- Displays the applied flow rates to provide a foundation of the implementation of low- and minimal-flow practices
- Displays the calculated CO₂ equivalent based on consumed anesthetic gases to evaluate the environmental impact

* Subject to applicable/licence terms of use. Requires compatible medical devices and additional IT infrastructure.

Benefits

Safety Mechanisms

The Atlan A350 anesthesia machine offers a wide range of functionalities to help make the anesthesia process safer for patients and clinical staff.

- Backup manual mode allows in case of ventilator, main screen, or gas mixer failure manual ventilation while maintaining gas and ventilation monitoring, O₂ and anesthetic agent delivery to perform anesthesia even during an emergency
- Generates a message* when the RFID technology-based accessories (Infinity ID CLIC absorber) are incorrectly connected and are not present or are not locked properly to minimize the risk of inspiratory CO₂ concentrations
- Intuitive start in case of emergencies to reduce waiting time in critical situations
- O₂ real gas test** checks to ensure the delivered gas is oxygen
- Automatic xMAC monitoring** to alarm in case of an unintentional drop in concentration of volatile anesthetics to avoid patient awareness
- In case of central gas supply failure and absence of spare gas cylinders the mechanical ventilation of the patient will continue with ambient air
- Automatic** and time-controlled*** self-test includes all relevant components (including flow sensor calibration) to ensure a safe-to-operate machine and enhance patient safety

* Only with integrated RFID antenna

** Only with integrated patient-gas measurement module

*** Requires Auto-On option. The Pre-test check has to be performed by the user prior the self-test

System Components

D-26736-2015



Dräger Vapor 2000 and D-Vapor®

Dräger vaporizers have been the benchmark for quality for over 50 years. Quality trusted by doctors and nurses around the world: to date, over 400,000 Vapor units have been sold to hospitals around the world.

D-19736-2009



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-2431-2009



Innovian® Anesthesia

Innovian Anesthesia is Dräger's latest answer to the increasing complexity of anesthesia delivery and regulatory compliance. This easy-to-use anesthesia information management (AIMS) system helps to streamline the capture and management of patient and device data throughout the perioperative process.

Accessories

D-12813-2018



Infinity® ID-accessories

Each and every Infinity® ID-accessory has been designed to offer additional functionality, which can help you simplify routine tasks, streamline workflow and increase safety levels.

D-14346-2017



WaterLock 2

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

D-15161-2017



Drägersorb Soda Lime

High safety and CO₂ absorption capacity. Soda lime is essential for CO₂ absorption in anesthesia machines with rebreathing systems.

MT-2909-2008



Consumables and Accessories

Bringing indispensable experience to disposable convenience.

Related Products



D-32415-2011

DrägerService®

We at Dräger are committed to providing services tailored to the specific needs of your hospital in order to best support your efforts to drive clinical outcomes and to achieve your business goals. Therefore, our offering goes way beyond classical device maintenance and encompasses comprehensive services prior, during and after the installation of your devices.



D-90669-2013

Dräger Perseus® A500

Outstanding ventilator technology meets the latest approaches to ergonomics and system integration in one innovative anesthesia machine, developed together with experts from all over the world to streamline your anesthesia workflow.



D-12287-2011

Dräger Fabius® MRI

Increase the diagnostic capability of your MRI unit with the help of state-of-the-art ventilation in the Dräger Fabius® MRI anesthesia system specially designed for use in MRI environments.

Technical Data

OPERATING CHARACTERISTICS (TROLLEY VARIANT)

Weight	Approx. 135 kg (298 lbs), basic setup
Dimensions (may deviate with hardware options)	(W x H x D) 74.5 cm x 140.3 cm x 69.2 cm (29.3 in x 55.2 in x 27.2 in)
Dimensions of the work surface	Width approx. 47 cm (18.5 in), depth approx. 38 cm (15.0 in)
Storage space and work surface	1 lockable drawer Work surface extension, foldable (W x D) 30 cm x 42.5 cm (11.8 in x 16.7 in), option Side shelves (option)
Material of the main housing parts	ABS
Power consumption	<95 W, during mechanical ventilation, maximum 400 W
Mains voltage	100 to 240 V AC at 50/60 Hz
Internal battery backup time	At least 45 min, typically 120 min (with new and fully charged battery)
Data interfaces	2 x serial ports (RS232) (MEDIBUS.X protocol), 1 x USB port, 1 x LAN
Data driven solutions	Support of Data Analytics and Digital Services via Dräger Connect
Auxiliary power socket strip (Option)	4 country-specific power sockets, individually fused with 2 fuses per socket
Intended patient population	Adults, pediatric patients, and neonates

GAS SUPPLY

Available as a 2-gas version (O₂/AIR) or a 3-gas version (O₂/AIR/N₂O), electronic measurement and monitoring of supply pressure of all gas connections (central gas supply, and gas cylinders when using optional Dräger pressure reducer)

Central gas supply, supply pressure for O ₂ , AIR, N ₂ O	2.7 to 6.9 kPa x 100 (39 to 100 psi)
Gas supply with gas cylinders (O ₂ , AIR, N ₂ O)	2 or 3 suspended gas cylinders with pin-index connector (option) Park holder for 1 additional standing gas cylinder (option)

FRESH-GAS DELIVERY

Gas mixer technology	Electronically controlled gas mixer with manual emergency O ₂ delivery
Fresh-gas flow (FG flow)	Off; 0.2 to 15 L/min
O ₂ concentration (FG O ₂)	21 to 100 Vol% (carrier gas: AIR); 25 to 100 Vol% (carrier gas: N ₂ O), N ₂ O cut off when the pressure of O ₂ drops; configurable minimal O ₂ flow
O ₂ flush	25 to 75 L/min at 2.7 to 6.9 kPa x 100 (39 to 100 psi; 0.27 to 0.69 MPa) supply pressure
Flow for O ₂ insufflation (Aux. O ₂)	Off; 2 to at least 10 L/min up to 20 L/min Flow for O ₂ insufflation (Aux. O ₂) can also pass through the vaporizer when switched to "Add. O ₂ "

Technical Data

VENTILATOR AND SETTING PARAMETERS

Electronically driven piston ventilator (E-Vent plus), fresh-gas decoupled, ventilation without drive gas i.e. no medical gases are consumed in operating the ventilator (regardless of gas supply). Adaptive piston control for optimized gas exchange times and fresh gas utilization, piston volume automatically adjusted according to patient category setting and ventilation parameters.

Standard ventilation modes	Manual/Spontaneous (Man/Spon) Volume-controlled: time controlled (VC-CMV) Pressure-controlled: time controlled (PC-CMV)
Optional ventilation modes	Volume-controlled with AutoFlow (VC-CMV/AutoFlow) Volume-controlled, synchronized, with pressure support (VC-SIMV/PS) Pressure-controlled, synchronized, with pressure support (PC-SIMV/PS) AutoFlow, synchronized, with pressure support (VC-SIMV/PS/AutoFlow) Pressure-support ventilation (CPAP/PSV, with adjustable RR for backup ventilation)
Respiratory rate (RR)	3 to 100/min
Inspiratory time (Ti)	0.2 to 10 seconds (resulting ratio I:E 1:49 to 49:1)
Ratio of inspiratory time to expiratory time (I:E)	4:1 to 1:10 (setting parameter I:E)
Tidal volume (VT) at VC modes (setting parameter)	10 to 1,500 mL 5 to 1,500 mL with option for "Advanced neonatal support"
Tidal volume monitoring, lowest detectable VT	≤10 mL for the "Pediatric" patients and "Neonates" patient categories ≤20 mL for the "Adults" patient category ≤3 mL with option for "Advanced neonatal support"
Trigger threshold (Trigger)	0.3 to 15 L/min
Inspiratory flow (Flow) Peak inspiratory flow	≤180 L/min
Inspiratory pressure (P _{insp})	PEEP +5 to 80 cmH ₂ O
Pressure limitation (P _{max})	PEEP +5 to 80 cmH ₂ O
Pressure support above PEEP (Δpsupp)	Off, 3 to (80 - PEEP) cmH ₂ O

BREATHING SYSTEM

Heated breathing system for low-flow and minimum-flow applications, disassembly without tools, design optimized for easy and effective hygienic reprocessing.

All patient-gas leading components are autoclavable.

Total volume without CO ₂ absorber	2.18 L when applying the maximum VT of 1500 mL, typically lower total volume according to patient category setting and ventilation parameters
Absorber volume	1.2 L with disposable CO ₂ absorber CLIC, 1.4 L with reusable CO ₂ absorber canister
Reprocessing	Cleaning, disinfection, replaceable without tools, less than 11 individual components during reprocessing

ANESTHETIC GAS SCAVENGING SYSTEM (AGS)

Available as active or passive anesthetic gas scavenging system for operation with and without adequate scavenging system infrastructure; detection of excessive suction flows, with connector for sample gas disposal when using third-party patient gas measurement modules.

Active AGS	For connection to an anesthetic gas scavenging system With a control valve
Passive AGS	For connection to a disposal system with low or no suction flow Maximum inlet flow 0.5 L/min With overpressure valve and underpressure valve

Technical Data

DISPLAYS AND MONITORING SYSTEMS

Screen	15.3" (38.9 cm) TFT LCD touchscreen, configurable screen contents, smart alarm management with extensive support system
Screen configuration	Depending on the machine configuration simultaneous display of 2, 3 or 4 real-time curves for: airway pressure, inspiratory and expiratory flow, CO ₂ , O ₂ , and anesthetic agents; display of color coded virtual flow tubes for O ₂ , AIR, N ₂ O; tabular trends; quick access to 3 configurable views
Device status display	Front Panel with LC display of airway pressure, supply status of battery and gases (central and cylinder supply)
Advanced trend display (Option)	Display of graphical trends or mini-trends simultaneously with real-time waveforms and loops; additional data export functions via USB storage device
Ventilation monitoring	Minute volume (MV) and tidal volume (VT and ΔVT); respiratory rate (frequency); peak inspiratory pressure (PIP), plateau pressure (Pplat), mean airway pressure (Pmean), PEEP; dynamic compliance (Cdyn), resistance (R), elastance (E), external pressure gauge (optional) for indicating the pressure in the internal breathing system
Advanced ventilation monitoring (Option)	Bar diagram display of volume and tidal volume, simultaneous display of 2 loops: Volume-pressure and flow-volume, reference loops can be saved

GAS MONITORING

Available as variant with oxygen cell for inspiratory O ₂ monitoring or with integrated patient-gas measurement module (PGM)	
Variant with inspiratory O ₂ monitoring	O ₂ sensor cell with 2 years minimum life span and with life span monitoring, electrochemical measurement principle
Variant with patient-gas measurement module (PGM)	Inspiratory and expiratory gas concentration of O ₂ , N ₂ O, CO ₂ and anesthetic agents, automatic identification of isoflurane, sevoflurane, desflurane, halothane, enflurane, detection of anesthetic gas mixtures, age-corrected xMAC display, sample gas returned to the breathing circuit
Advanced gas monitoring (Option by PGM module)	Low Flow Wizard for displaying fresh-gas efficiency, determination of consumption and uptake (determination of uptake only for anesthetics), fresh-gas and anesthetics per case and since last zeroing

SAFETY FUNCTIONS

- The integrated device checklist and illustrated step-by-step instructions for daily machine preparation help to comply with national guidelines, such as ASA/APSF (USA)
- Man/Spon ventilation with dosing of O₂ and anesthetic gases possible even when switched off (emergency start-up)
- Backup manual mode allows the direct change to manual ventilation while maintaining gas and ventilation monitoring; O₂ and anesthetic gases from the vaporizers can be continuously delivered
- Mechanical ventilation with ambient air in case of complete failure of the gas supply, the change to intravenous anesthetic agents is required
- Real-gas O₂ test integrated in automatic machine self-test (option with patient-gas measurement module)

COMFORT FUNCTIONS AND OTHER FEATURES

- Fully* automatic self-test including calibration of all sensors and testing of all control valves; normally no user action necessary after start of test; optional timer-based self test (Auto-on function)
- Autoset function for adjusting alarm limits, CBM mode (cardiac bypass mode) deactivates the alarms when using the heart-lung machine
- Breathing bag as an indicator of fresh-gas deficiency and leaks
- Pause mode for short-term interruptions of ventilation and fresh-gas flow
- Data storage on USB storage device (alarm history, self-test results, screen shots, trends and machine configurations; optionally: logbook files)
- Time-saving transfer of device default settings and configurations to other Atlan machines via USB storage device
- Integrated, dimmable illumination of working and documentation surfaces
- Central brake (option), smooth running dual wheel casters with cable deflectors (option)
- Free, six-week trial version of all available software options. Trial period expires automatically.

* Only with integrated patient-gas measurement module

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CORPORATE HEADQUARTERS

Drägerwerk AG & Co. KGaA
Moislinger Allee 53–55
23558 Lübeck, Germany

www.draeger.com

USA

Draeger, Inc.
3135 Quarry Road
Telford, PA 18969-1042
Tel +1 800 4DRAGER
(+1 800 437 2437)
Fax +1 215 723 5935
info.usa@draeger.com

Manufacturer:

Drägerwerk AG & Co. KGaA
Moislinger Allee 53–55
23558 Lübeck, Germany

Locate your Regional Sales
Representative at:
www.draeger.com/contact

