

S/5 ADU

An integrated solution for quality care



Features

- Three mechanical ventilation modes: pressure control, volume control (VCV) and synchronized intermittent mandatory ventilation (SIMV)
- Tidal volume compensation provides accurate delivery down to 20 mL by compensating for patient circuit compliance and fresh gas flow
- Electronic fresh gas flow measurement and O₂/N₂O/AA ratio control down to minimal flows
- Virtually service free, lightweight Aladin™ Cassettes for all five agents
- Integrated S/5 Anesthesia Monitor for physiological data (optional in some markets)
- Data integration of agent and gas flow usage to information management system
- 12-inch color display for anesthesia delivery data
- Recordkeeping capability of anesthesia delivery and patient monitoring parameters
- Full service mode with PC connection for troubleshooting and diagnostics
- Compact Breathing Circuit with automatic absorber by-pass is fully autoclavable
- Compact ceiling mount option (available for certain pendant systems)
- Numerous product options and accessories for flexible configuration



Physical specifications

Dimensions

	Trolley with cart (two heights)	Ceiling pendant mount
Height:	141 or 154 cm/ 55.6 or 66.7 in	117 cm/46.1 in
Width:	84 cm/33.1 in	84 cm/33.1 in
Depth:	78 cm/30.7 in	74.9 cm/29.5 in
Weight:	Approximately 110 to 130 kg/ 242 to 286 lbs	Approximately 110 to 130 kg/ 242 to 286 lbs

Top shelves

Weight limit:	50 kg/134 lbs
Width:	61 cm/24 in
Depth:	38.1 cm/15 in

Work surface

Height:	92 or 77.5 cm/36.2 or 30.5 in
Width:	51 cm/20.1 in
Depth:	35.3 cm/13.9 in

Drawers (0 to 3)

Height:	14.5 cm/5.7 in
Width:	48 cm/18.9 in
Depth:	0.5 cm/15.9 in

Display type

Size:	30.7 cm/12.1 in diagonal
Resolution:	VGA resolution, 800 x 600

Wheels

Diameter:	12.5 cm/4.9 in, twin wheels
Brakes:	Located on front wheels

Materials

All materials in contact with patient gases are free of natural rubber latex.

Pneumatic specifications

Fresh gas outlet

Coaxial 22 mm/15 mm conical fresh gas outlet in compliance with ISO 5356-1, EN 1281-1

Gas supply

Pipeline input
range: 270 kPa to 800 kPa/39 psi
to 116 psi

Pipeline
connections: DISS-male, DISS-female,
DIN 13252, AS4059,
F90-116, PrEN737-6, or
NIST (ISO 5359)

All fittings available for O₂,
N₂O, Air, VAC and EVAC

Cylinder input: Pin indexed in accordance
with CGA-V-1 or
DIN (nut and gland)

Primary regulator
diaphragm
minimum burst
pressure: 2758 kPa/400 psi

Primary regulator
nominal output: ≤ 338 kPa/49 psi

Pin indexed cylinder
connections
≤ 407 kPa/59 psi
DIN cylinder connections

Gas power outlet (optional)

Connector: DISS indexed in accordance
with CGA-V-5 or Anatrir

Gas: Oxygen/Air/Vacuum

Pressure
and flow
characteristics: Varies with source

O₂ controls

Method: Proportionate decrease of
N₂O with reduction in O₂
flow

O₂ flush: 35 to 56 L/min

Flowmeter ranges (flow control adjustments)

O₂ ranges: 0 to 10 L/min, as single gas
0 to 8.5 L/min, together
with max 4 L/min
Air or N₂O flow

N₂O ranges: 0 to 8.5 L/min, together with max 4 L/min O₂ flow

Air range: 0 to 10 L/min, as single gas
0 to 8.5 L/min, together with max 4 L/min O₂ flow

Electronic flow measurement

Accuracy: ±10% or ±20 mL/min, whichever is greater

Resolution: 0.05 L/min at 0 to 1 L/min
0.1 L/min at 1 to 10 L/min

Hypoxic guard system

Type: Electronic

Range: Provides a nominal minimum 25% concentration ±4% of oxygen in any O₂/N₂O/AA mixture

Ventilator operating specifications

Ventilation operating modes

Volume controlled and pressure limited (VCV)

Pressure controlled ventilation (PCV)

Synchronized intermittent mandatory ventilation (SIMV)

Spontaneous/Manual ventilation

Ventilator parameters

VCV and SIMV specific controls

Tidal volume range: 20 to 1400 mL

Incremental settings: 20 to 50 mL (increments of 2 mL)
50 to 100 mL (increments of 5 mL)
100 to 300 mL (increments of 10 mL)
300 to 1000 mL (increments of 25 mL)
Above 1000 mL (increments of 50 mL)

Rate: 2 to 60 breaths per minute (increments of 1 breath per minute)

Maximum inspiratory flow: 80 L/min continuous flow

Minute volume setting: 0.1 to 30 L/min

Inspiratory/ expiratory ratio: 2:1 to 1:4.5 (increments of 0.5)

Inspiratory pause: 0 to 60% of inspiratory time

Sigh (only in VCV): OFF/ON: 1.5 x TV every 100 breaths,
1.5 x cycle time

Trigger level: -0.5 to -5 cm H₂O

Trigger window: 5 to 95% of expiratory time. Minimum expiratory time 0.5 seconds

PCV specific controls

Pressure (P_{Inspired}) range: 5 to 40 cm H₂O (increments of 1 cm H₂O) above measured PEEP

Inspiratory rise time: Fast, medium, slow

Positive End Expiratory Pressure (PEEP)

Type: Integrated, electronically controlled

Range: OFF, 5 to 20 cm H₂O (increments of 1 cm H₂O), limited to 10 cm H₂O if TV < 100 mL

Ventilator pneumatics

Pressure range at inlet: 240 kPa to 700 kPa/35 psi to 100 psi

Peak gas flow: 120 L/min + fresh gas flow

Flow compensation range: 15 L/min. Compensated for fresh gas flow up to approximately 50% of actual minute volume.

Ventilator operating specifications continued

Independent of gas composition.
With $P_{plat} \geq 30$ cm H₂O the compensation is limited and with $P_{plat} \geq 45$ cm H₂O it is no longer increased.

Alarms

User adjustable alarms

High pressure alarm,

P_{peak} high (in AUTO/MAN mode): 6 to 80 cm H₂O
(default 30 cm H₂O) always >
 P_{peak} low + 2 cm H₂O

High pressure release,

P_{max} release (in AUTO mode): 6 to 80 cm H₂O
(default 40 cm H₂O)

Low pressure alarm,

P_{peak} low (in AUTO mode): 6 to 78 cm H₂O
or PEEP + 4 to
 P_{peak} high - 2 cm H₂O

Non-adjustable alarms

Non-adjustable ventilator and vaporizer initiated and other status alarms

Negative pressure alarm: Scavenging system malfunctions (leak), spontaneous breathing

Sustained pressure alarm, PEEP high: Scavenging system obstructed or stuck over-flow valve

Ventilator accuracy

Volume delivery

(typically): 20 to 50 mL $\pm 20\%$ or 5 mL, whichever is greater ≥ 50 mL $\pm 5\%$ or 10 mL, whichever is greater

Pressure delivery: ± 2 cm H₂O

PEEP delivery: ± 2 cm H₂O

Sigh: $\pm 10\%$ of volume, ± 60 ms timing

Rate, I:E,

inspiratory

pause: ± 60 ms

Aladin Cassette



Anesthetic agent delivery

Vaporizer: Aladin Cassette

Number of active positions: 1

Dimensions

Height: 70 mm/2.8 in

Depth: 230 mm/9 in

Width: 140 mm/5.5 in

Empty weight (with key filler):

Enflurane, Isoflurane,
Sevoflurane, Halothane: 2 kg/4.4 lbs

Empty weight:

Desflurane: 3 kg/6.6 lbs

Sevoflurane Quik-Fil*: 2.5 kg/5.5 lbs

Cassette handling

No restriction for tilting during storage or handling.

Agent capacity

Total: 250 mL

When cassette indicator shows empty:

150 mL (100 mL residual volume)

Accuracy

All agents in typical operating conditions. Fresh gas flow range 0.2 to 8 L/min. Ambient temperature 18° to 25°C/64.4° to 77°F.

Sea level ambient pressure:

Halothane, Enflurane, Isoflurane

cassette 5% ±0.15% v/v of full scale or ±10% of setting (whichever is greater)

Sevoflurane

cassette 8% ±0.25% v/v of full scale or ±10% of setting (whichever is greater)

Desflurane

cassette 18% ±0.55% v/v of full scale or ±10% of setting (whichever is greater)

In other operating conditions:

cassette 5% ±0.25% v/v of full scale or ±20% of setting (whichever is greater)

cassette 8% ±0.40% v/v of full scale or ±20% of setting (whichever is greater)

cassette 18% ±0.90% v/v of full scale or ±20% of setting (whichever is greater)

Note: Sevoflurane concentrations above 5% may not be reached if the ambient temperature is below 18°C/64.4°F and the fresh gas flow is above 5 L/min.

Note: Sevoflurane and Desflurane concentrations at high fresh gas flows (> 5 L/min) and high concentration settings (SEV > 5%; DES > 12%) will decline after some minutes of use. The rate of decline will increase with higher settings, higher fresh gas flow and lower temperature.

* Quik-Fil is the registered trademark of Abbott Laboratories and currently not available in the United States.

Agent setting ranges

Halothane,

Enflurane,

Isoflurane: OFF, 0.1 to 5% in fresh gas flow, resolution 0.1%

Sevoflurane: OFF, 0.1 to 8% in fresh gas flow, resolution 0.1%

Desflurane: OFF, 0.5 to 18% in fresh gas flow, resolution 0.5%

Minimum fresh

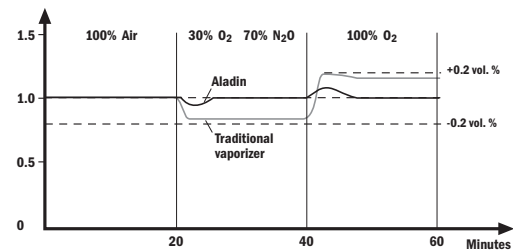
gas flow for

agent delivery: 0.2 L/min will allow agent delivery;

0.15 L/min will shut off the agent delivery

Operation

Agent concentration



* The Aladin Cassette is able to take into account the fresh gas flow concentrations due to the S/5 ADU's integrated electronic fresh gas flow measurement.

Electrical specifications

Current leakage

120 V: < 300µA

220 V: < 500µA

Power and battery back-up

Power input: 120 Vac (±10%), 60 Hz, 12A
220-240 Vac, 50/60 Hz, 10A

Backup power: Approximately 30 minutes of operation provided by battery

Battery type: Internal rechargeable (4 hours) sealed lead acid

Power cord: Length: 5 m/16.4 ft

Rating: 10A @ 250 Vac or
15A @ 120 Vac

Battery charging time: 4 hours

Communication port

Serial interface: 9 pin female D-connector for serial I/O and analog input

Electrical specifications continued

Inlet/outlet modules

	220-240 V	120 V
Fuses:	4 x T4A	4 x T5A
Outlets (optional):	3 outlets on back, 2A, total 8A	3 outlets on back, 3A, total 8A

Trends

Continuous trend information together with time discrete events are stored for the latest 24 hours with one minute resolution for all S/5 ADU parameters.

Display resolutions for continuous variables:

Up to 20 minutes:	10 seconds
Up to 2 hours:	1 minute
Up to 4 hours:	2 minutes
Up to 12 hours:	6 minutes
Up to 24 hours:	12 minutes

Trended parameters

Set ventilator values:	Ventilation mode
	PEEP
	Tidal Volume
	Minute Volume
	Resp. rate
	I:E ratio
	Inspiratory pause
	I:E times
Set fresh gas values:	O ₂ flow, N ₂ O flow, Air flow, Total flow
	O ₂ percent in fresh gas
	Agent percent in fresh gas
	Agent name
Measured values:	Ppeak
	Pplat
	PEEP

Environmental specifications

System operation

Temperature:	10° to 35°C/50° to 95°F
Humidity:	0 to 85% relative humidity (non-condensing, in operation)
Altitude:	Up to 3000 m/500 to 800 mmHg
Atmospheric pressure:	660 to 1060 mbar/ 500 to 800 mmHg, corresponding to altitudes up to about 3000 m above sea level

System storage

Temperature:	-10° to 60°C/14° to 140°F
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Safety standards

Immunity:	Complies with all requirements of EN 60601-1-2
Emissions:	CISPR 11 group 1 class B
Other:	UL 2601-1, CSA C22.2 #601.1 EN/IEC 60601-1

Breathing circuit specifications

Carbon dioxide absorbent canisters

Absorbent capacity:	600 mL
Canister release:	Latch mechanism CO ₂ bypass capability

Ports and connectors

Exhalation:	22 mm OD ISO 15 mm ID taper
Inhalation:	22 mm OD ISO 15 mm ID taper
Bag port:	22 mm OD

Bag-to-Ventilator switch

Type:	Bi-stable
Control:	Controls ventilator and direction of breathing gas within the circuit

Integrated Adjustable Pressure Limiting (APL) valve

Range:	1.5 to 80 cm H ₂ O
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Breathing circuit parameters

Compliance: Mechanical mode: Automatically compensates for compression losses within the absorber and bellows assembly

Circuit volume: 5.5 L (approximately)

Expiratory resistance:

Flow rate	P _{insp} Pressure drop	P _{exp} Pressure drop
10 L/min	0.70 cm H ₂ O	1.00 cm H ₂ O
30 L/min	2.32 cm H ₂ O	2.36 cm H ₂ O
60 L/min	5.93 cm H ₂ O	5.26 cm H ₂ O

Anesthetic gas scavenging

Type	Market	Hospital system required	Machine connection
Active high vacuum:	US and others	High vacuum 25 L/min (300 mmHg) @ 12 in Hg	DISS evac or 1/4 in hose barb
Passive:	Scandinavia	Evacuation gas outlet	
Active low vacuum:		25 LPM scavenging flow	

Compact Block II

Dimensions

	Compact Absorber single use	Compact Block II
Height:	108 mm/4.25 in	185 mm/7.3 in
Depth:	147 mm/5.8 in	150 mm/5.9 in
Width:	90 mm/3.5 in	125 mm/4.9 in
Weight:	550 g/1.2 lbs	1200 g/2.6 lbs

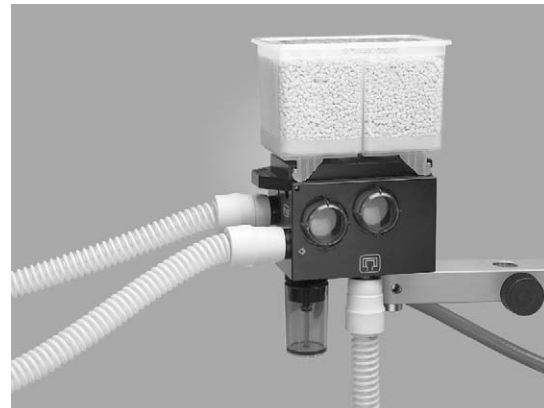
Volume

Canister: 850 mL
 Maximum soda lime: 600 mL

Soda lime: Medisorb
 Granule size: 2.5 to 5 mm
 Moisture content: 12% to 19%

Absorber bypass

Canister release: Latch mechanics, CO₂ bypass capability



High level disinfection

Compact Block II can be steam autoclaved.
 Maximum recommended temperature: 134°C/273°F

Note: Always clean before autoclaving

Materials

Block: Polyphenylsulfone
 Covers: Polyphenylsulfone
 Valve: Silicone

Resistance

At 60 L/min:	Includes Compact Absorber SU (insp/exp):	Includes filled compact canister (insp/exp):
	0.46/0.14 kPa 4.6/1.4 cm H ₂ O	0.39/0.14 kPa 3.9/1.4 cm H ₂ O

Compact Block II continued

Pressure

To open a wet
unidirectional valve: 0.05 kPa, 0.5 cm H₂O

Generated by a wet
unidirectional valve: 0.02 kPa/0.2 cm H₂O
at 5 L/min

0.04 kPa/0.4 cm H₂O
at 30 L/min

0.06 kPa/0.6 cm H₂O
at 60 L/min

Compliance (at 3 kPa)

12 mL/kPa

Datex-Ohmeda Compact Absorber Canister — single use and reusable

Duration

Approximately 6 hours

Fresh gas flow: 500 mL/min

RR: 10/min

TV: 500 mL/min

Color indicator

427002100: White to violet

427002000: Pink to white

Other information

Datex-Ohmeda Compact Absorber single use conforms to the standards for carbon dioxide absorbers (US Pharmacopeia Ed XXII).

Storage conditions

The absorber package must be closed and stored in a dry and clean environment at a temperature between 0° to +32°C/+32° to 95°F. Avoid direct sunlight. The package must be protected from physical damage and water.

Under these conditions, Datex-Ohmeda Compact Absorber will retain its carbon dioxide absorption capacity for one year. The expiration date of the canister is printed on the product.

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