

ADU Plus Carestation

An integrated solution for quality care

Features

- Easy to use, full range ventilator with mechanical ventilation modes: Pressure Control (PCV), Volume Control (VCV); and spontaneous ventilation modes: Pressure Support (PSV), 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
- State of the art Electronic fresh gas flow measurement and O₂/N₂O/AA ratio control down to minimal flows
- Service-free, lightweight Aladin™ Cassettes for all five agents
- On-screen agent level and gas flow usage indicators for all anesthetic agents and gases.
- Integrated Datex-Ohmeda Anesthesia Monitor for physiological data
- Data integration of agent and gas flow usage to information management system
- 12-inch color display for anesthesia delivery data
- Record keeping capability of anesthesia delivery and patient monitoring parameters
- Flexible low resistance Compact Breathing Circuit™ with automatic absorber by-pass
- Compact ceiling mount option
- Numerous product options and accessories for flexible configuration and upgrades.



Physical specifications

Dimensions

	Trolley with cart	Ceiling pendant mount
Height:	154 cm/66.7 in	141 cm/55.6 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

Folding side shelf (optional)

Height:	87.5 cm/34.5 in
Width:	26.5 cm/10.4 in
Depth:	31.5 cm/12.4 in
Weight limit:	11.3 kg/25 lb

Drawers (0 to 4)

Height:	14.5 cm/5.7 in
Width:	48 cm/18.9 in
Depth:	40.5 cm/15.94 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, single wheel
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
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Pipeline connections:	DISS-male
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All fittings available for O₂, N₂O, Air, VAC and EVAC

Cylinder input:	Pin indexed in accordance with CGA-V-1
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Primary regulator diaphragm minimum burst pressure:	2758 kPa/400 psi
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Primary regulator nominal output:	≤ 338 kPa/49 psi
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Pin indexed cylinder connections

Gas power outlet (optional)

Connector:	DISS indexed in accordance with CGA-V-5 or Anatrir
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Gas:	Oxygen/Air/Vacuum
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Pressure and flow characteristics:	Varies with source
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O₂ controls

Method:	Proportionate decrease of N ₂ O with reduction in O ₂ flow
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O ₂ flush:	35 to 56 L/min
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Flowmeter ranges (flow control adjustments)

O ₂ ranges:	0 to 10 L/min, as single gas 0 to 8.5 L/min, together with max 4 L/min Air or N ₂ O flow
N ₂ O ranges:	0 to 8.5 L/min, together with max 4 L/min O ₂ flow
Air range:	0 to 10 L/min, as single gas 0 to 8.5 L/min, together with max 4 L/min O ₂ flow

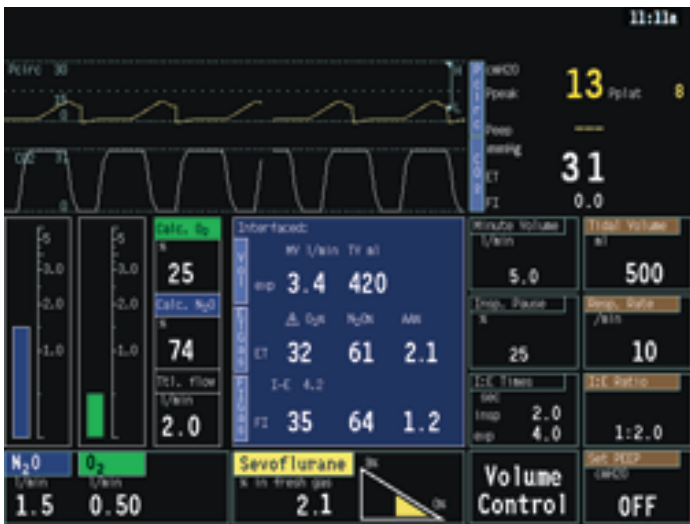
Electronic flow measurement

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 O ₂ /N ₂ O/AA mixture

Ventilator operating specifications



Ventilation modes

- Volume Controlled Ventilation (VCV)
- Pressure Controlled Ventilation (PCV)
- Synchronized Intermittent Mandatory Ventilation (SIMV)
- Spontaneous/Manual ventilation
- Pressure Support Ventilation (PSV) - optional

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)
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 H ₂ O
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 H ₂ O (increments of 1 cm H ₂ O) above measured PEEP
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Inspiratory rise time:	Fast, medium, slow
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PSV specific controls

Pressure support level	5 to 40 cm H ₂ O above measured PEEP
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Trigger level	-0.5 to -5 cm H ₂ O
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Trigger window	5 to 95%
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Backup time	5 to 30 s
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Positive End Expiratory Pressure (PEEP)

Type:	Integrated, electronically controlled
Range:	OFF, 5 to 20 cm H ₂ O (increments of 1 cm H ₂ O), limited to 10 cm H ₂ O if TV < 100 mL

Ventilator pneumatics

Pressure range at inlet:	270 kPa to 800 kPa/ 39 psi to 116 psi
Peak gas flow:	120 LPM + FGF
Flow compensation range:	15 L/min. Compensated for fresh gas flow up to approximately 50% of actual minute volume. Independent of gas composition. With Pplat ≥ 30 cm H ₂ O the compensation is limited to 75% and with Pplat ≥ 45 cm H ₂ O it is no longer increased.

Alarms

User adjustable alarms

High pressure alarm, Ppeak high (in AUTO/MAN mode):	6 to 80 cm H ₂ O (default 30 cm H ₂ O) always > Ppeak low + 2 cm H ₂ O
High pressure release, Pmax release (in AUTO mode):	6 to 80 cm H ₂ O (default 40 cm H ₂ O)
Low pressure alarm, Ppeak low (in AUTO mode):	6 to 78 cm H ₂ O or PEEP + 4 to Ppeak high - 2 cm H ₂ O

Non-adjustable alarms

Non-adjustable ventilator and vaporizer initiated and other status alarms
Negative pressure alarm
Sustained pressure alarm, PEEP high

Ventilator accuracy

Volume delivery (typically):	20 to 50 mL ±20% or 5 mL, whichever is greater ≥ 50 mL ±5% or 10 mL, whichever is greater
Pressure delivery:	±2 cm H ₂ O
PEEP delivery:	±2 cm H ₂ O
Sigh:	±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

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

Halothane, Enflurane, Isoflurane		
cassette 5%		±0.25% v/v of full scale or ±20% of setting (whichever is greater)
Sevoflurane		
cassette 8%		±0.40% v/v of full scale or ±20% of setting (whichever is greater)
Desflurane		
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.



Electronic integration

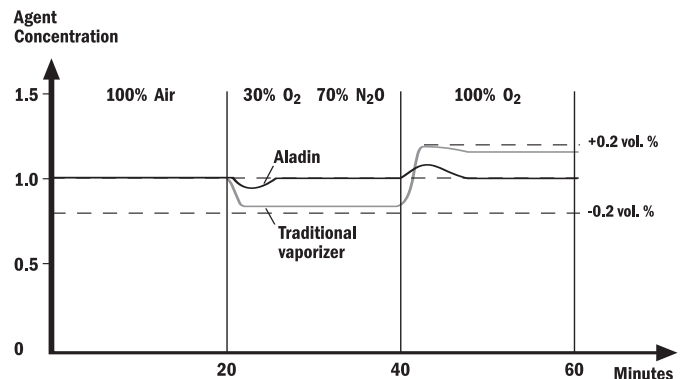
Agent and gas consumption tallied on screen and sent to record, facilitating cost control.

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 efficiency of various carrier gases on agent concentrations due to the ADU's integrated electronic fresh gas flow measurement.

Electrical specifications

Current leakage

120 V: < 300µA

Power and battery back-up

Power input: 120 Vac (±10%), 60 Hz, 12A
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

Inlet/outlet modules

Fuses: 4 x T5A
Outlets (optional): 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 ADU™ Plus Carestation® 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: O₂ flow, N₂O flow, Air flow, Total flow
O₂ percent in fresh gas
Agent percent in fresh gas
Agent name
Measured values: P_{peak}
P_{plat}
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

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, mechanical
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, breathing hoses and bellows assembly	
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Circuit volume:	2 L (approximately)
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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	Hospital system required	Machine connection
Active high vacuum:	High vacuum 25 L/min (300 mmHg) @ 12 in Hg	DISS evac
Passive:	Evacuation gas outlet	Requires pipeline Air
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, CO ₂ bypass capability
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High level disinfection

Compact Block II can be steam autoclaved.	
Maximum recommended temperature:	134°C/273°F
Note:	Always clean before autoclaving

Datex-Ohmeda Compact Absorber Canister – single use and reusable

Materials

Block:	Polyphenylsulfone
Covers:	Polyphenylsulfone
Valve:	Silicone

Resistance

At 60 L/min:	Includes Compact Absorber single use (insp/exp): 0.46/0.14 kPa 4.6/1.4 cm H ₂ O	Includes filled compact canister (insp/exp): 0.39/0.14 kPa 3.9/1.4 cm H ₂ O
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Compliance (at 3 kPa)

12 mL/kPa

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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