

# Aestiva/5 anesthesia machine

## More than superior ventilation

### Features

Superior ventilation: 7900 SmartVent™

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- Volume Mode, pressure
- Volume Mode, Pressure Control Mode, Pressure Support (PSVPro®), Synchronized Intermittent Mandatory Ventilation (SIMV), electronic PEEP
- Tidal volume compensation
- One motion from mechanical to manual mode
- Two key presses to total standby: end case
- Cardiac bypass case mode

Open systems architecture

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- Lower overall height
- User configurable drawers/shelving

Innovative patient breathing system

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- Eight machine hoses/cables integrated
- “No tools” disassembly of components
- Autoclavable and latex-free
- Responsive location of common gas outlet



Aestiva®/5  
Two vaporizer configuration



Aestiva/5  
Three vaporizer configuration

Improved low flow/reduced life cycle costs

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- Fresh gas flow compensation—automatically
- Smooth, faster acting fresh gas flow control
- Minimum O<sub>2</sub> flow of 50 mL
- Dual air flow tube for low flow
- Two scheduled maintenance checks per year



Physical Specifications

Dimensions		
	2 vaporizer configuration	3 vaporizer configuration
Height:	135.8 cm/53.4 in	135.8 cm/53.4 in
Width:	75 cm/29.5 in	93 cm/36.6 in
Depth:	83 cm/32.7 in	83 cm/32.7 in
Weight:	Approximately 136 kg/300 lb	Approximately 154 kg/340 lb

Top shelves (optional)		
	2 vaporizer configuration	3 vaporizer configuration
Weight limit:	46 kg/100 lb	46 kg/100 lb
Width:	47.5, 67.5 or 87.5 cm/ 18.7, 26.6 or 34.4 in	87.5 or 67.5 cm/ 34.4 or 26.6 in
Depth:	41 cm/16.1 in	41 cm/16.1 in

Work surface	
Height:	87.6 cm/34.5 in
Width:	47 cm/18.5 in
Depth:	31.5 cm/12.4 in

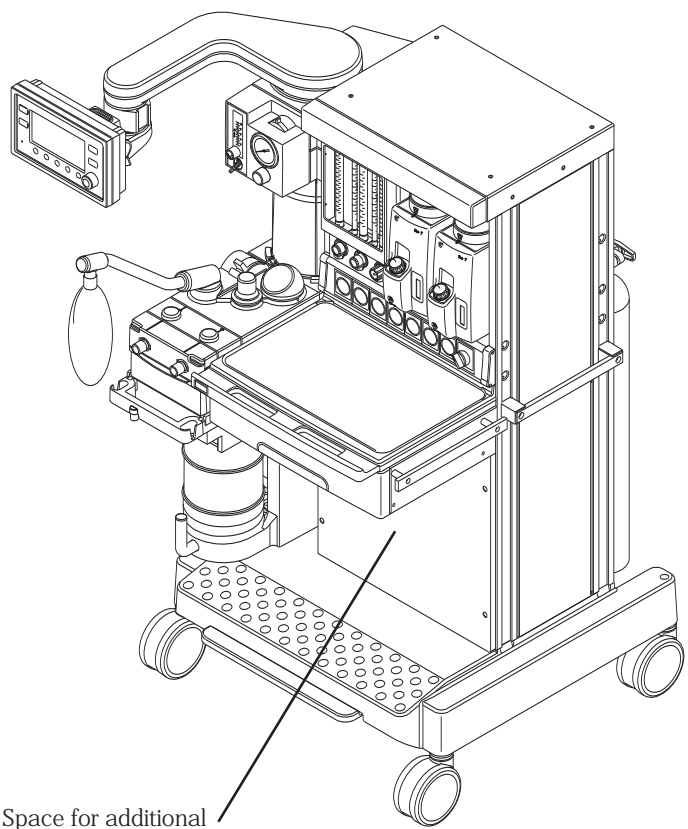
Folding side shelf (optional)	
Height:	87.5 cm/34.5 in
Width:	26.5 cm/10.4 in
Depth:	31.5 cm/12.4 in
Weight limit:	11.3 kg/25 lb

DIN rail (optional)	
Side of tabletop:	30 cm/12 in
Side of machine:	23.5 cm/9.25 in

Top drawer (1 standard)—locking (internal dimensions)	
Height:	10.5 cm/4.1 in
Width:	38.5 cm/15.2 in
Depth:	26 cm/10.2 in

Lower drawers (optional)*	
Height:	14.5 cm/5.7 in
Width:	38.5 cm/15.2 in
Depth:	26 cm/10.2 in

Lower shelves (optional)*		
Heights:	9.2 cm/3.7 in	13.2 cm/5.2 in
	20.6 cm/8.2 in	24.6 cm/9.8 in
	28.6 cm/11.4 in	36 cm/14.4 in
Width:	42.5 cm/16.75 in	42.5 cm/16.75 in
Depth:	36 cm/14 in	36 cm/14 in



Space for additional shelves and drawers

\* Lower cabinet can be configured with a variety of shelf and drawer combinations

## Absorber arms

	Adjustable	Non-adjustable
Arm length:	30.5 cm/12 in	25.4 cm/10 in
Bag arm height:	87 cm/34.3 in 104 cm/40.9 in	91.5 cm/36 in
Absorber rotation:	85°	85°

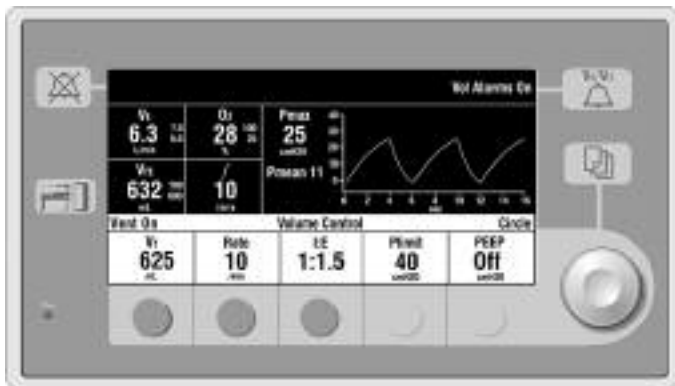
## Ventilator screen

Height:	7.6 cm/3 in
Width:	15.2 cm/6 in

## Casters

Diameter:	12.5 cm/5 in
Brakes:	Single foot lever locks and unlocks two front casters

## Ventilator operating specifications



## Ventilation operating modes

Volume Control  
Pressure Control  
Synchronized Intermittent Mandatory Ventilation (SIMV)  
Pressure Support (PSVPro) with Apnea Backup ventilation — (optional)

## Ventilator ( $V_T$ ) parameter ranges

Tidal volume range:	20 to 1500 mL (Volume Control and SIMV modes) 5 to 1500 mL (Pressure Control Mode)
Incremental settings:	20 to 100 mL (increments of 5 mL) 100 to 300 mL (increments of 10 mL) 300 to 1000 mL (increments of 25 mL) 1000 to 1500 mL (increments of 50 mL)
Minute volume range:	0 to 99.9 L/min
Pressure ( $P_{\text{Inspired}}$ ) range:	5 to 60 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)
Pressure ( $P_{\text{limit}}$ ) range:	12 to 100 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)
Pressure ( $P_{\text{support}}$ ) range:	Off, 2 to 40 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)
Rate:	4 to 100 breaths per minute for Volume Control and Pressure Control; 2 to 60 breaths per minute for SIMV, PSVPro and SIMV-PC+PSV (increments of 1 breath per minute)
Inspiratory/expiratory ratio:	2:1 to 1:8 (increments of 0.5)
Inspiratory time:	0.2 to 5.0 seconds (increments of 0.1 seconds) (SIMV and PSV Pro)
Trigger window:	0 to 80% (increments of 5%)
Flow trigger:	0.2 to 1.0 L/min (increments of 0.2 L/min) 1 to 10 L/min (increments of 0.5 L/min)
Inspiration termination level:	5 to 75% (increments of 5%)
Backup mode delay:	10 to 30 seconds (increments of 5 seconds)

## Positive End Expiratory Pressure (PEEP)

Type:	Integrated, electronically controlled
Range:	OFF, 4 to 30 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)

## Ventilator performance

Pressure range at inlet:	240 kPa to 700 kPa/ 35 psig to 100 psig
Peak gas flow:	120 L/min + fresh gas flow
Flow valve range:	1 to 120 L/min
Flow compensation range:	200 mL/min to 15 L/min

## Ventilator monitoring

Expiratory minute volume range:	0 to 99.9 L/min
Expiratory tidal volume range:	0 to 1500 mL
O <sub>2</sub> %:	5 to 110%
Peak pressure:	-20 to 120 cm H <sub>2</sub> O
Mean pressure:	-20 to 120 cm H <sub>2</sub> O
Plateau pressure:	0 to 120 cm H <sub>2</sub> O
Pressure waveform sweep speed:	4 to 25 breaths per minute (0 to 15 seconds) 26 to 75 breaths per minute (0 to 5 seconds) 75 breaths per minute (0 to 3 seconds)

## Ventilator accuracy

### Delivery/monitoring accuracy

Volume delivery:	> 210 mL = better than 7% < 210 mL = better than 15 mL < 60 mL = better than 10 mL
Pressure delivery:	±10% or ±3 cm H <sub>2</sub> O
PEEP delivery:	±1.5 cm H <sub>2</sub> O
Volume monitoring:	> 210 mL = better than 9% < 210 mL = better than 18 mL < 60 mL = better than 10 mL
Pressure monitoring:	±5% or ±2 cm H <sub>2</sub> O

## Alarm settings

Tidal volume (V <sub>TE</sub> ):	Low: OFF, 0 to 1500 mL High: 20 to 1600 mL, OFF
Minute volume (V <sub>E</sub> ):	Low: OFF, 0 to 10 L/min High: 0 to 30 L/min, OFF
Inspired oxygen (FiO <sub>2</sub> ):	Low: 18 to 100% High: 18 to 100%, OFF
Apnea alarm:	<i>Mechanical ventilation ON:</i> < 5 mL breath measured in 30 seconds  <i>Mechanical ventilation OFF:</i> < 5 mL breath measured in 30 seconds
Low airway pressure:	4 cm H <sub>2</sub> O above PEEP
High pressure:	12 to 100 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)
Sustained airway pressure:	<i>Mechanical ventilation ON:</i> P <sub>limit</sub> < 30 cm H <sub>2</sub> O, the sustained limit is 6 cm H <sub>2</sub> O  P <sub>limit</sub> 30 to 60 cm H <sub>2</sub> O, the sustained limit is 20% of P <sub>limit</sub>  P <sub>limit</sub> > 60 cm H <sub>2</sub> O, the sustained limit is 12 cm H <sub>2</sub> O  <i>PEEP and mechanical ventilation ON:</i> Sustained limit increases by PEEP minus 2 cm H <sub>2</sub> O  <i>Mechanical ventilation OFF:</i> P <sub>limit</sub> 60 cm H <sub>2</sub> O, the sustained limit is 50% of P <sub>limit</sub> P <sub>limit</sub> > 60 cm H <sub>2</sub> O, the sustained limit is 30 cm H <sub>2</sub> O
Subatmospheric pressure:	Paw < -10 cm H <sub>2</sub> O
Alarm silence countdown timer:	120 to 0 seconds

Ventilator components

Flow transducer

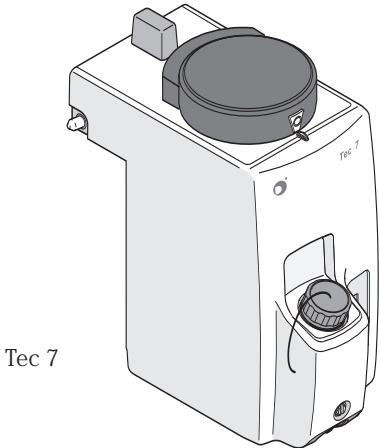
Type:	Variable orifice flow sensor
Dimensions:	22 mm OD and 15 mm ID
Location:	Inspiratory outlet and expiratory inlet
Optional autoclavable sensor available	

Oxygen sensor

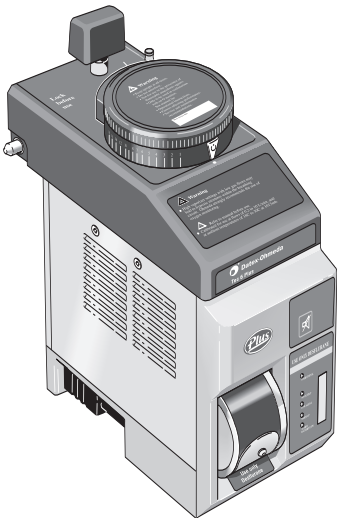
Type:	Galvanic fuel cell
Life cycle:	Approximately 18 months (dependent on usage)

Anesthetic agent delivery

Vaporizers:	Tec 4, Tec 5, Tec 6 Plus, Tec 7
Number of positions:	2 or 3
Mounting:	Tool-free installation Selectatec® manifold interlocks and isolates vaporizers



Tec 7



Tec 6 Plus

Electrical specifications

Current leakage

120 V:	< 300µA
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Light package

Task light:	12 V, 3 lamps, type 194, .270A each
Goose neck (optional):	12 V, type 1815, .200A

Power and battery backup

Power input:	120 Vac, 60 Hz, 10A
Backup power:	Demonstrated battery backup time under typical operating conditions is 45 minutes when fully charged
Battery type:	Internal rechargeable sealed lead acid
Power cord:	Length: 5 m/16.4 ft Rating: 15A @ 120 Vac

Communication port

Serial interface:	Isolated RS-232C compatible port
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Inlet/outlet modules (120 V)

System circuit breakers:	No outlets 5A w/outlets 10A
Outlets (optional):	4 outlets on back, 3-2A, 1-3A individual breakers and 1-5A combined outlet breaker, optional isolation transformer
Auxiliary outlet box (optional):	5 NEMA outlets on dovetail-mounted box, 5-2A breakers, isolation transformer
Tec 6 Plus outlet:	1 IEC 320 located above vaporizer backbar

## Pneumatic specifications

### Internal common gas outlet

Connector: ISO 22 mm OD and 15 mm ID

### Auxiliary common gas outlet (optional)

Connector: ISO 22 mm OD and 15 mm ID

### Gas supply

Pipeline  
input range: 240 kPa to 600 kPa/  
35 psig to 88 psig

Pipeline  
connections: DISS-male  
  
All fittings available for O<sub>2</sub>, N<sub>2</sub>O,  
and Air, and contain pipeline filter  
and check valve.

Cylinder input: Pin indexed in accordance with  
CGA-V-1; contains input filter and  
check valve  
  
Note: Maximum 5 cylinders total; one  
oxygen required.

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

Primary regulator  
nominal output: < 338 kPa/49 psig  
Pin indexed cylinder connections

### Gas power outlet (optional)

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

Gas: Oxygen

Pressure and flow  
characteristics: Varies with source

### O<sub>2</sub> controls

Method: Proportionate decrease of N<sub>2</sub>O, CO<sub>2</sub>,  
O<sub>2</sub>/He with reduction in O<sub>2</sub> pressure

Supply failure  
alarm: Range: 193 kPa to 221 kPa/  
28 psig to 32 psig

Sounds at maximum  
volume every 10 seconds

O<sub>2</sub> flush: Range: 35 to 50 L/min

## Flowmeters

O<sub>2</sub> ranges: Two tubes: 0.05 to 0.95  
L/min and 1 to 15 L/min

Minimum O<sub>2</sub> flow:  
50 mL/min ±25 mL

N<sub>2</sub>O ranges: Two tubes: 0 to 0.95  
L/min and 1 to 10 L/min

Air range: One tube option:  
1 to 15 L/min

Two tube option: 0 to  
0.95 and 1 to 15 L/min  
(low flow tube optional)

CO<sub>2</sub> (optional): One tube: 0 to 0.5 L/min

Heliox range  
(optional): One tube: 0 to 15 L/min

Calibration:	Percent of full scale flow	Accuracy (% of flowrate)
	100	±2.5%
	90	±2.5%
	80	±2.6%
	70	±2.7%
	60	±2.9%
	50	±3.1%
	40	±3.4%
	30	±4.0%
	20	±5.0%
	10	±8.1%

Calibration  
conditions:\* 20°C/68°F  
101.3 kPa/760 mmHg

\* Different breathing circuit pressures, barometric  
pressures or temperatures change flowtube accuracy.

### Hypoxic guard system

Type: Mechanical Link-25™

Range: Provides a nominal 25%  
concentration of oxygen in any  
O<sub>2</sub>/N<sub>2</sub>O mixture

### Materials

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

**Environmental specifications**

System operation

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Temperature:	10° to 40°C/50° to 104°F
Humidity:	15 to 95% relative humidity (non-condensing)
Altitude:	–440 to 3565 m/500 to 800 mmHg

System storage	
Temperature:	–25° to 65°C/–13° to 149°F
Humidity:	10 to 100% relative humidity (including condensing)
Altitude:	–440 to 5860 m/375 to 800 mmHg

Oxygen cell storage:	–15° to 50°C/5° to 122°F
	10 to 95% relative humidity
	500 to 800 mmHg

Electromagnetic compatibility

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Immunity:	Complies with all requirements of EN 60601-1-2
Emissions:	CISPR 11 group 1 class B
Approvals:	UL 2601-1, CSA C22.2 #601.1 IEC 601-1 EN 60601-1

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