

Aestiva/5 MRI anesthesia machine

Complete your MRI suite

Features

- Validated for use in MRI environments up to 300 Gauss, active shielded 1.5T and 3T magnets
- Physically integrated magnetic field strength monitor (Gauss Alarm)
- Low overall height
- Features facilitate use in both the MRI suite and surgical OR

Superior ventilation: 7900 SmartVent™

- 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

Innovative patient breathing system

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

Improved low flow/reduced life cycle costs

- Fresh gas flow compensation—automatically
- Smooth, fast acting fresh gas flow control
- Minimum O₂ flow of 50 mL
- Dual air flow tube for resolution of low flows
- Two scheduled maintenance checks per year



Physical specifications

Dimensions

Height:	152 cm/59.8 in
Width:	97.5 cm/38.4 in
Depth:	83 cm/32.7 in
Weight:	Approximately 136 kg/300 lb

Work surface

Height:	87.5 cm/34.5 in
Width:	47 cm/18.5 in
Depth:	31.5 cm/12.4 in

Drawer (1 standard)* – locking (international dimensions)

Height:	10.5 cm/4.1 in
Width:	38.5 cm/15.2 in
Depth:	26 cm/10.2 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

Absorber

	Non-adjustable	Adjustable
Bag arm length:	25.4 cm/10 in	30.5 cm/12 in
Bag arm height:	91.5 cm/36 in	87 to 104 cm/ 34.3 to 40.9 in
Absorber rotation:	24°	24°

Casters

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

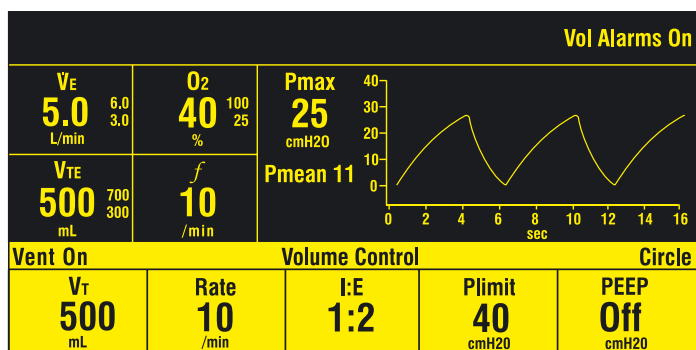
Magnetic field strength monitor (Gauss Alarm)

Front bezel indicators:	Green light < 275 Gauss	Monitor is sampling and magnetic fringe field is < 275 Gauss
	Amber light 275 to 300 Gauss	Monitor is sampling and magnetic fringe field is 275 to 300 Gauss
	Red light > 300 Gauss	Monitor is sampling and magnetic fringe field is > 300 Gauss light is blinking and audio alarm is sounding



* Aestiva/5 MRI can be configured with only one drawer.

Ventilator operating specifications



Ventilation operating modes

Volume Control

Pressure Control

Synchronized Intermittent Mandatory Ventilation (SIMV) (optional)

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)

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_{Inspired}) range: 5 to 60 cm H₂O (increments of 1 cm H₂O)

Pressure

(P_{limit}) range: 12 to 100 cm H₂O (increments of 1 cm H₂O)

Pressure

(P_{support}) range: OFF, 2 to 40 cm H₂O (increments of 1 cm H₂O)

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 seconds (increments of 0.1 seconds) (SIMV and PSVPro)

Trigger window: 0 to 80% (increments of 5%)

Flow trigger: 0.2 to 1 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 H₂O (increments of 1 cm H₂O)

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 9999 mL

O₂%:

8 to 100%

Peak pressure:

-20 to 120 cm H₂O

Mean pressure:

-20 to 120 cm H₂O

Plateau

pressure:

0 to 120 cm H₂O

Pressure

waveform

sweep speed: 2 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: $\pm 10\%$ or ± 3 cm H₂O

PEEP delivery: ± 1.5 cm H₂O

Volume monitoring: > 210 mL = better than 9%
< 210 mL = better than 18 mL
< 60 mL = better than 10 mL

Pressure monitoring: $\pm 5\%$ or ± 2 cm H₂O

Alarm settings

Tidal volume (VTE): Low: OFF, 0 to 1500 mL
High: 20 to 1600 mL, OFF

Minute volume (VE): Low: OFF, 0 to 10 L/min
High: 0 to 30 L/min, OFF

Inspired oxygen (FI_O₂): Low: 18 to 100%
High: 18 to 100%, OFF

Apnea alarm: Mechanical ventilation ON:
< 5 mL breath measured in 30 seconds
Mechanical ventilation OFF:
< 5 mL breath measured in 30 seconds

Low airway pressure: 4 cm H₂O above PEEP

High pressure: 12 to 100 cm H₂O (increments of 1 cm H₂O)

Sustained airway pressure: *Mechanical ventilation ON:*
Plimit < 30 cm H₂O, the sustained limit is 6 cm H₂O
Plimit 30 - 60 cm H₂O, sustained limit is 20% of Plimit
Plimit > 60 cm H₂O, sustained limit is 12 cm H₂O

PEEP and mechanical ventilation ON:
Sustained limit increases by PEEP minus 2 cm H₂O

Mechanical ventilation OFF:
Plimit \leq 60 cm H₂O, sustained limit is 50% of Plimit
Plimit > 60 cm H₂O, sustained limit is 30 cm H₂O

Subatmospheric pressure: Paw < -10 cm H₂O

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)

Ventilator screen

Height: 7.6 cm/3 in

Width: 15.2 cm/6 in

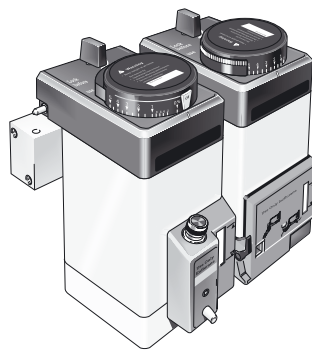
Anesthetic agent delivery

Delivery

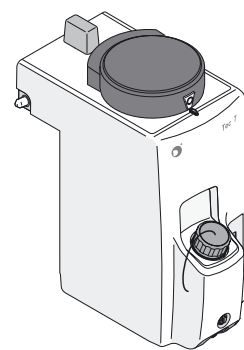
Vaporizers: Tec 5, Tec 7

Number of positions: 2

Mounting: Tool-free installation Selectatec® manifold interlocks and isolates vaporizers



Tec 5



Tec 7

NOTE: Tec 6 Plus Vaporizers cannot be used in MRI environments.

Electrical specifications

Current leakage

120 V:	< 300µA
220 V:	< 500µA

Power and battery back-up

Power input:	USA/Canada/Mexico:	120 Vac, 60 Hz, 10A
	Euro:	220-240 Vac, 50 Hz, 6A
	Italy/France/Belgium:	230 Vac, 50 Hz, 6A
	Japan:	100 Vac, 50 or 60 Hz, 10A
	UK:	240 Vac, 50 Hz, 6A

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

Communication port

Serial interface: Isolated RS-232C compatible port

Inlet/outlet modules

	220-240 V	100-120 V
System circuit breakers:	No outlets	No outlets

Pneumatic specifications

Internal common gas outlet

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, DISS-female, DIN 13252, AS4059, F90-116, or NIST (ISO 5359). All fittings available for O₂, N₂O and Air, and contain pipeline filter and check valve.

Cylinder input: Pin indexed in accordance with CGA-V-1 or DIN (nut and gland); contains input filter and check valve

Note: Maximum 2 cylinders of each gas; 4 cylinders total

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

Primary regulator nominal output: ≤ 338 kPa/49 psig
Pin indexed cylinder connections
< 407 kPa/59 psig, DIN cylinder connections

Gas power outlet (optional)

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

Gas: Oxygen

Pressure and flow characteristics: Varies with source

Pneumatic specifications, continued

O₂ controls

Method: Proportionate decrease of N₂O, CO₂, He/O₂ with reduction in O₂ pressure

Supply failure alarm range: 193 kPa to 221 kPa/28 psig to 32 psig
Sounds at maximum volume every 10 seconds

O₂ flush range: 35 to 50 L/min

Flowmeters

O₂ ranges: Two tubes: 0.05 to 0.95 L/min and 1 to 15 L/min

Minimum O₂ flow: 50 mL/min ±25 mL

N₂O 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)

CO₂ (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 minimum 25% concentration of oxygen in O₂/N₂O mixture.

Materials

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

Environmental specifications

System operation

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

Safety and compliance

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
CE 0197

Breathing circuit specifications

Operational modes

Breathing circuit modules: Interchangeable circle or bain (Mapleson D)

Carbon dioxide absorbent canisters (2)

Absorbent capacity: 1.35 kg/3 lb each

Canister release: Integrated sensing mechanism, CO₂ bypass capability (optional)

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

Pressure gauge

Scale range: 0 to 10 kPa/-20 to 100 cm H₂O

Bag-to-Ventilator switch

Type: Bi-stable

Control: Controls ventilator and direction of breathing gas within the circuit.

Materials

All materials in contact with exhaled patient gases are autoclavable, except standard flow sensors.

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

Breathing circuit parameters

Compliance:	Bag mode	Mechanical mode
	5.15 mL/cm H ₂ O	Automatically compensates for compression losses within the absorber and bellows assembly.

Circuit volume: 5.5 L

Expiratory resistance:

Flow rate	P _{insp} Pressure drop	P _{exp} Pressure drop
10 L/min	0.74 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

Integrated Adjustable Pressure Limiting (APL) valve

Range: 0.8 to 70 cm H₂O

Tactile knob indication at: 30 cm H₂O and above

Adjustment range of rotation: 0.8 to 30 cm H₂O/0 to 230°
30 to 70 cm H₂O/230 to 330°

Anesthetic gas scavenging

Type	Market	Hospital system required	Machine connection
Active low flow:	US and others	High vacuum 36 L/min (300 mmHg) @ 12 in Hg	DISS evac
Active low flow without flow indicator:	Japan	Adjustable Venturi with flowmeter > 30 L/min	12.7 mm/0.5 in hose barb
Active high flow:	UK/related	Low vacuum 40 - 130 L/min	30 mm/1.2 in BSI Male threaded
Passive:	Germany	Venturi 50 L/min	25mm/0.98 in hose barb
Passive:	Generic	Passive or externally attached active system	30 mm/1.2 in M ISO taper
Passive:	Sweden Norway	Venturi/Ejector > 30 L/min	12mm/0.47 in hose barb
Passive:	Denmark	Venturi/Ejector > 30 L/min	8 mm/0.31 in hose barb

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