

GE Healthcare

# Avance

Innovating with you,  
shaping exceptional care



## Features

- Complete patient monitoring capabilities: respiratory gas, hemodynamic and adequacy of anesthesia
- Our state of the art electronic gas mixer with pneumatic back-up control
- Four patient case configuration options and four 'pages' to enhance usability
- Age adjusted MAC

## Superior Ventilation Options

- Volume Control, Pressure Control, PSVPro® (Pressure Support with Apnea backup mode), Synchronized Intermittent Mandatory Ventilation (SIMV) (Volume and Pressure), electronic PEEP, Pressure Controlled Ventilation-Volume Guaranteed (PCV-VG)
- Tidal volume compensation
- One motion from mechanical to manual mode
- Two key presses to total standby: end case
- Cardiac bypass mode

## Advanced Breathing System (ABS™)

- Minimal number of parts and tube connections greatly reduces the potential for leaks and misconnects
- Ease of disassembly (no tools)
- Fully autoclavable and latex-free

## Exceptional Design

- Generous storage and work surface space
- Bi-level work surface illumination
- Integrated cable and tube management
- Intuitive user interface



## Physical Specifications

### Dimensions

Height:	134.5 cm/52.9 in
Width:	72 cm/28.3 in
Depth:	73 cm/28.7 in
Weight:	Approximately 125 kg/275 lb

### Top shelf

Weight limit:	34 kg/75 lb
Width:	66 cm/26 in
Depth:	40 cm/15.75 in

### Work surface

Height:	81.7 cm/32.2 in
Size:	2640 cm <sup>2</sup> /409 in <sup>2</sup>

### DIN rail

Side of machine:	34.5 cm/13.6 in
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### Drawers (internal dimensions)

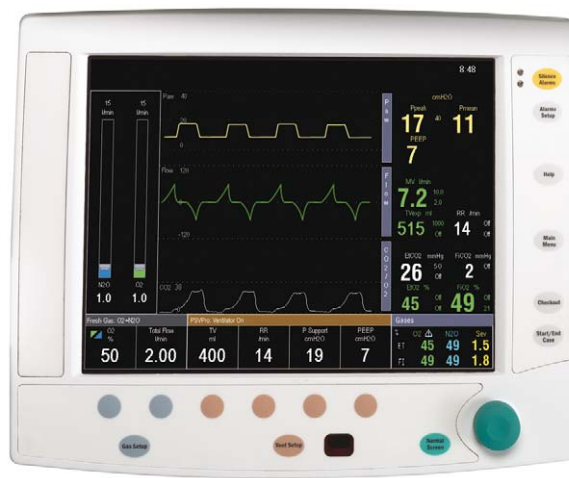
Height:	17.5 cm/6.9 in
Width:	33 cm/13 in
Depth:	26.5 cm/10.4 in

### Absorber bag arm (optional)

Arm length:	30.5 cm/12 in
Bag arm height (adjustable):	87 cm/34.3 in 104 cm/40.9 in

### Casters

Diameter:	12.5 cm/5 in
Brakes:	Individual locking front casters



## Ventilator Operating Specifications

### Modes of ventilation – standard

Volume Control with tidal volume compensation

### Modes of ventilation – optional

Pressure Control

Pressure Controlled Ventilation-Volume Guaranteed (PCV-VG)

Synchronized Intermittent Mandatory Ventilation (SIMV) (volume and pressure)

PSVPro (Pressure Support with Apnea backup)

Note: CPAP can be delivered when in PSVPro mode.

Range: Off; 4 - 30cmH<sub>2</sub>O

### Ventilator 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 <sub>inspired</sub> ) range:	5 to 60 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O) 5 to 1500 mL volume delivery
Pressure (P <sub>limit</sub> ) range:	12 to 100 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)
Pressure (P <sub>support</sub> ) 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:	1 to 10 L/min (increments of 0.5 L/min) 0.2 to 1 L/min (increments of 0.2 L/min)
Inspiration termination level:	5 to 50% (increments of 5%)
Inspiratory Pause range:	0-60%

### Positive End Expiratory Pressure (PEEP)

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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

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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 Accuracy

#### Delivery/monitoring accuracy

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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

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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: 19 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

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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

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Type:	Optional galvanic fuel cell or paramagnetic with MGAI option
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### Ventilator screen

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Display size:	31 cm/12.1 inch diagonal
Pixel format:	800 (H) x 600 (V)

### Battery backup

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Backup power:	Demonstrated battery time under typical operating conditions is 90 + minutes when fully charged. Battery time under extreme conditions is 30 minutes.
Battery type:	Internal rechargeable sealed lead acid

### Communication ports

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RS-232C compatible serial interface  
Ethernet  
Datex-Ohmeda device interface solutions port  
USB port

## Anesthetic Agent Delivery

### Delivery

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

## Compact Airway Modules

### General

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M-CAiO, M-CAiOV, M-CAiOVX module software version 3.2 or higher; E-CAiO, ECAiOV, E-CAiOVX

Size (WxDxH):	75 x 215 x 112 mm/ 2.9 x 8.4 x 4.4 in
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Weight:	1.6 kg/3.7 lb
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Sampling rate:	200 mL/min ±20 mL
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Automatic compensation for atmospheric pressure variation (500 to 800 mmHg) temperature and CO<sub>2</sub>/N<sub>2</sub>O and CO<sub>2</sub>/O<sub>2</sub> collision broadening effect. Parameter display update interval typically breath-by-breath. Functional alarms for blocked sample line, D-fend check and D-fend replacement.

### Non-disturbing gases:

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Ethanol, acetone, methane, nitrogen, nitric oxide, carbon monoxide, water vapor:

Maximum effect on readings:	CO <sub>2</sub> < 0.2 vol %; O <sub>2</sub> < 2 vol %
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### Carbon dioxide (CO<sub>2</sub>)

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EtCO <sub>2</sub> :	End-tidal CO <sub>2</sub> concentration
FiCO <sub>2</sub> :	Inspired CO <sub>2</sub> concentration

### CO<sub>2</sub> waveform

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Measurement range:	0 to 15% (0 to 15 kPa, 0 to 113 mmHg)
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Accuracy:	±0.3 vol %*
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Datex-Ohmeda infrared sensor

Adjustable low and high alarm limits for EtCO<sub>2</sub> and FiCO<sub>2</sub>

### Respiration rate (RR)

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Measurement range:	4 to 60 breaths per second
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Detection criteria:	1% variation in CO <sub>2</sub>
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Adjustable low and high alarm limits for respiration rate; alarm for apnea

### Patient Oxygen (O<sub>2</sub>)

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FiO <sub>2</sub> :	Inspired O <sub>2</sub> concentration
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EtO <sub>2</sub> :	End-tidal O <sub>2</sub> concentration
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FiO <sub>2</sub> -EtO <sub>2</sub> :	Inspired-expired difference
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\* Typical value

\*\* Measurement not valid with O<sub>2</sub> and N<sub>2</sub>O mixtures

## O<sub>2</sub> waveform

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Measurement range: 0 to 100 %

Accuracy: ±2 vol %\*

Datex-Ohmeda differential paramagnetic sensor

Adjustable low and high alarm limits for FiO<sub>2</sub> and EtO<sub>2</sub>;  
alarm for FiO<sub>2</sub> < 18%

## Nitrous Oxide (N<sub>2</sub>O)

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Measurement range: 0 to 100%

Accuracy: ±3 vol %\*  
FiN<sub>2</sub>O > 82% alarm

## Anesthetic Agent (AA)

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*Halothane, Isoflurane, Enflurane*

Measurement range: 0 to 6%  
Accuracy: ±0.2 vol %\*

*Sevoflurane*

Measurement range: 0 to 8%  
Accuracy: ±0.2 vol %\*

*Desflurane*

Measurement range: 0 to 20%  
Accuracy: 0 to 5% ±0.2 vol %\*  
5 to 10% ±0.5 vol %  
10 to 20% ±1 vol %\*

Waveform displayed

MAC value displayed

Identification threshold: 0.15 vol %\*

Agent mixture detection

Adjustable high and low alarm limits for EtAA, FiAA

## Patient Spirometry™

(available in Datex-Ohmeda Anesthesia Monitor module bay)

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Pressure-volume loop

Flow-volume loop

Airway pressure and flow waveforms

Adjustable low and high alarm limits for P<sub>peak</sub>, PEEP<sub>tot</sub> and MV<sub>exp</sub>

Alarms for MV<sub>exp</sub> << MV<sub>insp</sub> and for MV<sub>exp</sub> low. Detection through D-lite® or Pedi-lite® flow sensor and gas sampler with following specifications:

	<i>D-lite</i>	<i>Pedi-lite</i>
Respiration rate:	4 to 35 breaths/min	4 to 50 breaths/min

## Tidal volume

Measurement range: 150 to 15 to  
2000 mL 300 mL  
Accuracy\*: ±6% or 30 mL ±6% or 4 mL

## Minute volume

Measurement range: 2 to 20 L/min 0.5 to 5 L/min  
Accuracy\*: ±6% ±6%

## Airway pressure

Measurement range: -20 to -20 to  
+100 cm H<sub>2</sub>O +100 cm H<sub>2</sub>O  
Accuracy\*: ±1 cm H<sub>2</sub>O ±1 cm H<sub>2</sub>O  
Display units: cm H<sub>2</sub>O, mmHg, kPa, mbar, hPa

## Flow

Measurement range: 1.5 to 0.25 to 25 L/min  
100 L/min

## I:E

Measurement range: 1:4.5 to 2:1

## Compliance

Measurement range: 4 to 100 1 to 100  
mL/cm H<sub>2</sub>O mL/cm H<sub>2</sub>O

## Airway resistance

Measurement range: 0 to 40 cm H<sub>2</sub>O/L/s

## Sensor specifications

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	<i>D-lite</i>	<i>Pedi-lite</i>
Dead space:	9.5 mL	2.5 mL
<i>Resistance</i>		
at 30 L/min:	0.5 cm H <sub>2</sub> O	
at 10 L/min:		1.0 cm H <sub>2</sub> O

## Gas exchange\*\*

(available in Datex-Ohmeda Anesthesia Monitor module bay)

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VO <sub>2</sub> :	Oxygen consumption
VCO <sub>2</sub> :	Carbon dioxide production
Measurement range:	20 to 1000 mL/min
Respiration rate range:	4 to 35 bpm

## Accuracy

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FiO <sub>2</sub> < 65%:	±10% or 10 mL
65% < FiO <sub>2</sub> < 85%:	±15% or 15 mL

Detection through D-lite flow sensor or Pedi-lite flow sensor and gas sampler (see the measurement ranges and sensor specifications above).

\* Typical value

\*\* Measurement not valid with O<sub>2</sub> and N<sub>2</sub>O mixtures

## Electrical Specifications

### Current leakage

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100/120 V: < 300 $\mu$ A

### Power

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Power input: 100-120 Vac, 50/60 Hz  
Power cord: Length: 5 m/16.4 ft  
Rating: 10A @ 220 Vac or 15A @ 120 Vac

### Inlet/outlet modules (100V)

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System circuit breakers: 15A  
Outlets (optional): 3 outlets on back, 2-2A, 1-4A individual breakers, isolation transformer standard

## Pneumatic Specifications

### Auxiliary common gas outlet (optional)

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Connector: ISO 22 mm OD and 15 mm ID

### Gas supply

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Pipeline input range: 280 kPa to 600 kPa/  
41 psig to 88 psig  
Pipeline connections: DISS-male, DISS-female, DIN 13252, AS4059, BSPP 3/8, S90-116, or NIST  
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 or DIN (nut and gland); contains input filter and check valve.  
*Note: Maximum 2 cylinders*  
Primary regulator diaphragm minimum burst pressure: 2758 kPa/400 psig  
Primary regulator nominal output:  $\leq$  345 kPa/50 psig  
Pin indexed cylinder and DIN cylinder connections

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

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Method: N<sub>2</sub>O shut off with loss of 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 L/min

### Alternate O<sub>2</sub> (safety flow)

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Range: 500 mL/min minimum to 10 L/min  
Indicator: Flow tube  
Indicator accuracy:  $\pm$ 5% full scale

### Fresh gas

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Flow range: 0 and 150 mL/min to 15 L/min (minimal flow capable)  
Total flow accuracy:  $\pm$ 10% or  $\pm$ 40 mL/min of setting (larger of)  
O<sub>2</sub> flow accuracy:  $\pm$ 5% or  $\pm$ 20 mL/min of setting (larger of)  
Balance gas flow accuracy:  $\pm$ 5% or  $\pm$ 20 mL/min of setting (larger of) Air/N<sub>2</sub>O  
O<sub>2</sub> concentration range: 25% to 100%  
O<sub>2</sub> concentration accuracy:  $\pm$ 8% V/V for flows < 400 mL/min  
 $\pm$ 5% V/V for flows > 400 mL/min to 1 L/min  
 $\pm$ 2.5% setting for flows > 1 L/min  
Electronic mixer response time: 500mS (10% to 90% flow step)  
Compensation: Temperature and atmospheric pressure compensated to standard conditions of 20°C and 101.3 kPa  
Hypoxic guard: Electronic

### Materials

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All materials in contact with patient breathing gases 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) per IEC 68-2-3  
Altitude: -440 to 3565 m/  
500 to 800 mmHg

## System storage

Temperature:	-25° to 60°C/-13° to 140°F
Humidity:	10 to 95% relative humidity (non-condensing) per IEC 68-2-3
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

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, EN/IEC 60601-1, CE 0197, EN 740

## Breathing Circuit Specifications

### Operational modes

Breathing circuit is circle mode; SCGO option converts to open circuit mode

### Carbon dioxide absorbent canister

Absorbent capacity:	800 g
Integrated expiratory limb water reservoir	

### 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:	0.8 to 70 cm H <sub>2</sub> O
Tactile knob indication at:	30 cm H <sub>2</sub> O and above
Adjustment range of rotation:	0.8 to 30 cm H <sub>2</sub> O (0 to 230°) 30 to 70 cm H <sub>2</sub> O (230 to 330°)

## Materials

All materials in contact with exhaled patient gases are autoclavable, except disposable flow sensors, O<sub>2</sub> cell, and M-CAiOVX or ECAiOVX module. (Autoclavable flow sensors optional)

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

## Breathing circuit parameters

Compliance:	Bag mode:	1.82 mL/cm H <sub>2</sub> O
	Mechanical mode:	Automatically compensates for compression losses within the absorber and bellows assembly

Total circuit volume:	2.7 L Vent Mode 1.2 L Bag Mode
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*Note: Includes Absorber volume*

Expiratory resistance:	$P_{exp}$	$P_{exp}$	
	<b>Bag Mode</b>		<b>Vent Mode</b>
	<b>Flow rate</b>	<b>Pressure drop</b>	<b>Pressure drop</b>
	10 L/min	0.78 cm H <sub>2</sub> O	0.77 cm H <sub>2</sub> O
	30 L/min	1.59 cm H <sub>2</sub> O	1.71 cm H <sub>2</sub> O
	60 L/min	3.48 cm H <sub>2</sub> O	3.88 cm H <sub>2</sub> O

*Note: With patient circuit and wye piece add +0.89 cm H<sub>2</sub>O*

## Anesthetic gas scavenging

AGSS Type	Hospital extract system required	Machine connection
High vacuum, low flow with indicator:	High vacuum 36 L/min @ 12 in Hg (305 mmHg)	DISS evac
High vacuum, variable flow with bag indicator:	High vacuum 30 L/min extract flow @ 12 in Hg (305 mmHg)	DISS evac
Passive:	Passive or external active system with air break	30 mm/1.2 in M ISO taper

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## Healthcare Re-imagined

GE is dedicated to helping you transform healthcare delivery by driving critical breakthroughs in biology and technology. Our expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, and biopharmaceutical manufacturing technologies is enabling healthcare professionals around the world discover new ways to predict, diagnose and treat disease earlier. We call this model of care “Early Health.” The goal: to help clinicians detect disease earlier, access more information and intervene earlier with more targeted treatments, so they can help their patients live their lives to the fullest. Re-think, Re-discover, Re-invent, Re-imagine.

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GE imagination at work