GE Healthcare

Smart Anesthesia Multi-gas (SAM) Module

The single source for respiratory monitoring in anesthesia

The Smart Anesthesia Multi-gas (SAM®) module provides breath-by-breath analysis of respiratory (O_2*, CO_2) and anesthetic gases (N_2O and commonly used halogenated agents).

Utilized in conjunction with GE Healthcare's monitoring systems, it provides:

- Display of the CO_2 waveform

- Inspired and expired digital gas values including respiratory rate

- Integrated alarms as well as graphic and tabular trend values

The SAM module provides:

- Miniaturization and physical integration into the GE Healthcare Tram-Rac®

- Automatic identification of agents

- Anesthetic agent identification and quantification; alone or in a mixture

- Oxygen analysis provides inspired and expired oxygen values and waveform*

- Minimal room air calibrations

- Moisture protection with GE Healthcare 's innovative Aqua-Knot® II water trap

* The SAM Module is available without the oxygen (O_2) analysis option

Performance Specifications

Information displayed

- CO_2 concentration in %, mmHg or kPa
- N_2O concentration in %, mmHg or kPa
- O_2 concentration in %, mmHg or kPa*
- Agent concentration in %, mmHg or kPa
- Respiratory rate
- Continuous CO_2 waveform
- Continuous O_2 waveform*

Measurement range

CO_2	0 to 10%
N_2O, O_2*	0 to 100%
Isoflurane, Halothane, Enflurane,Sevoflurane	0 to 7%
Desflurane	0 to 20%

Rise time (10 to 90%, at nominal flow rate)

CO_2	< 400ms
N_2O, O_2, agents	< 600ms*

Accuracy

O_2	±2% Abs.*
N_2O	±5% Abs.
CO_2, Halothane, Enflurane, Isoflurane, Desflurane, Sevoflurane	±0.2% Abs. or ±5% of reading, whichever is greater
Detection threshold of second anesthetic agent in mixture	0.3% of agent gas
Trends	All gas values & respiratory rate, for up to 24 hours
Sampling	Sidestream
Technology	Infrared for CO_2, N_2O, agents; Paramagnetic for O_2*
Water trap	Disposable hydrophilic Aqua-Knot II water trap with automatic shutoff and on-screen indicator
Flow rate	250 ml/min (nominal) 150 ml/min (no O_2)*

* The SAM Module is available without the oxygen (O_2) analysis option

Calibration

Automatic zero to room air for CO_2 agent and N_2O, infrequent gas calibration for CO_2, N_2O and agents

Gas compensations on CO_2	N_2O (automatic), O_2 (automatic)*, Temperature (automatic), Atmospheric pressure (automatic), Water vapor (automatic)

Alarms

Type	Automatic (with defaults) and manual as set in Solar® and Dash® critical care monitors
High/low expired	CO_2, N_2O, O_2* and agent
High/low inspired	CO_2, N_2O, O_2* and agent
Respiratory rate	Adjustable high and low

On-screen occlusion alarm
No-breath detection system
System diagnostic alarms

Temporary silence	2 minutes with automatic reset

Environmental Specifications

Operating conditions

Ambient temperature	15 to 30°C (59 to 86°F)
Relative humidity	0 to 90% (non-condensing)

Transport and storage conditions

Temperature	0 to 50°C (32° to 122°F)
Relative humidity	0 to 90 (non-condensing)

Physical specifications

Height	8 cm/3.15 in
Width	11.2 cm/4.4 in
Depth	27 cm/10.625 in
Weight	2.70 kg/6 lb

Limited warranty

Standard warranty is one year.

Certification

IEC/EN/UL 60601-1, CAN/CSA C22.2 No. 601.1, IEC/EN 60601-1-2, CE marking for the 93/42/EEC Medical Devices Directive

* The SAM Module is available without the oxygen (O_2) analysis option.

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