

# CARESCAPE Respiratory Modules, E-sCO(V), E-sCAiO(V)

Monitoring respiratory and ventilator parameters for adult, pediatric and neonatal patients in anesthesia and critical care applications



This family of compact airway modules is designed to support respiratory monitoring in anesthesia and critical care areas. Depending on the module type, host device software version and the clinical application, they provide measurements of airway gases, anesthetic agents with identification and Patient Spirometry.

## Features

- Airway gases measured by the sidestream method
- Four module versions available to meet the needs of various care areas
- All parameter values sampled proximal at the patient's airway with a single gas sampling line, D-lite(+)\* or Pedi-lite(+) flow sensor, along with an additional Spirometry tube
- Et and Fi values updated breath by breath
- Fast oxygen measurement for accurate EtO<sub>2</sub> and FiO<sub>2</sub> values
- Automatic identification of anesthetic agents
- Detects end inspiratory and end expiratory occlusions automatically and displays values for Statis Plat, Static PEEPi+e and Static Compliance
- Calculated balance gas value for estimating the N<sub>2</sub>-concentration
- Very compact size, low weight and low power consumption

## Clinical measurements

- CO<sub>2</sub> and N<sub>2</sub>O – GE infrared technology:
  - Inspired and end-tidal values, CO<sub>2</sub> waveform and respiration rate
- Respiration rate – calculated from the CO<sub>2</sub> waveform
- Anesthetic agents – GE infrared technology
  - Measures and identifies all five agents and two agent mixtures: halothane, enflurane, isoflurane, sevoflurane and desflurane
  - MAC (Minimum Alveolar Concentration)
  - MACage with age, temperature and ambient pressure compensation
- Patient oxygen – GE paramagnetic oxygen (O<sub>2</sub>) technology:
  - Inspired, end-tidal and Fi-Et difference, waveform
- Patient Spirometry – Designed to measure true patient values independent of the ventilator with GE-patented D-lite(+) and Pedi-lite(+) flow sensors and gas samplers at the patient airway
  - Numerical values for airway pressure, minute and tidal volumes, compliance, airway resistance and I:E ratio values, and flow and airway pressure waveforms
  - Continuous measurement of intrinsic, extrinsic and total PEEP
  - Pressure-volume and flow-volume loops
  - Ability to store and print up to six loops
  - Recall saved loops to compare to current loop
  - Module keys to save or change loop view



## Technical specifications

### General

---

When monitoring neonatal or other patients that have high respiration rate or low tidal volume these modules shall be used within the limits of respiration rates and tidal volumes to ensure specified measurement accuracy.

Sampling flow 120 ±20 ml/min

Size and fit of gas sampling accessories may impact measured gas concentration values at low tidal volumes. Always ensure use of appropriate accessories according to patient and application.

Automatic compensation for atmospheric pressure variation (660-1060 mbar), temperature and CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>O, agent cross effect compensation. Parameter display update interval typically breath-by-breath.

Functional alarms for

- Low gas sampling flow
- Blocked sample line
- Blocked sample gas outflow
- Disconnected water trap
- Blocked water trap

#### Letters in the module name stand for

s = Single-width module

C = CO<sub>2</sub> and N<sub>2</sub>O

Ai = Anesthetic agents and agent identification

O = Patient O<sub>2</sub>

V = Patient Spirometry

#### Non-disturbing gases

- Ethanol, acetone, isopropanol, methane, nitrogen, nitric oxide, carbon monoxide, water vapor and freon R134A (for CO<sub>2</sub>, O<sub>2</sub> and N<sub>2</sub>O).
- Maximum effect of non-disturbing gases on readings: O<sub>2</sub> & N<sub>2</sub>O <2vol%, CO<sub>2</sub> < 0.2 vol%, AA < 0.15 vol%.

### Carbon dioxide (CO<sub>2</sub>)

---

GE infrared absorption sensor technology

CO<sub>2</sub> waveform

EtCO <sub>2</sub>	End-tidal CO <sub>2</sub> concentration
FiCO <sub>2</sub>	Inspired CO <sub>2</sub> concentration
Measurement range	0 to 15 vol% (0 to 15 kPa, 0 to 113 mmHg)
Accuracy	±(0.2 vol% + 2% of reading)
Rise time	<260 ms

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

### Respiration rate (RR)

---

Measurement range	4 to 100 breaths/min
Detection criteria	1 vol% change in CO <sub>2</sub> level
Alarm note sent to host device if no breath detected in 20 seconds	

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

---

GE differential paramagnetic sensor

O<sub>2</sub> waveform

FiO <sub>2</sub>	Inspired O <sub>2</sub> concentration
EtO <sub>2</sub>	End-tidal O <sub>2</sub> concentration
FiO <sub>2</sub> -EtO <sub>2</sub>	Inspired-expired difference
Measurement range	0 to 100 vol%
Accuracy	±(1 vol% + 2% of reading)
Rise time	<260 ms

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

---

GE infrared absorption sensor

FiN <sub>2</sub> O	Inspired N <sub>2</sub> O concentration
EtN <sub>2</sub> O	End-tidal N <sub>2</sub> O concentration
Measurement range	0 to 100 vol%
Accuracy	±(2 vol% + 2% of reading) N <sub>2</sub> O ≤ 85%

Note: N<sub>2</sub>O is only displayed with CARESCAPE\* ANE and PACU software, and AS/3 and S/5 modular monitors with ANE software.

### Anesthetic agent (AA)

---

GE infrared absorption sensor

Anesthetic agent waveform

FiAA	Inspired anesthetic agent concentration
EtAA	End-tidal anesthetic agent concentration

MAC or MACage value options for hosts

Agent mixture detection

Measurement range	
Sevoflurane	0 to 8 vol%
Desflurane	0 to 20 vol%
Isoflurane, enflurane, halothane	0 to 6 vol%
Accuracy	±(0.15 vol% + 5% of reading)

#### Agent identification

Identification threshold	0.15 vol%
Detection time	<20 sec

## Patient Spirometry

---

Pressure-volume loop, flow-volume loop, airway pressure and flow waveforms updated breath by breath

Adjustable low and high alarm limits for Ppeak, PEEPtot and MVexp

Messages for MVexp << MVinsp and for low volumes

Through selection of D-lite or Pedi-lite gas sampling and flow sensor from menu, the following specifications apply:

	<b>D-lite(+)</b>	<b>Pedi-lite(+)</b>
<b>Respiration rate</b>	4 to 35 breaths/min	4 to 70 breaths/min
<b>Tidal volume</b>		
Measurement range	150 to 2000 ml	5 to 300 ml
Accuracy	±6% or 30 ml	±6% or 4 ml
<b>Minute volume</b>		
Measurement range	2 to 20 l/min	0.1 to 5 l/min
<b>Airway pressure</b>		
Measurement range	-20 to +100 cmH <sub>2</sub> O	-20 to +100 cmH <sub>2</sub> O
Accuracy	±1 cmH <sub>2</sub> O	±1 cmH <sub>2</sub> O
Display units	cmH <sub>2</sub> O, mmHg, kPa, mbar, hPa	
<b>Flow</b>		
Measurement range	-100 to +100 l/min	-25 to +25 l/min
<b>I:E</b>		
Measurement range	1:4.5 to 2:1	1:4.5 to 2:1
<b>Compliance</b>		
Measurement range	4 to 100 ml/cmH <sub>2</sub> O	1 to 100 ml/cmH <sub>2</sub> O
<b>Airway resistance</b>		
Measurement range	0 to 200 cmH <sub>2</sub> O/l/s	0 to 200 cmH <sub>2</sub> O/l/s

The presence of xenon or helium in the breathing circuit causes incorrect measurement values.

## Sensor specifications

---

	<b>D-lite(+)</b>	<b>Pedi-lite(+)</b>
Dead space	9.5 ml	2.5 ml

## System compatibility

---

- CARESCAPE Monitor B850
- CARESCAPE Monitor B650
- S/5 Anesthesia Monitor, software version L-ANE06(A) 24.1 or later
- S/5 Critical Care Monitor, software version L-ICU06(A) 24.1 or later
- S/5 Compact Anesthesia Monitor, software version L-CANE06(A) 19.6 or later
- S/5 Compact Critical Care Monitor, software version L-CICU06(A) 19.6 or later

Displayed data (including but not limited to TV, MV, RR, Raw and N<sub>2</sub>O) trends and alarms may vary depending on the host device. Specifications listed represent the capabilities of the modules. Always check the host device's User Manual for additional information.

## Environmental specifications

### Operating conditions

---

Temperature	10 to 40°C (50 to 104°F)
Relative humidity	10 to 98% non-condensing
Ambient pressure	660 to 1060 mbar

### Storage conditions

---

Temperature	-25 to 60°C (-13 to 140°F)
Relative humidity	10 to 90% non-condensing

## Physical specifications

---

Dimensions (H x W x D), excluding water trap	11.3 x 3.8 x 20.5 cm (4.4 x 1.5 x 8.1 in)
Weight	0.7 kg (1.5 lb)

© 2012 General Electric Company – All rights reserved.  
\* GE, GE Monogram, CARESCAPE and D-lite are trademarks of General Electric Company.

General Electric Company reserves the right to make changes in specification and features shown herein, or discontinue the product described at any time without notice or obligation. Contact your GE representative for the most current information

Always refer to the user manual that accompanies the monitor/module.

GE Healthcare Finland Oy, a General Electric company, doing business as GE Healthcare.

GE Healthcare, a division of General Electric Company

## About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement and performance solutions services help our customers to deliver better care to more people around the world at a lower cost. In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

Our “healthymagination” vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at [www.gehealthcare.com](http://www.gehealthcare.com).

GE Healthcare  
P.O. Box 900, FIN-00031 GE, Finland  
GE Direct United Kingdom: +44 (0)800 0329201

[www.gehealthcare.com](http://www.gehealthcare.com)



GE imagination at work