GE Healthcare

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 EtO₂ and FiO₂ values
- Automatic identification of anesthetic agents
- Detects end inspiratory and end expiratory occlusions automatically and displays values for Static Plat, Static PEEPi+e and Static Compliance
- Calculated balance gas value for estimating the N₂-concentration
- Very compact size, low weight and low power consumption

Clinical measurements
- CO₂ and N₂O – GE infrared technology: Inspired and end-tidal values, CO₂ waveform and respiration rate
- Respiration rate – calculated from the CO₂ 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 (O₂) 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.


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 = CO₂ and N₂O
Ai = Anesthetic agents and agent identification
O = Patient O₂
V = Patient Spirometry

Non-disturbing gases

• Ethanol, acetone, isopropanol, methane, nitrogen, nitric oxide, carbon monoxide, water vapor and freon R134A (for CO₂, O₂ and N₂O).
• Maximum effect of non-disturbing gases on readings:
  O₂ & N₂O <2 vol%, CO₂ < 0.2 vol%, AA < 0.15 vol%.

Carbon dioxide (CO₂)

GE infrared absorption sensor technology

CO₂ waveform

EtCO₂ End-tidal CO₂ concentration

FiCO₂ Inspired CO₂ 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 EtCO₂ or FiCO₂

Respiration rate (RR)

Measurement range 4 to 100 breaths/min

Detection criteria 1 vol% change in CO₂ level

Alarm note sent to host device if no breath detected in 20 seconds

Patient oxygen (O₂)

GE differential paramagnetic sensor

O₂ waveform

FiO₂ Inspired O₂ concentration

EtO₂ End-tidal O₂ concentration

FiO₂-EtO₂ Inspired-expired difference

Measurement range 0 to 100 vol%

Accuracy ±(1 vol% + 2% of reading)
Rise time <260 ms

Nitrous oxide (N₂O)

GE infrared absorption sensor

FiN₂O Inspired N₂O concentration

EtN₂O End-tidal N₂O concentration

Measurement range 0 to 100 vol%

Accuracy ±(2 vol% + 2% of reading)
N₂O ≤ 85%

Note: N₂O 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:

<table>
<thead>
<tr>
<th>Specification</th>
<th>D-lite(+)</th>
<th>Pedi-lite(+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiration rate</td>
<td>4 to 35</td>
<td>4 to 70</td>
</tr>
<tr>
<td></td>
<td>breaths/min</td>
<td>breaths/min</td>
</tr>
<tr>
<td>Tidal volume</td>
<td>150 to 2000 ml</td>
<td>5 to 300 ml</td>
</tr>
<tr>
<td>Measurement range</td>
<td>±6% or 30 ml</td>
<td>±6% or 4 ml</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±6% or 30 ml</td>
<td>±6% or 4 ml</td>
</tr>
<tr>
<td>Minute volume</td>
<td>2 to 20 l/min</td>
<td>0.1 to 5 l/min</td>
</tr>
<tr>
<td>Airway pressure</td>
<td>-20 to +100 cmH₂O</td>
<td>-20 to +100 cmH₂O</td>
</tr>
<tr>
<td>Display units</td>
<td>cmH₂O, mmHg, kPa, mbar, hPa</td>
<td></td>
</tr>
<tr>
<td>Flow</td>
<td>-100 to +100 l/min</td>
<td>-25 to +25 l/min</td>
</tr>
<tr>
<td>I:E</td>
<td>1:4.5 to 2:1</td>
<td>1:4.5 to 2:1</td>
</tr>
<tr>
<td>Compliance</td>
<td>4 to 100 ml/cmH₂O</td>
<td>1 to 100 ml/cmH₂O</td>
</tr>
<tr>
<td>Airway resistance</td>
<td>0 to 200 cmH₂O/l/s</td>
<td>0 to 200 cmH₂O/l/s</td>
</tr>
</tbody>
</table>

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

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 N₂O) 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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>10 to 40°C (50 to 104°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>10 to 98% non-condensing</td>
</tr>
<tr>
<td>Ambient pressure</td>
<td>660 to 1060 mbar</td>
</tr>
</tbody>
</table>

Storage conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-25 to 60°C (-13 to 140°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>10 to 90% non-condensing</td>
</tr>
</tbody>
</table>

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)

Sensor specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>D-lite(+)</th>
<th>Pedi-lite(+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead space</td>
<td>9.5 ml</td>
<td>2.5 ml</td>
</tr>
</tbody>
</table>

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

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

www.gehealthcare.com