Anexa 3

Specificație Tehnică Completată

Anexa 3 Mașină de anestezie
Model: Carestation 750 Reg. SMDM: DM000271225
Monitorul pentru afișarea funcțiilor vitale
Model: Carescape Canvas 1000 Reg. SMDM DM000818909
Producător: DATEX-OHMEDA,INC./GE Healthcare
Țara: SUA

Specificarea tehnică deplină solicitată, Standarde de referință	Specificația tehnică propusă de ofertant
Mașină de anestezie (caracteristici avansate) Cod 110130 Descriere Mașina de anestezie este destinată să livreze, să monitorizeze gazele anestezice și să asigure respirația artificială a pacientului în timpul actului chirurgical Parametru Specificația Prize de gaz O2, Aer Display mașina de anestezie ≥15", color TFT sau LCD touch screen Debitmetre tipul electronice gaz O2, Air gama, L/min diapazon min. 0.2 - 15 Vaporizator: tip vaporizator acceptate Izofluran obligatoriu Sevofluran obligatoriu Halothan obligatoriu număr de vaporizatoare instalate la dispozitiv ≥ 2 unități obligatoriu Izofluran obligatoriu Sevofluran obligatoriu interlock obligatoriu sistem de absorbție obligatoriu	Mașină de anestezie (caracteristici avansate) Cod 110130 Descriere Mașina de anestezie este destinată să livreze, să monitorizeze gazele anestezice și să asigure respirația artificială a pacientului în timpul actului chirurgical Parametru Specificația Prize de gaz O2, Aer **DA** Display mașina de anestezie **15"**, **color LCD touch screen 1024X768 DA, pag.4 Carestation_750_Spec_sheet** Debitmetre tipul electronice gaz O2, Air **DA, pag.1 Carestation_750_Spec_sheet** gama, L/min diapazon 0 - 15 **DA, pag.6 Carestation_750_Spec_sheet** Vaporizator: tip vaporizator acceptate Izofluran obligatoriu **DA, pag.4,5 Carestation_750_Spec_sheet, pag.1 Tec820-Vaporizer** Sevofluran obligatoriu **DA, pag.4,5 Carestation_750_Spec_sheet, pag.1 Tec820-Vaporizer** Halothan obligatoriu **DA, Carestation_750_Spec_sheet pag.4, Tec7_Vaporizer pag.1** număr de vaporizatoare instalate la dispozitiv 2 unități obligatoriu **DA** Izofluran obligatoriu **DA** Sevofluran obligatoriu **DA** interlock obligatoriu **DA** sistem de absorbție obligatoriu **DA, pag.7 Carestation_750_Spec_sheet**

Anexa 3

Mecanisme de siguranță: siguranța O2 acustică, vizuală	Mecanisme de siguranță: siguranța O2 acustică, vizuală **DA, pag.6 Carestation_750_Spec_sheet, pag.27 Carestation-750- user manual**
siguranță de amestec hipoxic obligatoriu	siguranță de amestec hipoxic obligatoriu **DA, pag.5 Carestation_750_Spec_sheet**
Ventilator automat tip pacient Adult, Pediatric, Neonatal	Ventilator automat tip pacient Adult, Pediatric, Neonatal **DA, pag.1 Carestation_750_Spec_sheet**
moduri de ventilație Manual/spontan, VCV, PCV, PSV/PS, SIMV -V, SIMV - P	moduri de ventilație Manual/spontan, VCV, PCV, PSV/PS, SIMV -V, SIMV - P **DA pag.2 Carestation_750_Spec_sheet**
mecanism electronic de amestec a gazelor (mixer) obligatoriu	mecanism electronic de amestec a gazelor (mixer) obligatoriu **DA, pag.1 Carestation_750_Spec_sheet**
volumul Tidal, ml diapazon min. 5 -1500	volumul Tidal, ml diapazon 5 -1500 **DA, pag.1 Carestation_750_Spec_sheet**
frecvența respirației/minut diapazon min. 5 - 100	frecvența respirației/minut diapazon **5 - 100 DA, pag.3 Carestation_750_Spec_sheet**
Volum minutar (MV), L/min diapazon min. 3-60	Volum minutar (MV), L/min diapazon **0.1-99.9 DA pag.3 Carestation_750_Spec_sheet**
raportul I:E minim 2:1 la 1:8	raportul I:E 2:1 la 1:4.5 **pag.5 Carestation_750_Spec_sheet**
pauză de inspirație obligatoriu	pauză de inspirație obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
limita de presiune, cmH2O diapazon min. 10-70	limita de presiune, cmH2O diapazon **ventilație manuală 0.5-70 DA, Carestation_750_Spec_sheet, pag.7. În ventilație mecanică Limita de presiune este compusă din limita de presiune a parametrului PEEP (Off, 4-30 cmH2O) și a parametrului P inspired (5-60 cmH2O) de asupra presiunii PEEP conform Carestation_750_Spec_sheet, pag.3 . Astfel limita inferioară este de 5 cmH2O (suma dintre PEEP Off si P inspired 5 cmH2O), iar limita superioară este de 100 cmH2O conform parametrului Pmax care este mai mare decât suma dintre PEEP maxim si P inspired maxim fiindcă există și parametrul P support. Cerința solicitată este astfel îndeplinită fiindcă limita de presiune este 5-100 cmH2O.**
PEEP, cmH2O diapazon min. 4-30	PEEP, cmH2O diapazon Off, 4-30 **DA, pag.3 Carestation_750_Spec_sheet**
Trigger flux diapazon min. 1-10 L/min	Trigger flux diapazon 0.2-10 L/min **DA, pag.3 Carestation_750_Spec_sheet**
Trigger presiune diapazon min. 20 - 1 cmH20	Trigger presiune diapazon 40 - 2 cmH20 **DA, pag.3 Carestation_750_Spec_sheet**
Monitorizare compliantă, rezistivitate obligatoriu	Monitorizare compliantă, rezistivitate obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
Sistem de autodiagnostic testare la scurgeri, testarea circuitelor respiratorii, complianța, alimentarea cu gaz, verificarea tuturor sistemelor	Sistem de autodiagnostic testare la scurgeri, testarea circuitelor respiratorii, complianța, alimentarea cu gaz, verificarea tuturor sistemelor **DA pag.20-21 Carestation-750-user manual**

Anexa 3

AGSS (sistem de evacuare a gazelor anestezice) obligatoriu	AGSS (sistem de evacuare a gazelor anestezice) obligatoriu **DA, pag7 Carestation_750_Spec_sheet**
Sistem de management al consumului de agent anestezic opțional	Sistem de management al consumului de agent anestezic opțional **DA, pag.36 Carestation-750-user manual**
Circuitul pneumatic de ventilare a pacientului: cu funcție de încălzire a amestecului gazos obligatoriu	Circuitul pneumatic de ventilare a pacientului: cu funcție de încălzire a amestecului gazos obligatoriu **DA, CS700-ADITIONAL INFORMATION pag 1, senzorii de flux pe inspir și pe expir au circuit de încălzire**
port auxiliar ieșire a amestecului gazos obligatoriu	port auxiliar ieșire a amestecului gazos obligatoriu **DA, pag.6 Carestation_750_Spec_sheet**
Parametri monitorizați și afișați pe display: Presiunea de aer Alarmă de înaltă presiune obligatoriu	Parametri monitorizați și afișați pe display: Presiunea de aer **DA, pag.11 Carestation-750-user manual** Alarmă de înaltă presiune obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
Alarma presiune sub atmosferică obligatoriu	Alarma presiune sub atmosferică obligatoriu **DA, pag.3 Carestation_750_Spec_sheet, pag.2 din CS700-ADITIONAL INFORMATION**
Continuarea alarma presiune obligatoriu	Continuarea alarma presiune obligatoriu **DA, pag.3 Carestation_750_Spec_sheet, pag.2 din CS700-ADITIONAL INFORMATION**
Presiune scăzută / apnee obligatoriu	Presiune scăzută / apnee obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
Alte alarme de presiune obligatoriu	Alte alarme de presiune obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
Volum expirator/flux obligatoriu	Volum expirator/flux obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
Volumul minut, l/min obligatoriu	Volumul minut, l/min obligatoriu **DA, pag.3 Carestation_750_Spec_sheet**
Concentrația de O2 Timp de răspuns, sec<30	Concentrația de O2 Timp de răspuns, sec<35 **DA, pag.3 din CS700-ADITIONAL INFORMATION**
Concentrația de CO2 alarmă apnee obligatoriu	Concentrația de CO2 alarmă apnee obligatoriu **DA, pag.4-5 din CS700-ADITIONAL INFORMATION**
Monitorizare agent Tipul de agenți Halothan, isofluran, sevofluran	Monitorizare agent isofluran, sevofluran **DA, pag.5 Carestation_750_Spec_sheet** Tipul de agenți Halothan **DA, E-sCAiOV pag 31**
Auto identificarea gazelor anestezice obligatoriu	Auto identificarea gazelor anestezice obligatoriu **DA, pag.5 Carestation_750_Spec_sheet**
Alarmă concentrare agent obligatoriu	Alarmă concentrare agent obligatoriu **DA, pag.5 Carestation_750_Spec_sheet**
Determinarea și afișarea valorii MAC obligatoriu	Determinarea și afișarea valorii MAC obligatoriu **DA, pag.5 Carestation_750_Spec_sheet**
Spirometria opțional Modulul de gaze: încorporat la mașina de anestezie obligatoriu	Spirometria **DA, pag.2 din Carestation_750_Spec_sheet** Modulul de gaze: încorporat la mașina de anestezie obligatoriu

Anexa 3

determină concentrațiile de gaze: O2, CO2, agenți anestezici obligatoriu	determină concentrațiile de gaze: O2, CO2, agenți anestezici obligatoriu **DA, pag.7-8 din CS700-ADITIONAL INFORMATION**
Celulă determinare O2 tip paramagnetic obligatoriu	Celulă determinare O2 tip paramagnetic obligatoriu **DA, pag.4 Carestation_750_Spec_sheet**
Monitorul pentru afișarea funcțiilor vitale: display ≥19"	Monitorul pentru afișarea funcțiilor vitale: Acesta are următoarele softuri adiționale: **1. 12ST-MULTI-LEAD ST ANALYSIS LICENSE** **2. PARR-FULL ARRHYTHMIA LICENSE** **3. PSPI-SURGICAL PLETH INDEX LICENSE**
color TFT sau LCD obligatoriu	Display 19 inch **DA, Monitor CARESCAPE Canvas 1000DA, pag.2 din Spec-Sheet-CARESCAPE-Canvas-1000** Matrice activă color TFT, LCD cu îmbinare optică, **pag.2 din Spec-Sheet_CARESCAPE-Canvas-1000**
touch screen obligatoriu	touch screen obligatoriu **DA, pag.2 din Spec-Sheet-CARESCAPE-Canvas-1000**
monitor dedicat vizualizării funcțiilor vitale obligatoriu	monitor dedicat vizualizării funcțiilor vitale obligatoriu **DA, pag.1 din Spec_ Sheet-CARESCAPE-Canvas-1000**
fixarea monitorului de/pe mașina de anestezie obligatoriu	fixarea monitorului de/pe mașina de anestezie obligatoriu **DA, B1X5-REC pag.2 din CARESCAPE_Canvas_INFO**
imprimantă termică obligatoriu	imprimantă termică obligatoriu **DA, B1X5-REC pag.2 din CARESCAPE_Canvas_INFO**
conexiuni WiFi/LAN/HDMI/USB obligatoriu	conexiuni USB obligatoriu **DA, pag.2 din Spec-Sheet-CARESCAPE-Canvas_1000**
protecție la defibrilare 360J obligatoriu	protecție la defibrilare 360J obligatoriu **DA, pag.3 din CARESCAPE_Canvas_INFO**
protecție contra dispozitivelor de electrochirurgie cu frecvența înaltă obligatoriu	protecție contra dispozitivelor de electrochirurgie cu frecvența înaltă obligatoriu **DA, pag.3 din CARESCAPE_Canvas_INFO**
compensarea automata a driftului isoliniei obligatoriu	compensarea automata a driftului isoliniei obligatoriu **DA**
detectarea automata a tipului de manjetă obligatoriu	detectarea automata a tipului de manjetă obligatoriu **DA**
baterie internă reîncărcabilă obligatoriu	baterie internă reîncărcabilă obligatoriu **DA, pag.4 din CARESCAPE_CANVAS_INFO**
interfață de cuminicare cu altele obligatoriu	interfață de cuminicare cu altele obligatoriu **DA, pag.2 din Spec-Sheet-CARESCAPE-Canvas-1000**
Modulele hemodinamice incluse: Electro-cardio-grama (ECG)	Modulele hemodinamice incluse: Electro-cardio-grama (ECG) **DA, pag.2 din Spec-Sheet-CARESCAPE-Canvas-1000**
frecvența cardiacă obligatoriu	frecvența cardiacă obligatoriu **DA, pag.5 din CARESCAPE_Canvas_INFO**
traseul ECG obligatoriu	traseul ECG obligatoriu **DA, pag.1 din CARESCAPE_Canvas_INFO**

Anexa 3

analiza și măsurarea segmentului ST obligatoriu	analiza și măsurarea segmentului ST obligatoriu **DA, pag.6 din CARESCAPE_Canvas_INFO (opțiunea 12 ST-MULTI-LEADST ANALYSIS LICENSE)**
determinarea cel puțin 20 de aritmii obligatoriu	determinarea cel puțin 20 de aritmii obligatoriu **DA, pag.7 din CARESCAPE_CANVAS_INFO**
Puls-oximetria (SpO2)	Puls-oximetria (SpO2) **DA, pag.8 din CARESCAPE-Canvas-INFO**
fotopletismografia obligatoriu	fotopletismografia obligatoriu **DA**
valoarea SpO2 obligatoriu	valoarea SpO2 obligatoriu **DA, pag.2 din Spec-Sheet-CARESCAPE-Canvas_1000**
indiciile de perfuzie obligatoriu	indiciile de perfuzie obligatoriu **DA, opțiunea PSPI-SURGICAL PLETH INDEX LICENSE**
Tensiune sanguină neinvazivă (NIBP) obligatoriu	Tensiune sanguină neinvazivă (NIBP) obligatoriu **DA, pag.2 din Spec-Sheet_ CARESCAPE-Canvas-1000**
Respirația (impedanța trans-toracică) obligatoriu	Respirația (impedanța trans-toracică) obligatoriu **DA, pag.2 din Spec-Sheet_CARESCAPE-Canvas-1000**
Temperatura pe 2 canale obligatoriu	Temperatura pe 2 canale obligatoriu **DA, pag.2 din Spec-Sheet-CARESCAPECanvas-1000**
Tensiune sanguină invazivă (IBP) pe 2 canale obligatoriu	Tensiune sanguină invazivă (IBP) pe 2 canale obligatoriu **DA**
Modul de monitorizare BIS (bispectral index) sau modul de monitorizarea obiectiva a profunzimii blocului neuro-muscular intraanestezic (TOF/ NMT) obligatoriu	Modul de monitorizare a profunzimii blocului neuro-muscular intraanestezic NMT obligatoriu **DA, pag.2 din Spec-Sheet-CARESCAPE_ Canvas-1000**
Alarme prioritare 3	Alarme prioritare 3**. MONITOR CARESCAPE_Canvas_SIM Prioritățile alarmelor este direct proporțional cu creșterea timpului de activare DA, pag.9 din CARESCAPE_Canvas_INFO Impedanța respirației, SPO2, NIBP Alarme prioritare 3 MAȘINĂ DE ANESTEZIE DA, pag.8 Din CS700-ADITIONAL INFORMATION**
Tensiune de alimentare 220 V, 50 Hz	Tensiune de alimentare 220 V, 50 Hz **DA, pag.5 din Carestation_750_Spec_sheet**
Prize auxiliare 220 V ≥ 3 buc obligatoriu	Prize auxiliare 220 V 4 buc obligatoriu **DA**
Baterie internă reincarcabila autonomie de lucru ≥ 1.5h obligatoriu	Baterie internă reincarcabila autonomie de lucru 1.5h obligatoriu **DA, pag.4 Carestation_750_Spec_sheet**
Sertar pentru depozitare ≥ 2 buc obligatoriu	Sertar pentru depozitare 3 buc obligatoriu **DA, pag.1 din Carestation_750_Spec_sheet**
Frână centralizată pentru fixarea aparatului sau sistem clasic de blocare a minim două roți obligatoriu	Frână centralizată pentru fixarea aparatului sau sistem clasic de blocare a minim două roți obligatoriu **DA, pag.1 din Carestation_750_Spec_sheet**
Presiune de alimentare cu gaze 3.0 - 6 bar	Presiune de alimentare cu gaze 3.0 - 6 bar **DA, pag.6 Carestation_750_Spec_sheet**

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Accesorii: Furtunul cu conector de conectare la sursa de aer comprimat 1 buc. Furtunul cu conector de conectare la sursa de oxigen (conector standard DIN) 1 buc. Circuit de ventilare Adult, reutilizabil ≥ 2 set., să se indice codul produsului Plămîn de test Adult, reutilizabil ≥ 2 buc., să se indice codul produsului Senzor de flux Reutilizabil ≥ 2 buc., să se indice codul produsului Filtru antibacterian Adult, unică utilizare ≥ 200 buc., să se indice codul produsului Accesorii modul de gaz CO2 Adult ≥ 2 set., să se indice codul produsului Cablu ECG Adult, reutilizabil min. 5 fire ≥ 2 buc., să se indice codul produsului Senzor ECG Adult, unica utilizare ≥ 100 buc., să se indice codul produsului Senzor SpO2 Adult, reutilizabil ≥ 2 Buc., să se indice codul produsului Manșete NIBP Adult, reutilizabilă ≥ 2 buc., să se indice codul produsului Adult mare, reutilizabilă ≥ 2 buc., să se indice codul produsului Senzor de temperatură Adult, reutilizabil ≥ 2 buc., să se indice codul Cablu de interconectare senzor IBP Adult, reutilizabil ≥ 1 buc., să se indice codul produsului Senzor IBP Adult, unica utilizare ≥ 10 buc., să se indice codul produsului produsului Accesorii necesare de funcționare a modulului BIS sau TOF/ NMT Accesorii pentru Adult ≥ 5 buc., să se indice codul produsului	Accesorii: Furtunul cu conector de conectare la sursa de aer comprimat 1 buc. **DA** Furtunul cu conector de conectare la sursa de oxigen (conector standard DIN) 1 buc. **DA** Circuit de ventilare Adult, reutilizabil 2 set. **DA Cod: 2096534-009** Plămîn de test Adult, reutilizabil 2 buc. **DA Cod: 2096534-009** Senzor de flux Reutilizabil 2 buc. **DA, Cod: 2069358-001-S** Filtru antibacterian Adult, unică utilizare 200 buc. **DA Cod: 2106570-007** Accesorii modul de gaz CO2 Adult 2 set **DA Cod: M1182629+5514183** Cablu ECG Adult, reutilizabil min. 5 fire 2 buc. **DA, Cod: 2106389-004** Senzor ECG Adult, unica utilizare 100 buc **DA, Cod:** 33299 Senzor SpO2 Adult, reutilizabil 2 Buc. **DA, Cod: TS-F-D** Manșete NIBP Adult, reutilizabilă 2 buc. **DA, Cod:SFT-A2-2A-INT-5S** Adult mare, reutilizabilă 2 buc. **DA, Cod:SFT-A3-2A-INT-5S** Senzor de temperatură Adult, reutilizabil 2 buc. **DA, pag. 2107176-031** Cablu de interconectare senzor IBP Adult, reutilizabil 1 buc **DA** Senzor IBP Adult, unica utilizare 10 buc **DA** Accesorii necesare de funcționare a modulului NMT. **DA Cod: 2099660-001E3**

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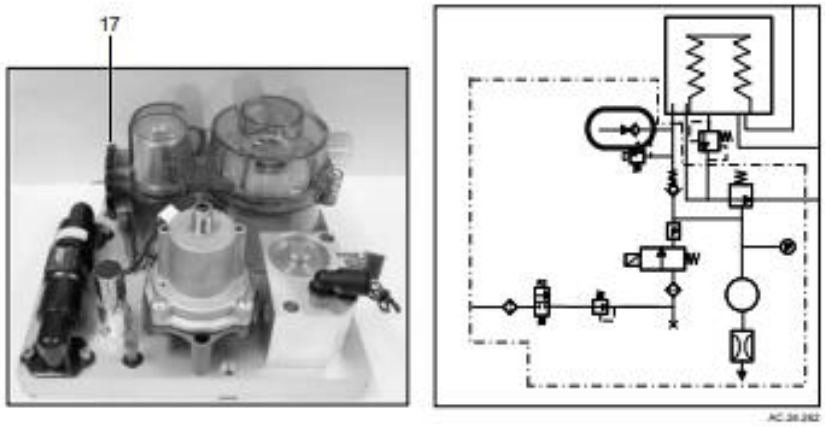

Figure 2-35 • Free breathing valve

2.13.12 Breathing circuit flow sensors

Two flow sensors (18) are used to monitor inspiratory and expiratory gas flow:

- The inspiratory flow sensor is located at the input of the breathing system inspiratory check valve.
- The expiratory flow sensor is located at the input to the breathing system expiratory check valve.

Feedback from both the inspiratory and expiratory transducers is used to:

- supply tidal volumes that make allowances for the effects of fresh gas flow and circuit compressibility.
- supply signals for expiratory tidal volume monitoring and the breath rate.

The breathing circuit flow sensors include two flex boards (one for each sensor). Each flex board contains a heating circuit and an EEPROM.

Each flex board has an I2C interface for communication with SIB. The SIB provides +12.5 VDC power with a minimum of 200 mA supply current to each flex board for flow sensor heating circuit, and provides +5 VDC with a minimum of 200 mA supply current to each flex board for EEPROM.

Carestation™ 750

Anesthesia Delivery System

The Carestation 750 anesthesia machine is a modern, sophisticated and easy-to-navigate anesthesia workstation. It's built on our clinically proven platform to give you the control and accuracy you need for high-quality, attentive care.

KEY FEATURES

- Modern, premium, compact design for an optimized workspace utilization
- Simple and easy-to-use 15" touchscreen ventilator display
- Intuitive user interface, inspired by the CARESCAPE™ Monitor, makes for a seamless experience in the OR
- Integrated CARESCAPE Respiratory Module
- Advanced tools to help individualize therapy
- Scalable software and hardware features: "build your own" Carestation system
- ecoFLOW software helps support clinicians in the practice of low-flow anesthesia by predicting how much O_2 is needed within the fresh gas flow
- Electronic gas mixer

VENTILATION

- Small, Compact Breathing System (CBS) specifically designed for low-flow anesthesia
- Fast gas kinetics for rapid wash-in and wash-out
- Digitally controlled, flow valve ventilator to support all patient types from neonates to adults
- Advanced ventilation options, including synchronized PCV-VG with pressure support (SIMV PCV-VG) and minimum rate ventilation (CPAP+PSV)
- Lung Protective Ventilation tools, including single-step and multi-step Lung Recruitment maneuvers to optimize clinical outcomes, while reducing workloads for clinicians
- Continual fresh gas flow with fresh gas flow compensation during mechanical ventilation

DESIGN

- Ergonomic form factor for seamless and efficient workflow and serviceability
- Innovative cable management solution to organize power cables and gas hoses and to simplify installation, cleaning and transportability
- Easy to clean surfaces
- Extendable, tiltable, swiveling display arm for flexible positioning to stay close to the patient
- Two-vaporizer configuration
- Bi-level work surface illumination
- Absorbent canister designed for ease of use and long life
- Intelligent lighting that highlights active flow controls and auxiliary ports when in use

PHYSICAL SPECIFICATIONS

Product Description

Carestation™ 750 A1 Anesthesia Delivery System

Dimensions

Height:	144 cm/56.7 in
Width:	89.1 cm/35.1 in
Depth:	81.5 cm/32.1 in
Weight:	161 kg/355 lb*

Top shelf

Weight limit:	25 kg/55 lb
Width:	41.3 cm/16.3 in
Depth:	38.8 cm/15.3 in

Work surface

Height:	83.6 cm/32.9 in
Size:	1620 cm^2 /251 in^2
Size: (with optional flip shelf)	2527 cm^2/392 in^2

Upper left Datex-Ohmeda (DO) dovetail

Dovetail length:	49 cm/19.3 in

Lower left Datex-Ohmeda (DO) dovetail

Dovetail length:	32 cm/12.6 in

Right Datex-Ohmeda (DO) dovetail

Dovetail length:	96.4 cm/38.0 in

Drawers (internal dimensions)

Height:	
Top and middle:	8.6 cm/3.4 in
Bottom:	13.3 cm/5.2 in
Width:	34 cm/13 in
Depth:	37 cm/14.6 in

Manual ventilation bag arm (optional)

Arm length:	39.8 cm/15.7 in
Bag arm height: (adjustable)	53 cm/20.9 in 136 cm/53.5 in

Casters

Diameter:	12.5 cm/4.9 in
Brakes:	Central Brake

VENTILATOR OPERATING SPECIFICATIONS

Modes of ventilation – included

VCV (Volume Control) Mode with tidal volume compensation

PCV (Pressure Control Ventilation)

Cardiac Bypass

Modes of ventilation – optional

PCV-VG (Pressure Controlled Ventilation-Volume Guarantee)

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

PSVPro™ Mode (Pressure Support with Apnea backup)

CPAP+PSV (Pressure Support mode)

SIMV PCV-VG

Advanced software options

Spirometry (included)

Auto alarm limits (included)

ecoFLOW

Pause Gas

Recruitment maneuver

VCV Cardiac Bypass

Ventilator parameter ranges

Tidal volume range:	5 to 1500 mL (PCV modes 5 to 1500 mL) (Volume Control, PCV-VG and SIMV volume 20 to 1500 mL)
Incremental settings:	20 to 50 mL (increments of 1 mL) 50 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)

** Excludes vaporizers, airway gas module, patient monitor.*

VENTILATOR OPERATING SPECIFICATIONS *(continued)*

Ventilator parameter ranges

Minute volume range:	Less than 0.1 to 99.9 L/min)
Pressure ($P_{inspired}$) range:	5 to 60 cmH_2O (increments of 1 cmH_2O) above set PEEP
Pressure (P_{max}) range:	12 to 100 cmH_2O (increments of 1 cmH_2O)
Pressure ($P_{support}$) range:	Off, 2 to 40 cmH_2O (increments of 1 cmH_2O)
Respiratory Rate:	4 to 100 breaths per minute for Volume Control and Pressure Control; 2 to 60 breaths per minute for SIMV, PSVPro mode and SIMV PCV-VG; 4 to 60 bpm for CPAP+PSV (increments of 1 breath per minute)
Inspiratory/ expiratory ratio:	2:1 to 1:8 (increments of 0.5) (VCV, PCV, PCV-VG)
Inspiratory time:	0.2 to 5.0 seconds (increments of 0.1 seconds) (SIMV, PSVPro and CPAP PSV)
Trigger window:	Off, 5 to 80% of Texp (SIMV, PSVPro) (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 75% (increments of 5%)
Inspiratory Pause range:	Off, 5-60% of Tinsp

Positive End Expiratory Pressure (PEEP)

Type:	Integrated, electronically controlled
Range:	OFF, 4 to 30 cmH_2O (increments of 1 cmH_2O)

Ventilator performance

Peak gas flow:	120 L/min + fresh gas flow
Flow valve range:	1 to 120 L/min
Flow compensation range:	150 mL/min to 15 L/min

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:	±10% or ±3 cmH_2O (larger of)
PEEP delivery:	±1.5 cmH_2O
Volume monitoring:	> 210 mL = better than 9% ≤ 210 mL = better than 18 mL < 60 mL = better than 10 mL
Pressure monitoring:	±5% or ±2.4 cmH_2O (larger of)

Alarm settings

Tidal volume (V_{TE}):	Low: OFF, 1 to 1500 mL High: 20 to 1600 mL, OFF
Minute volume (V_E):	Low: OFF, 0.1 to 10 L/min High: 0.5 to 30 L/min, OFF
Inspired oxygen (FiO_2):	Low: 18 to 99% High: 19 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 cmH_2O above PEEP
High pressure:	12 to 100 cmH_2O (increments of 1 cmH_2O)

Sustained airway pressure:

Mechanical ventilation ON:	P_{max} < 30 cmH_2O, the sustained limit is 6 cmH_2O P_{max} 30 to 60 cmH_2O, the sustained limit is 20% of P_{max} P_{max} > 60 cmH_2O, the sustained limit is 12 cmH_2O
PEEP and mechanical ventilation ON:	Sustained limit increases by PEEP minus 2 cmH_2O
Mechanical ventilation OFF:	P_{max} 12 to 60 cmH_2O, the sustained limit is 50% of P_{max} P_{max} > 60 cmH_2O, the sustained limit is 30 cmH_2O
Subatmospheric pressure:	Paw < -10 cmH_2O
Audio pause countdown clock:	120 to 0 seconds

VENTILATOR COMPONENTS

Flow transducer

Type:	Variable orifice flow sensor (autoclavable)
Location:	Inspiratory outlet and expiratory inlet

Oxygen sensor

Type:	Optional galvanic fuel cell or paramagnetic with Airway Module option

Ventilator screen

Display size:	15 inch
Pixel format:	1024 x 768

Battery backup

Backup power:	Battery time is 90 minutes when fully charged, which supports full system functionality and ventilation.
Battery type:	Internal rechargeable sealed lead acid

Communication ports

RS-232C compatible serial interface

Ethernet

Datex-Ohmeda device interface solutions port

USB port

VGA Output

ANESTHETIC AGENT DELIVERY

Delivery

Vaporizers:	Tec™ 6 Plus, Tec 7, Tec 820, Tec 850
Number of positions:	2
Mounting:	Tool-free installation Selectatec™ manifold interlocks and isolates vaporizers

AIRWAY MODULES

General

Supported modules:	E-sCAiO, E-sCAiOV
Size (HxWxD), excluding water trap:	112 x 37 x 205 mm/4.4 x 1.5 x 8.1 in
Weight:	0.7 kg/1.5 lb
Sampling rate:	120 mL/min ±20 mL

Automatic compensation for atmospheric pressure variation (495 to 795 mmHg) temperature and CO_2/N_2O and CO_2/O_2 collision broadening effect. Parameter display update interval typically breath-by-breath. Functional alarms for blocked sample line, D-fend™ Water Trap check and D-fend replacement.

Non-disturbing gases:

Ethanol, acetone, isopropanol, methane, nitrogen, nitric oxide, carbon monoxide, water vapor, freon R134A (for CO_2, O_2 and N_2O):

Maximum effect on readings:	CO_2 < 0.2 vol% ; O_2, N_2O < 2 vol%; AA < 0.15 vol%

Carbon dioxide (CO_2)

$EtCO_2$:	End-tidal CO_2 concentration
$FiCO_2$:	Inspired CO_2 concentration

CO_2 waveform

Measurement range:	0 to 15% (0 to 15 kPa, 0 to 113 mmHg)
Accuracy:	± (0.2 vol% + 2% of reading)

Datex-Ohmeda infrared sensor

Adjustable low and high alarm limits for $EtCO_2$ and $FiCO_2$

Respiration rate (RR)

Measurement range:	4 to 100 breaths/min
Detection criteria:	1% variation in CO_2

Adjustable low and high alarm limits for respiration rate; alarm for apnea

Patient Oxygen (O_2)

FiO_2:	Inspired O_2 concentration
EtO_2:	End-tidal O_2 concentration
FiO_2-EtO_2:	Inspired-expired difference

O_2 Measurement

Measurement range:	0 to 100%
Accuracy:	± (1 vol% +2% of reading)

Datex-Ohmeda differential paramagnetic sensor Adjustable low and high alarm limits for FiO_2 and EtO_2; alarm for FiO_2 < 18%

Nitrous Oxide (N_2O)

Measurement range:	0 to 100%
Accuracy:	± (2 vol% +2% of reading)

AIRWAY MODULES *(continued)*

Anesthetic Agent (AA)

Isoflurane

Measurement range: 0 to 6%

Accuracy: ±(0.15 vol% +5% of reading)

Sevoflurane

Measurement range: 0 to 8%

Accuracy: ±(0.15 vol% +5% of reading)

Desflurane

Measurement range: 0 to 20%

Accuracy: ±(0.15 vol% +5% of reading)

Waveform displayed

MAC value displayed (Airway Gas Option modules)

MACage value displayed (CARESCAPE modules)

Identification threshold: 0.15 vol%**

Agent mixture detection

Adjustable high and low alarm limits for EtAA, FiAA

Patient Spirometry

Pressure-volume loop

Pressure-flow loop

Flow-volume loop

Airway pressure and flow waveforms

Adjustable low and high alarm limits for P_{peak}, $PEEP_{tot}$ and MV_{exp} Alarms for MV_{exp} << MV_{insp} and for MV_{exp} low. Detection through D-lite™ Flow Sensor or Pedi-lite Flow Sensor and gas sampler with following specifications:

CARESCAPE Airway Modules

	D-lite(+)	Pedi-lite(+)
Respiration rate:	4 to 35 breaths/min	4 to 70 breaths/min
Tidal volume		
Measurement range:	150 to 2000 mL	5 to 300 mL
Accuracy**:	±6% or 30 mL	±6% or 4 mL
Minute volume		
Measurement range:	2 to 20 L/min	0.1 to 5 L/min
Airway pressure		
Measurement range:	-20 to +100 cmH_2O	
Accuracy**:	±1 cmH_2O	
Display units:	cmH_2O, mmHg, kPa, mbar, hPa	
Flow		
Measurement range:	-100 to 100 L/min	-25 to 25 L/min
I:E		
Measurement range:	1:4.5 to 2:1	
Compliance	**D-lite(+)**	**Pedi-lite(+)**
Measurement range:	4 to 100 mL/cmH_2O	1 to 100 mL/cmH_2O
Airway resistance		
Measurement range:	0 to 200 $cmH_2O/L/s$	

Sensor specifications

	D-lite/ D-lite(+)	Pedi-lite/ Pedi-lite(+)
Dead Space:	9.5 mL	2.5 mL
Resistance		
at 30 L/min:	0.5 cmH_2O	
at 10 L/min:		1.0 cmH_2O

ELECTRICAL SPECIFICATIONS

Current leakage

100/120V	< 500µA
220/240V	< 500µA

Power

Power input: 100-120 Vac, 50/60 Hz
220-240 Vac, 50/60 Hz
120/220-240 Vac ± 10%, 50-60 Hz

Power cord:

Length: 5 m/16.4 ft

Rating: 10A @ 220-240 Vac or
15A @ 100-120 Vac
10A @ 120/220-240 Vac

Inlet modules

100/120 V:

Without outlets: 2A

With outlets: 12A

220/240 V:

Without outlets: 2A

With outlets: 8A

Outlet modules (optional)

100/120 V:

4 outlets on side, from top to bottom: 3A, 2A, 2A, 1.5A, individual breakers, isolation transformer (optional)

***Typical value*

ELECTRICAL SPECIFICATIONS *(continued)*

Outlet modules (optional)

220/240 V:

4 outlets on side, from top to bottom: 1.5A, 1A, 1A, 1A, individual breakers, isolation transformer (optional)

Japan:

3 outlets on side, from top to bottom: 3A, 2A, 2A, individual breakers, isolation transformer (optional)

PNEUMATIC SPECIFICATIONS

Auxiliary O_2 (optional)

Connection:	7-10 mm hose barb port
O_2 concentration range:	100% O_2
Flow range:	0 to >10 L/min

Auxiliary O_2 +Air (optional)

Connection:	7-10 mm hose barb port
O_2 concentration range:	100% O_2 only, or 21% to 100% $O_2$with Air
Flow range for O_2 and Air:	0 and 150 mL/min to 15 L/min

Auxiliary common gas outlet (optional)

Connector:	ISO 22 mm OD and 15 mm ID

Gas supply

Pipeline input range:	280 kPa to 600 kPa (41 psig to 87 psig)
Pipeline connections:	DISS-male, AS4059, S90-116, or NIST All fittings available for O_2, N_2O, and Air, and contain pipeline filter and check valve. Secondary O_2 pipeline inlet available.
Cylinder input:	Pin indexed in accordance with CGA-V-1 or DIN-477 (nut and gland); contains input filter and check valve. Large cylinder kit available for O_2 and N_2O (with DIN-477).

Note: *Maximum 3 cylinders*

Primary regulator diaphragm minimum burst pressure:	2758 kPa/400 psig
Primary regulator nominal output:	< 345 kPa/50 psig Pin indexed cylinder connections
	< 414 kPa/60 psig DIN-477 cylinder connections

O_2 controls

Method:	N_2O shut off with loss of O_2 pressure
Supply failure alarm:	< 252 kPa (36.55 psig)
O_2 flush:	Range: 25 to 75 L/min

Fresh gas

Flow range:	0 and 150 mL/min to 15 L/min Minimum total flow O_2 and balance gas is 150 mL/min

Measurement accuracy

for O_2, Air and N_2O:	±5% of setting value, or ±20 mL/min (larger of)
O_2 concentration range:	21% to 100% when Air is available
O_2 Cell accuracy:	± 2.5% full scale plus 2.5% of reading
Compensation:	Temperature and atmospheric pressure compensated to standard conditions of 20°C and 101.3 kPa
Hypoxic guard:	Electric Mixer: Provides a nominal minimum 25% concentration of oxygen in O_2/N_2O mixture. ALT O_2, 0 to 8-15 L/min

Materials

All materials in contact with patient breathing gases are not made from 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 3200 m (520 to 800 mmHg)

System storage

Temperature:	-25° to 60°C (-13° to 140°F)
Humidity:	15 to 95% relative humidity (non-condensing)
Altitude:	-440 to 4880 m (425 to 800 mmHg)
Oxygen cell storage:	-15° to 50°C (5° to 122°F) 10 to 95% relative humidity 500 to 800 mmHg

ENVIRONMENTAL SPECIFICATIONS *(continued)*

Electromagnetic compatibility

Immunity:	Complies with all applicable requirements of EN 60601-1-2
Emissions:	CISPR 11 group 1 class A
Standard compliance:	AAMI ES60601-1, CSA C22.2 #601.1, EN/IEC 60601-1, ISO 80601-2-13
European Notified Body	
CE Mark:	CE0197

BREATHING CIRCUIT SPECIFICATIONS

Carbon dioxide absorbent canister

Absorbent capacity:	Reusable canister 1370 mL Disposable canister 1400 mL

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 (15 mm ID), ROW 22 mm ID, Australia

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:	0.5 to 70 cmH_2O
Tactile knob indication at:	30 cmH_2O and above
Adjustment range of rotation:	0.5 to 30 cmH_2O (0 to 230°) 30 to 70 cmH_2O (230 to 330°)

Materials

All materials in contact with exhaled patient gases are autoclavable, except O_2 cell, and Airway Modules.
All materials in contact with patient gases are not made from natural rubber latex.

Breathing circuit parameters

Compliance:

Bag mode:	1.81 mL/cmH_2O (filled disposable absorber canister)
	1.74 mL/cmH_2O (filled reusable absorber canister)
Mechanical mode:	Automatically compensates for compression losses within the absorber and bellows assembly
Volume:	2006 mL Ventilator side
	500 mL Bag side
	1000 mL Reusable canister
	1000 mL Disposable canister

Expiratory resistance in bag mode:

Flow rate	P_{exp} Absorber canister Installed	P_{exp} Absorber canister Removed
5 L/min	0.57 cmH_2O	0.57 cmH_2O
30 L/min	2.47 cmH_2O	2.47 cmH_2O
60 L/min	5.60 cmH_2O	5.60 cmH_2O

Note: Values include patient circuit tubing and wye piece (0.65 cmH_2O at 60 L/min)

Anesthetic gas scavenging

AGSS Type	Hospital extract system required	Machine connection
High vacuum, low flow:	High vacuum 36 +/- 3 L/min @ 12 inHg (305 mmHg)	SIS evac
High vacuum, low flow:	High vacuum 25-30 L/min @ 12 inHg (305 mmHg)	DISS evac
Low vacuum, high flow:	Low vacuum 50 to 80 L/min ISO 1H	BSI 30 mm threaded
Low vacuum, low flow:	Low vacuum 25 to 50 L/min ISO 1L	12.7 mm hose barb, 25 mm hose barb, or 30 mm ISO taper
Passive:	Passive system with air break	30 mm/1.2 in M ISO taper

Product may not be available in all countries and regions.
Contact a GE Healthcare representative for more information.
Please visit www.gehealthcare.com

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This document applies to Carestation 750 A1.

DOC2322002 Rev 3

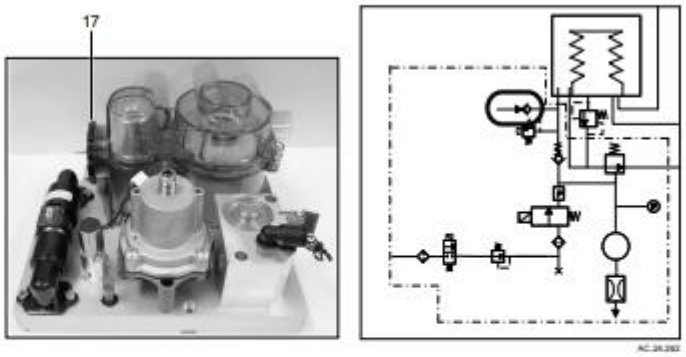


Figure 2-35 • Free breathing valve

2.13.12 Breathing circuit flow sensors

Two flow sensors (18) are used to monitor inspiratory and expiratory gas flow:

- The inspiratory flow sensor is located at the input of the breathing system inspiratory check valve.
- The expiratory flow sensor is located at the input to the breathing system expiratory check valve.

Feedback from both the inspiratory and expiratory transducers is used to:

- supply tidal volumes that make allowances for the effects of fresh gas flow and circuit compressibility.
- supply signals for expiratory tidal volume monitoring and the breath rate.

The breathing circuit flow sensors include two flex boards (one for each sensor). Each flex board contains a heating circuit and an EEPROM.

Each flex board has an I2C interface for communication with SIB. The SIB provides +12.5 VDC power with a minimum of 200 mA supply current to each flex board for flow sensor heating circuit, and provides +5 VDC with a minimum of 200 mA supply current to each flex board for EEPROM.

Message	Priority	Cause	Action
Inspiration stopped	Medium	High airway pressure.	Check system for blockages.
Internal failure. System may shut down.	High	Power controller software failure.	Contact an authorized service representative.
Internal failure. System may shut down.	Medium	Power controller software failure.	Contact an authorized service representative.
Low gas sample flow	Low	Sample flow is less than 80% of nominal flow for 20 seconds.	Check for blockage in the airway module sample gas line.
Memory (EEPROM) failure	Low	Software error.	Contact an authorized service representative.
Module fail. No CO2, AA, O2 data.	Medium	Airway module hardware failure.	Replace module.
Module not compatible	Low	The monitoring module detected is not compatible with system software.	Remove the incompatible module. Use a compatible module.
Move Bag/Vent switch to Bag	Medium	Bag/Vent switch was in the Vent position when the case was changed from Aux O2+Air to circle mode.	Move switch to the Bag position.
MVexp high	Medium	MVexp is greater than MVexp high alarm limit (for nine breaths and one minute has elapsed).	Set the alarm limits appropriately. Check the ventilation settings.
MVexp low	Medium	MVexp is less than MVexp low alarm limit (for nine breaths and one minute has elapsed).	Set the alarm limits appropriately. Check the ventilation settings.
N2O Inaccurate	Low	Airway module has fault.	Calibrate the airway module. If problem persists, contact an authorized service representative.
N2O supply pressure low	Medium	N2O pipeline pressure is less than 252 kPa (36 psi) and the N2O cylinder pressure is less than 2633 kPa (381 psi).	Ensure the N2O pipeline and cylinder are properly connected. Ensure facility gas supply pressure is within specification and the backup cylinder is full and open.
Negative airway pressure	High	Paw is less than -10 cmH2O.	Check for blockages in the patient circuit.
No battery backup	Medium	Battery or charging failure.	Between cases turn the system off, then back on after 15 seconds to reset the system.
No exp flow sensor	Medium	Electrical signals show the flow sensor is not connected.	Connect the flow sensor. Replace the flow sensor if necessary.
No insp flow sensor	Medium	Electrical signals show the flow sensor is not connected.	Connect the flow sensor. Replace the flow sensor if necessary.
O2 flow low	Low	The O2 flow is less than 150 ml/min.	Adjust the O2 flow.
O2 flush stuck on?	Low	Switch detected “on” continuously for more than 30 seconds.	Check flush valve. Ensure flush valve is not sticking.

Breath rate	4 to 100 bpm (non-spontaneous) 2 to 60 bpm (spontaneous) 1 bpm resolution
Volume sensor type	Variable flow orifice

Oxygen

Display range	5 to 110% O2
Display resolution	1% increments
Sensor type	Galvanic fuel cell
Measurement range	0 to 100% O2
Measurement accuracy	+/- (2.5% full scale plus 2.5% of reading)
Cell response time	Less than 35 seconds Note: Response time of cell and adapters is measured using the text method described in ISO 7767 (1997).
Low O2 alarm range	18% to 99%
High O2 alarm setting	19 % to 100% or Off Note: Low O2 limit may not be set above high O2 limit. High O2 limit may not be set below the low O2 limit.
Expected cell life	One year of shelf life (23°C room air) and additional two years of normal operation.
Output drift in 21% O2	Less than 1% over one month
Influence of humidity	- 0.03% of reading per %RH
Gas cross effect	Less than 0.3% vol% anesthetic agents and N2O

Case defaults

Use the ***Case Defaults*** menu to set the default case types that show on the ***Start Case*** menu and access the ***Apnea Alarm Setup*** menu.

Configuring case defaults

Set the case defaults for the case types that are selectable from the ***Start Case*** menu. In each case type, the name, patient defaults, gas defaults, screen layout defaults, alarm defaults, and ventilator settings for each available ventilation mode can be preset.

1. From Super User mode, select ***Case Defaults***.
2. Select the case name to enter the adjustment window.
3. Select an item to change. Make the change.
4. Continue to select items and make changes.
5. Select ***Confirm***.
6. Repeat to set the defaults for another default case.

Setting case name

1. From Super User mode, select ***Case Defaults***.
2. Select the name of the case to enter the adjustment window.
3. Select ***Name***.
   - Select ***Clear*** to remove the existing name.
   - Select up to 10 characters from the drop-down list.
   - Select ***Delete*** to delete a character.
   - Select ***Save*** to save the name and close the drop-down list.
   - Select ***Reset*** to return the name to the factory default name.
   - When the 10 character maximum is reached, the name is automatically saved. The drop-down list closes.
4. Select ***Confirm*** when done.

Setting apnea alarm

Use the ***Apnea Alarm Setup*** menu to enable or disable the user's ability to turn the volume apnea alarms off during manual ventilation.

1. From ***Super User*** mode, select ***Case Defaults***.
2. Select ***Apnea Alarm Setup***.

3. Set ***Volume Apnea Selection*** to ***Enable*** or ***Disable***.

   Set to ***Enable*** to allow the user to turn the volume apnea alarm on or off from the ***Start Case*** menu.

   Set to ***Disable*** to set the volume apnea alarms as always on during manual ventilation.
4. Set the ***Volume Apnea*** for each case default.
5. Set the ***Apnea Delay*** for each case default.

   - The apnea time delay range is 10 to 30 seconds.
   - CO2 apnea minimum delay is 20 seconds.

6. Select ***Back*** to return to the ***Case Defaults*** menu.

Note When the ***Volume Apnea Selection*** is set to ***Disable***, the ***Volume Apnea Alarm*** menu selection does not show on the user's ***Start Case*** menu and the ***Vol Apnea Alarm*** selection does not show on the ***Alarm Setup*** menu.

Default case type setting

Each case has multiple settings. The default settings for the default case types are shown in the following table. An * indicates that the setting is not used for the default ventilation mode in the case type. Use the empty columns to write in facility changes.

Note ***VCV ADULT*** settings are used as the default if the system does not have an optional ventilation mode shown.

Page 1 Default settings for default case types								
Settings	ADULT		PEDIATRIC		LOCAL		CUSTOM 1	
Name	ADULT		PEDIATRIC		LOCAL		CUSTOM 1	
Patient and Sensor	Adult		Pedi		Adult		Adult	
Ideal Weight	70		18		70		70	
Age	40		5		40		40	
Other Gas	Air		Air		Air		Air	
Data Source	Vent		Vent		Vent		Vent	
O2%	100		100		100		100	
Total Flow	6.00		6.00		0.20		6.00	
Auto MV Limits	Off		Off		Off		Off	
Alarm Volume	3		3		1		3	

Airway module specifications

Use only airway modules that have anesthetic agent monitoring and O2 monitoring on this system. The following modules can be used on this system:

CARESCAPE™ series: E-sCAiO and E-sCAiOV

Gas specifications for airway modules

Airway humidity (patient spirometry)	10% RH to 100% RH
Sampling delay	3.0 seconds typical with a 3 m sampling line
Total system response time	Less than 3.8 seconds with a 3 m sampling line
Warm-up time	1 minute for operation with CO2, O2, and N2O 5 minutes for operation of anesthetic agents 20 minutes for full specifications
Respiration rate	4 to 100 breaths/min
Diversion flow	120 +/- 20 ml/min
Airway pressure	-20 cmH2O to 100 cmH2O

Accuracy during stable conditions	
Ambient temperature: 10 to 40°C Ambient pressure: 495 to 795 mmHg Ambient humidity: 10 to 98% RH, non-condensing Automatic compensation for ambient pressure Full module accuracy for Respiration rate of 4 to 70 breaths/min	
CO2	+/- (0.2 vol% + 2% of reading)
O2	+/- (1 vol% + 2% of reading)
N2O	+/- (2 vol% + 2% of reading) between 0 and 85 vol% +/- (2 vol% + 8% of reading for N2O between 85 and 100 vol%
Iso, Sev, Des	+/- (0.15 vol% + 5% of reading)

Typical performance	
CO2	Measurement range 0 to 15 vol% (0 to 15 kPa, 0 to 113 mmHg). Measurement rise time less than 260 ms typical. Accuracy +/- (0.2 vol% + 2% of reading). 6 hour drift less than 0.1 vol% Gas cross effects less than 0.2 vol% (O2, N2O, anesthetic agents).

Typical performance	
O2	Measurement range 0 to 100 vol%. Measurement rise time less than 260 ms typical. Accuracy +/- (1 vol% + 2% of reading). 6 hour drift less than 0.3 vol% Gas cross effects less than 1 vol% anesthetic agents, less than 2 vol% N2O.
N2O	Measurement range 0 to 100 vol%. Measurement rise time less than 320 ms typical. Accuracy +/- (2 vol% + 2% of reading). 6 hour drift less than 0.3 vol% Gas cross effects less than 2 vol% anesthetic agents.
Anesthetic agents	Measurement range Iso 0 to 6% vol%. Measurement range Sev 0 to 8 vol%. Measurement range Des 0 to 20 vol%. Measurement rise time Des, Iso, Sev less than 420 ms typical. Accuracy +/- (0.15 vol% + 5% of reading). 6 hour drift for Iso, Sev less than 0.1 vol% 6 hour drift for Des less than 0.3 vol% Gas cross effects less than 0.15 vol% N2O.

Note The effects caused by N2O to the measurement of CO2, O2, and anesthetic agents are automatically compensated for when using the airway module. The effects caused by anesthetic agents to the measurement of CO2 and N2O are automatically compensated for when using the airway module.

Alarms

Alarms may be high priority, medium priority, or low priority. When an alarm occurs during a case, an alarm tone sounds and the alarm message is displayed in the alarm message field. The system checks for alarm conditions at 1 second intervals. The alarm tone is from 47 to 70 dB (A) depending on the alarm volume setting.

CAUTION No repair should ever be attempted by anyone not having experience in the repair of devices of this nature. See the "*Repair policy*" in the "*User maintenance*" section.

WARNING If an alarm occurs, safeguard the patient first before performing troubleshooting or doing repair procedures.

Alarm priorities

Alarm priority is indicated by the color of the alarm message and the audio sequence.

- High-priority alarm messages appear in white text on a red background.
- Medium-priority alarm messages appear in black text on a yellow background.
- Low-priority alarms appear in black text on a blue background.

Pausing alarms

Selecting ***Audio Pause*** for an active alarm stops the audible tone for 120 seconds. The alarm message shows in the alarm message field. Selecting ***Audio Pause*** when no medium or high priority alarms are active prevents the audible alarm tones (audio off) for 90 seconds.

Alarms in the apnea alarm family have special silence behavior to reduce apnea nuisance alarms. Apnea family alarms include 'Apnea', 'EtCO2 low', 'MVexp low', 'RR low', and 'TVexp low'.

When pausing an apnea family alarm, the audio tone for the active alarm is paused for 120 seconds. The audible tone for any additional apnea family alarm that occurs during the audio paused period is silenced for the remaining time shown on the audio pause countdown. Only the audible alarm tone is silenced. The alarm messages still show in the alarm message fields. 'APN' shows above the audio pause countdown when the audible tone silence is in effect for the apnea family alarms.

CARESCAPE respiratory modules
User's Manual

CARESCAPE respiratory modules
English
9th edition
2082250-001 paper

Due to continuing product innovation, specifications in this manual are subject to change without notice.

For technical documentation purposes, the abbreviation GE is used for the legal entity names, GE Medical Systems *Information Technologies*, Inc. and GE Healthcare Finland Oy.

Contents

About this manual

CARESCAPE respiratory modules' indications for use

The CARESCAPE Respiratory Modules (E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOV, E-sCAiOVX, E-sCAiOE, E-sCAiOVE) are indicated for use with a host device for monitoring respiratory parameters (CO_2, O_2, N_2O, anesthetic agents, anesthetic agent identification, and respiratory rate) and ventilatory parameters (airway pressure, flow and volume) of adult, pediatric, and neonatal patients and gas exchange parameters (VCO_2, VO_2) of adult and pediatric patients.

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.

These modules are intended for use by qualified medical personnel only.

Intended use of this manual

This manual is to be used with the user documentation of the patient monitor. Pay special attention to all generic safety statements and safety symbols listed in the monitor's user documentation.

Intended audience of this manual

This manual is intended for clinical professionals. Clinical professionals are expected to have a working knowledge of medical procedures, practices and terminology required to provide patient care. Using the device should never replace nor impede the human intervention and required patient care provided by clinical professionals.

Training requirements

No product-specific training is required for the use of these modules.

Manufacturer responsibility

GE is responsible for the effects on safety, reliability, and performance of the equipment only if:

- Assembly operations, extensions, readjustments, modifications, servicing, or repairs are carried out by authorized service personnel.
- The electrical installation of the relevant room complies with the requirements of the appropriate regulations.
- The equipment is used in accordance with the instructions for use.

Related documents

The module may be used with multiple host devices. Always check with the host device's user manual for additional information.

There are two separate technical manuals for the respiratory modules providing information about installing, maintaining, and servicing the modules:

- One for modules E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOV, and E-sCAiOVX used with monitoring host devices
- One for modules E-sCAiO, E-sCAiOV, E-sCAiOVX, E-sCAiOE, and E-sCAiOVE used in the anesthesia systems Avance CS^2 or Aisys CS^2. If the E-sCAiOE or E-sCAiOVE module is used in a patient monitor, also refer to the E-sCAiO, E-sCAiOV, E-sCAiOVX, E-sCAiOE, E-sCAiOVE specific technical manual for instructions on how to perform the module fresh gas branch leak test in connection with preventive maintenance and after servicing the module.

Safety precautions

Safety precautions given in this manual apply to the CARESCAPE respiratory modules. For generic system-level safety statements, refer to the monitor's user documentation. For accessory-specific statements, refer to their own instructions for use.

Safety message signal words

Safety message signal words designate the severity of a potential hazard.

DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazardous situation not related to personal injury that, if not avoided, could result in property damage.

Disposal and storage warnings

WARNING

DISPOSAL. At the end of their service life, the products described in this manual, as well as their accessories, must be disposed of in compliance with the guidelines regulating the disposal of each product. If you have any questions concerning disposal of a product, please contact GE or its representatives.

Disposal and storage cautions

General cautions

This symbol is identified by a white background, black triangular band, and a black symbol.

CAUTION

PACKAGING DISPOSAL. Dispose of the packaging material, observing the applicable waste control regulations.

CAUTION STORAGE AND USE. Do not use or store equipment outside the specified temperature, humidity, or altitude ranges.

Module overview

System compatibility

The CARESCAPE respiratory modules E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOV, E-sCAiOVX, E-sCAiOE, and E-sCAiOVE can be used for respiratory monitoring in the following host systems:

- CARESCAPE Monitor B850
- CARESCAPE Monitor B650
- CARESCAPE Monitor B450
- B40 Patient Monitor (2060600-002)
- Aisys CS^2
- Avance CS^2
- 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-CANE 05(A) 19.6 or later
- S/5 Compact Critical Care Monitor, software version L-CICU 05(A) 19.6 or later

NOTE Low sample gas flow situation is indicated with the message ***Replace D-Fend*** in the L-xxx06(A) software versions 24.1 and L-xxx05(A) software versions 19.6.

NOTE The CARESCAPE respiratory modules cannot be used in the S/5 Extension Frame.

NOTE The Neonatal Intensive Care Unit (NICU) software package of the CARESCAPE modular patient monitors may not support the use of CARESCAPE respiratory modules.

NOTE Displayed data (including but not limited to TV, MV, RR, Raw and N_2O), 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.

NOTE The following modules are considered identical and cannot be used in the same system at the same time: E-CO, E-sCO, E-COV, E-sCOV, E-COVX, E-sCOVX, E-CAiO, E-sCAiO, E-sCAiOE, E-CAiOV, E-sCAiOV, E-sCAiOVE, E-CAiOVX, E-sCAiOVX, E-miniC, N-CAiO, N-FC, N-FCREC.

CARESCAPE respiratory module parameters

The CARESCAPE respiratory modules use the sidestream method to measure the airway gas concentrations, and optionally Patient Spirometry. The following table shows the parameters measured by different modules. The x indicates that the module measures the parameter referred to in the column heading.

Module	CO_2	N_2O	O_2	Anes-thetic agents	Agent ID	Patient Spirom-etry	Gas exchange	Aisys CS^2 end-tidal control
E-sCO	×	× *	×					
E-sCOV	×	× *	×			×		
E-sCOVX	×	×*	×			×	×	
E-sCAiO	×	×	×	×	×			
E-sCAiOE	×	×	×	×	×			×
E-sCAiOV	×	×	×	×	×	×		
E-sCAiOVX	×	×	×	×	×	×	×	
E-sCAiOVE	×	×	×	×	×	×		×
* N_2O is not displayed by all host devices.								

For more information on the use of the end-tidal control, refer to the Aisys CS^2 user documentation.

About the measurements

The CARESCAPE respiratory modules draw a 120 ml/min flow of sampled gas through the gas sampling line and water trap to the gas sensors. CO_2, N_2O, and anesthetic agent concentrations are measured with an infrared absorption sensor, and the O_2 concentration with a paramagnetic sensor.

The module finds the time instant of the highest CO_2 concentration in each breath. Concentration at that instant is the ET CO_2 reading. Because nitrous oxide and anesthetic agents are measured by the same sensor as CO_2, the ET readings of those gases are obtained directly at the time instant of ET CO_2. For calculating ET readings of oxygen, the module synchronizes the O_2 waveform with the CO_2 waveform. The ET reading of O_2 is then determined as O_2 concentration at the time instant of ET CO_2. If no breaths are detected for a given time (20 s, for example), an apnea situation is triggered. During apnea, the ET values are updated every two seconds to the current concentration of each gas.

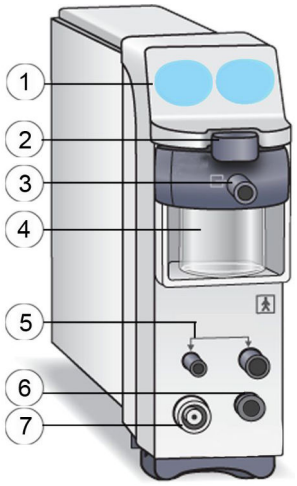
The infrared sensor also identifies the anesthetic agent and mixtures of two anesthetic agents in the sampled gas. The module has a gas exhaust port that can be connected to a scavenging system.

With the E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVX, and E-sCAiOVE modules you can also monitor airway pressures, flow, volumes, compliance and resistance, breath-by-breath. The measurement is taken using the pressure sensors in the module. The sensors are connected to the patient's airway with a double lumen spirometry line that conducts pressures from the D-lite(+)/Pedi-lite(+) spirometry sensor to the module. The respiratory volumes are calculated from the flow data, and the airway compliance and resistance are calculated from both the airway pressure and flow values.

The E-sCOVX and E-sCAiOVX modules also measure gas exchange parameters VCO_2 and VO_2.

For instructions on how to use the airway gases and Patient Spirometry measurements, see the host device's user documentation.

CARESCAPE respiratory module connectors

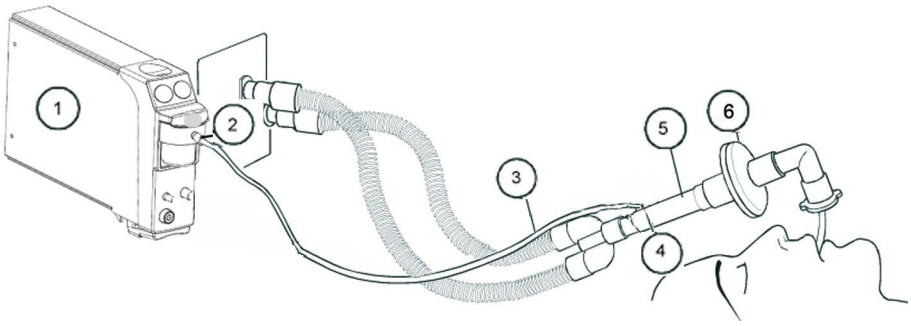


1. Patient Spirometry keys (**Save Loop**, **Change Loop**)
2. Water trap release/locking latch
3. Gas sample, sampling line connector on the water trap
4. Water trap container
5. Connectors for Patient Spirometry tubes
6. Connector for fresh gas used in end-tidal control. For more information on the use of the end-tidal control, please refer to the Aisys CS^2 user documentation.
7. Gas exhaust, connector for the gas exhaust line

NOTE Only qualified service personnel may remove the protecting screw from the fresh gas connector and attach the fresh gas sample tubing.

Airway gases measurement

Airway gases equipment to patient connections with CARESCAPE respiratory modules



1. CARESCAPE respiratory module
2. Gas sample, gas sampling line connector on the water trap
3. Gas sampling line

4. Gas sampling line connector on the airway adapter; place the connector upwards
5. Airway adapter with sampling line connector
6. Heat and moisture exchanger with filter (HMEF) (optional)

Setting up the airway gases measurement

1. Make sure that the water trap container is empty and properly attached.
2. Connect the gas sampling line to the sampling line connector on the water trap.
3. Connect the sample gas outlet to gas scavenging if N_2O or volatile agents are used.
4. Turn on the monitor or connect the module to the monitor. The monitor performs a self-check for the module when the module is connected. Automatic agent identification is activated in those modules that have this feature.
5. Wait until the message ***Calibrating*** or ***Calibrating gas sensor*** disappears before connecting the sampling line to the airway adapter or the airway adapter to the ventilator circuit.
6. Connect the sampling line to the airway adapter or the airway adapter to the ventilator circuit. Position the adapter with the sampling port upwards to minimize the amount of condensed water possibly entering the sampling line.
7. Check that the airway adapter connections are tight and that the adapter is operating properly.

NOTE Check that the sample line is connected to the water trap before connecting the module to the monitor or turning on the monitor.

NOTE To minimize the amount of dust drawn into the gas sampling system, always keep the water trap connected to the module. When gas measurement is not in use, you can disconnect the module from the monitor to eliminate the operating sound of the gas pump.

Airway gases warnings

General warnings

This symbol is identified by a yellow background, black triangular band, and a black symbol.

WARNING Always inspect the airway adapter for a tight connection and proper operation before attaching it to the patient.

WARNING Leaks in the gas sampling circuit (water trap and sampling line) may cause inaccurate readings.

WARNING Remove the airway sampling line from the patient's airway while nebulized medications are being delivered.

WARNING Handle the water trap and its contents as you would any body fluid. Infectious hazard may be present.

WARNING Since sample gas may contain anesthetic agents, make sure that it is not released in the room. Connect exhaust to a scavenging system to prevent exposure to anesthetic agents.

WARNING Strong scavenging suction may cause excessive sample gas flow and inaccurate gas readings.

WARNING Route all tubing away from the patient's throat to avoid strangulation.

WARNING To avoid the spread of infectious disease, do not allow the exhaust to discharge in the direction of the patient or user.

WARNING $EtCO_2$ values may differ from blood gas readings.

WARNING Do not use a CO_2 module at the same time as a multi-gas module.

WARNING When using the CARESCAPE respiratory modules with volume controlled ventilation at low tidal volumes, the specified gas withdrawal rate may significantly reduce the amount of gas delivered to the patient.

WARNING Make sure to compensate for the possible reduction of tidal volume caused by the 120 ml/min gas sample flow.

WARNING A failure in zeroing or calibrating airway gases may cause inaccurate readings.

WARNING Make sure that the module is always in vertical position when used.

WARNING Since calibration gas contains anesthetic agents, always ensure sufficient ventilation of the room during calibration.

WARNING Always ensure the correct size and fit of accessories according to patient type and application, especially when monitoring pediatric and neonatal patients. The size and fit of accessories may impact the measured gas concentration values at low tidal volumes. It is recommended to have the gas sampling port close to the proximal end of the endotracheal tube. Excessive dead space in the circuit, including the accessories, may cause re-breathing of gases. Very low accessory dead space between the breathing circuit Y-piece and the gas sampling site may impact the measured gas concentration due to dilution of the sampled exhaled gas with fresh gas from the ventilator. To confirm accurate correlation with measured gases and blood, check arterial blood gas values to confirm a suitable setup is used.

WARNING EQUIPMENT FAILURE OR INACCURATE READINGS. Planned maintenance should be carried out annually according to the instructions given in the technical manual. Failure to implement the recommended maintenance schedule may cause equipment failure or inaccurate readings.

WARNING PATIENT CROSS-INFECTION. Returning the sampled gas to the patient circuit causes a risk of patient cross-infection.

WARNING PATIENT CROSS-INFECTION. Always use a bacterial breathing system filter proximal to the patient when returning the sampled gas to the patient circuit. If a bacterial breathing system filter is not used, a failure in the D-Fend Pro water trap may cause a risk of patient cross-infection.

WARNING PATIENT CROSS-INFECTION. If the sampled gas is returned to the patient circuit, ensure the protective function of the D-Fend Pro water trap by replacing it at least once a week, or immediately in case of a defective or missing bacterial breathing system filter. Otherwise, there is a risk of patient cross-infection.

Airway gases cautions

CAUTION Never connect the loose end of the gas sampling line to the Patient Spirometry connector as this may break the spirometry unit. The Patient Spirometry connector is meant for the Patient Spirometry tube only.

CAUTION Do not apply pressurized air or gas to any outlet or tubing connected to the monitor. Pressure may destroy sensitive elements.

Scavenging

Preventing operating room pollution

When N_2O and volatile anesthetics are used, prevent operating room pollution by connecting the sample gas outlet (gas exhaust) of the module to the scavenging system.

Scavenging through the ventilator reservoir

1. Connect an exhaust line to the sample gas outlet (gas exhaust) on the module's front panel.
2. Attach the other end of the line to the ventilator reservoir. Make sure that the reservoir tube diameter is at least 2 to 3 times larger than the exhaust line.

Scavenging through the anesthesia gas scavenging system

Anesthesia machines are equipped with an anesthesia gas scavenging system (AGSS), and in some machines you can connect the sample gas outlet directly to it. See the anesthesia machine's user documentation to find out where and how the sample gas can be connected.

Connecting directly to the scavenging system

1. Connect the exhaust line to the module's sample gas outlet.
2. Connect the exhaust line only to an open scavenging system where gas is removed at room pressure.

NOTE Do not connect the module directly to a strong vacuum scavenging system.

Returning sampled gas to the patient circuit

Returning sampled gas to the patient circuit causes a risk of patient cross-infection. To prevent patient cross-infection always use a bacterial breathing system filter proximal to the patient. Ensure the protective function of the D-Fend Pro water trap by replacing it at least once a week, or immediately in case of a defective or missing bacterial breathing system filter.

1. Connect the exhaust line to the module's gas outlet.
2. Connect the exhaust line to the patient circuit.

NOTE Refer to the anesthesia machine's documentation to find out where and how the sample gas can be returned.

Airway gases points to note

- Use GE anesthesia sampling lines (PE/PVC) when anesthetic agents are used. If no anesthetic agents are present, you can use GE CO_2 sampling lines (PVC)
- Make sure that you are using the D-fend Pro or D-fend Pro+ water trap.
- Empty the water trap container as soon as it is more than half full. With a sample gas temperature of 37°C, a room temperature of 23°C, and sample gas relative humidity of 100 %RH, the water trap should be emptied every 24 hours (applies when the sample gas flow is within 120 ± 20 ml/min).
- When using an HMEF filter, place it between the patient and airway adapter.
- Place the airway adapter between the HMEF and Y-piece.
- Place the airway adapter in 45° tilt and all ports upwards to prevent condensed water from entering the adapter interior and the tubing
- Always check the tightness of all connections.
- Make sure that the gas sampling line is properly connected to the water trap and the water trap is properly connected to the airway gas module. Gas leaks in these connections may dilute the gas sample from the patient circuit, thus resulting in erroneous gas readings. During normal operation, all sampled gas flows out of the sample gas outlet. Room air is used as reference gas for the oxygen measurement and it is mixed with the sampled gas. The sampled gas is diluted by room air so that the fraction of room air in the exhaust gas is about 20%.

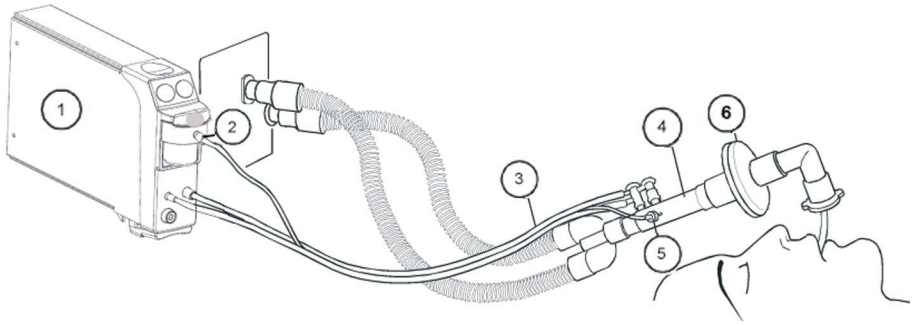
Airway gases troubleshooting

Problem	Solution
Airway gas values seem too low	• Check the sampling line and connectors for leakage. • Check the patient status. • Check the arterial blood gas values.
Airway gas values seem too high	• Check the sampling line for blockage. • Check the patient status. • Check the arterial blood gas values.

Problem	Solution
Module does not work	• Check and clean the filter if necessary. • Check the water trap and water trap connectors. Liquid may have entered the module. Replace the module and have it checked by authorized service personnel.
No airway gas values	• Check that the gas sampling line is connected to the water trap.

Patient Spirometry measurement

Patient Spirometry equipment to patient connection



1. E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVX, or E-sCAiOVE module
2. Gas sample, gas sampling line connector on the water trap
3. Gas sampling and spirometry tubes
4. D-lite/Pedi-lite sensor, or D-lite+/Pedi-lite+ sensor for humid conditions
5. Gas sampling line connector
6. Heat and moisture exchanger with filter (HMEF)

Preparing the Patient Spirometry measurement

1. Take a new Patient Spirometry tube and connect the tube to the D-lite(+)/Pedi-lite(+) sensor by inserting the angle connectors in the sensor connectors. Place all D-lite(+)/Pedi-lite(+) ports upwards with approximately a 45 °C tilt to prevent condensed water from entering the sensor interior and the tubings.
2. Connect the other end of the Patient Spirometry tube to the pressure connectors on the module.
3. Connect a gas sampling line to the Luer connector on the other side of the D-lite(+)/Pedi-lite(+) sensor.
4. Connect the other end of the gas sampling line to the sampling line connector on the module's water trap.
5. Make sure that the connections are tight.
6. Select the correct sensor type.
7. Connect the D-lite(+)/Pedi-lite(+) between the Y-piece and the intubation tube in the breathing circuit.

Patient Spirometry warnings

General warnings

This symbol is identified by a yellow background, black triangular band, and a black symbol.

WARNING The presence of Helium or Xenon in the breathing circuit causes incorrect measurement values.

WARNING Make sure you select the correct sensor type for the patient: D-lite(+) for adult patients, Pedi-lite(+) for pediatric patients. Also check the sensor type selection in the host device.

Patient Spirometry cautions

CAUTION Never connect the loose end of the gas sampling line to the Patient Spirometry connector as this may break the spirometry unit. The Patient Spirometry connector is meant for the Patient Spirometry tube only.

CAUTION Do not apply pressurized air or gas to any outlet or tubing connected to the monitor. Pressure may destroy sensitive elements.

Patient Spirometry points to note

- Place an HME/HMEF/filter between the D-lite(+)/Pedi-lite(+) sensor and the patient.
- Disconnect the HME/HMEF/filter and D-lite(+)/Pedi-lite(+) during nebulization of medications.
- The flow measurement should be calibrated once a year or when there is a permanent difference between inspiratory and expiratory volume. For further information, see the modules technical manual.
- Using a cuffless intubation tube may affect Patient Spirometry readings due to potential leakages around the endotracheal tube.
- When anesthetic agents are used, use a module with anesthetic agent (Ai) identification option.
- The flow and volume measurement of the CARESCAPE respiratory module is compensated for the density of the gas which is important for measurement accuracy with heavy molecules of anesthetic agents like Desflurane. However, using high concentrations of anesthetic agents may still affect flow and tidal volume readings. In this case, the CARESCAPE respiratory module tends to underestimate flow and volume.
- Depending on the type of patient circuit used, the temperature and humidity inside the D-lite flow sensor vary between dry ambient temperature air and 100% humid 37 °C air. As the CARESCAPE respiratory module needs to convert the measured volume/flow to ATPD or BTPS conditions, it needs to assume the temperature and humidity of the gas that flows through the flow sensor. By default the module assumes conditions equivalent to an HME patient circuit. If active humidification is used, the module will therefore overestimate the measured volume/flow by approx. 5%. For some host devices you can select the type of patient circuit used, and in this case the remaining error is minimized.

- When using active humidification, there might be condensation in the D-lite flow sensor affecting flow and volume readings. In this case, the CARESCAPE respiratory module tends to overestimate flow and volume.

Patient Spirometry troubleshooting

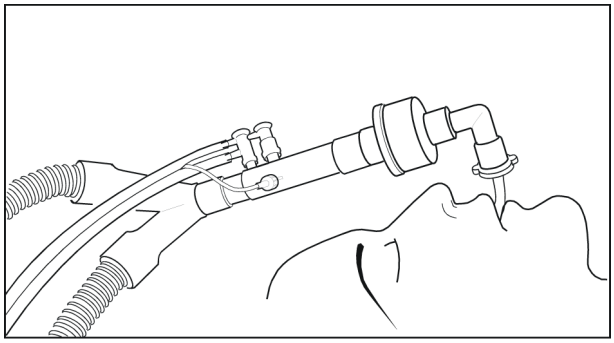
Problem	Solution
Values seem erroneous	• Check the patient status. • Check that you are using the correct sensor type: D-lite(+) for adult patients, Pedi-lite(+) for pediatric patients. • Check the sensor type selection. • Check that the Patient Spirometry tube connectors and their connections are tight and not leaking. • Check the arterial blood gas values. • Check that the sampling line is not kinked.
Values seem unstable	• Remove the D-lite(+)/Pedi-lite(+) and shake drops away. • Check that the connectors on the D-lite(+)/Pedi-lite(+) are intact and that connections are tight.
Strong vibrations in the loop	• Check the patient status. • Check the patient and system for water or secretions.

Gas exchange measurement

Gas exchange equipment to patient connection

The equipment to patient connections for gas exchange are similar to those of Patient Spirometry but there are also some connection-related issues to be noted. Only the modules E-sCAiOVX and E-sCOVX measure gas exchange.

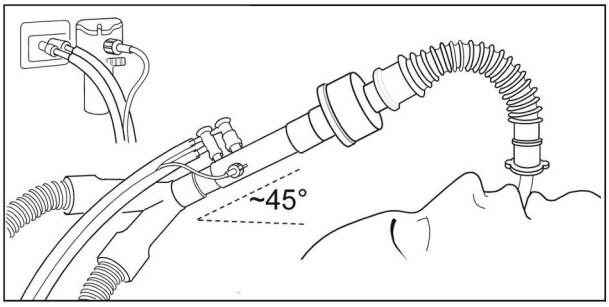
Gas exchange patient connections with HME/HMEF



NOTE Always place the HME/HMEF between the D-lite(+) sensor and the patient.

NOTE By-pass flow together with long expiration flow pause time may disturb the measurement. Consider using shorter expiration time to diminish the effect. In addition, you may use a suitable spacer with a 5 to 10 ml dead space (e.g., a straight T-adapter) between the Y-piece and D-lite(+)/Pedi-lite(+). The by-pass flow effect may exist even in an adult setting, but it is more emphasized when monitoring pediatric patients and using the Pedi-lite(+).

Gas exchange patient connections with flexible tube



NOTE Place all D-lite ports upwards with a 20° to 45° tilt to prevent condensed water from entering the sensor interior and the tubings.

NOTE When monitoring pediatric patients with tidal volumes less than 300 ml, use the Pedi-lite(+) sensor. Remember to select the sensor type accordingly.

Gas exchange warnings

Before using the gas exchange measurement, familiarize yourself with safety precautions related to airway gases and Patient Spirometry measurements as they apply to the gas exchange measurement also.

General warnings

This symbol is identified by a yellow background, black triangular band, and a black symbol.

WARNING The presence of Helium or Xenon in the breathing circuit causes incorrect measurement values.

WARNING Make sure you select the correct sensor type for the patient: D-lite(+) for adult patients, Pedi-lite(+) for pediatric patients. Also check the sensor type selection in the host device.

WARNING If the expiration gas flow during the end phase of the patient's expiration is close to zero for more than two seconds before the next inspiration starts, the ventilator's bypass flow may affect the measurement.

WARNING INACCURATE READINGS. As the gas exchange parameters are calculated from O_2, CO_2, and airway flow data, any conditions affecting the accuracy of these parameters will also affect the accuracy of gas exchange parameters. To avoid the risk of inaccurate gas exchange readings that may result in compromised patient safety, adhere to the given measurement guidelines for O_2, CO_2, and airway flow measurements and check that these measurements are functioning properly.

WARNING INACCURATE READINGS. The following conditions affect the accuracy and performance of the gas exchange measurement:

- A leaking airway.
- The use of a sampling line other than a 2–meter non-nasal sampling line.
- The use of high FiO_2.
- The fluctuation of the delivered FiO_2 level during inspiration.
- The use of N_2O in ventilation.
- High pressure variation from PEEP to Ppeak.
- The use of Helium or Xenon in ventilation.
- High respiration rates.
- The use of high frequency ventilation (HFV).
- The use of bi-level positive airway pressure (BiPAP).
- Irregular airway flow pattern.
- High bias flow, especially when using ventilation settings resulting in periods with no airway flow.
- Irregular CO_2 amplitude.

If these conditions are present, there is a risk of inaccurate readings, which may result in compromised patient safety.

WARNING INACCURATE READINGS. Increased inspiratory dead space in breathing systems without expiratory by-flow through the Y-piece may cause too large VCO_2 and VO_2 readings. To avoid any risk to the patient, always take this into account when interpreting the measurement results with such breathing systems.

Gas exchange cautions

General cautions

This symbol is identified by a white background, black triangular band, and a black symbol.

CAUTION Never connect the loose end of the gas sampling line to the Patient Spirometry connector as this may break the spirometry unit. The Patient Spirometry connector is meant for the Patient Spirometry tube only.

CAUTION Do not apply pressurized air or gas to any outlet or tubing connected to the monitor. Pressure may destroy sensitive elements.

Gas exchange measurement limitations

- This measurement is not available in the NICU software package.
- Only the E-sCAiOVX and E-sCOVX modules measure gas exchange.

NOTE Routine calibration checks are required to ensure the measurement accuracy.

Gas exchange points to note

- Gas exchange measurement is for intubated patients only.
- Use only 2-meter (7-ft) gas sampling lines. Using other lines may cause inaccurate readings.
- FiO_2 delivery from the ventilator side should be stable.
- High PEEP or ventilating pressures may activate a message prompting to check the water trap. In this case, you may consider decreasing the PEEP if possible.
- To ensure measurement accuracy, check the accuracy of airway gas measurement every two months: feed calibration gas mixture to the monitor in the normal operation mode (without entering the calibration menu) and check that the readings on the monitor match those on the calibration gas bottle. If they do not match, calibrate airway gases.
- When anesthetic agents are present, use the E-sCAiOVX module for monitoring airway flow and gas exchange.
- Any acute change in alveolar ventilation will be immediately reflected in CO_2 output, which will not measure the metabolic production of CO_2 until a new steady state has been achieved. The time required for the stabilization varies widely and ranges from 30 to 120 minutes.

Gas exchange troubleshooting

Problem	Solution
Gas exchange values are too low.	• Check the sampling line and connectors for leakage.
Gas exchange values seem unreliable.	• Check the ventilation settings. • Check the inspired oxygen concentration and correct if necessary (max. 85%). • Check that pressure variation from PEEP to Ppeak is not too high. • Check the Patient Spirometry data to ensure that flow measurement is functioning properly.

Problem	Solution
	• If the expiration gas flow during the end phase of the patient's expiration is close to zero for more than two seconds before the next inspiration starts, the ventilator's bypass flow may affect the measurement. You can reduce this effect by adding a suitable spacer with a 5 to 10 ml dead space (e.g., a straight T-adapter) between the Y-piece and the D-lite or the Pedi-lite adapter.
Module does not work.	• Check and clean the filter if necessary. • Check the water trap. If it was too full, liquid may have entered the module. Replace the module and have it checked by authorized service personnel.
No gas exchange values.	• Check that the gas sampling line is not connected to the sample gas out connector.
VO_2 values are non-physiologic.	• Verify that the oxygram curve is stable. • Change the sampling line. • Check the D-lite placement.
Are gas exchange values accurate with 100% oxygen?	No, gas exchange measurements are not possible when the FiO_2 > 85%. This is also indicated on screen by the replacement of numbers by ---. Please also note that full measurement accuracy is obtained when FiO_2 is less than 65%. Between 65% and 85% FiO_2, the accuracy is reduced to +/-15%
Can the gas exchange modules be used with active humidification?	Yes, they can. Use the D-lite+/Pedi-lite+ flow sensor for humid conditions. If HME is used, both the D-lite/Pedi-lite and D-lite+/Pedi-lite+ can be used.
Can the gas exchange modules be used with pediatric patients?	Yes, for those pediatric patients whose respiration rate is below 35 breaths/minute. When monitoring pediatric patients, use the Pedi-lite sensor and select the sensor accordingly from the monitor menu.
How can I ensure that the VCO_2 and VO_2 values are correct?	Always make sure that you are using correct accessories and that the measurement setup and patient connections are correct.
Why does the RQ value rise above 1.0?	The physiological range of RQ is usually between 0.7 and 1.0. If the value is out of this range, check the measurement setup.
Why does the RQ value sometimes show unphysiological values such as RQ < 0.6?	Usually this is due to a non-steady state: the ventilator settings have been changed, FiO_2 has changed, the ventilation is irregular.

Cleaning and care

For detailed maintenance instructions, refer to the respiratory modules' technical documentation.

WARNING EQUIPMENT FAILURE OR INACCURATE READINGS. Planned maintenance should be carried out annually according to the instructions given in the technical manual. Failure to implement the recommended maintenance schedule may cause equipment failure or inaccurate readings.

For detailed cleaning instructions, refer to the host device's user documentation.

CAUTION Do not apply pressurized air or gas to any outlet or tubing connected to the monitor. Pressure may destroy sensitive elements.

D-fend Pro(+) water trap

- Change the water trap every two months (D-fend Pro) or every 24 hours (D-fend Pro+), or whenever a message prompts you to do so.
- If the sampled gas is returned to the patient circuit, ensure the protective function of the D-Fend Pro water trap by replacing it at least once a week, or immediately in case of a defective or missing bacterial breathing system filter.
- Remove the water trap by pressing the release latch and pulling the water trap out.
- Attach the water trap by pushing it firmly to its place, so that the locking latch makes a clicking sound.
- Empty the container whenever half full and for each new patient. In normal conditions, the container fills up in 24 hours.
- The water trap cartridge is disposable. Do not wash or reuse the cartridge.
- Also read the water trap instructions for use in the accessory package.

Reusable D-lite and Pedi-lite sensor cleaning instructions

Reusable D-lite and Pedi-lite sensors can be washed, disinfected, or steam autoclaved. Make sure that the sensor is dry and the connectors are not damaged. A tight connection is essential for correct measurement.

Also read the sensor instructions for use in the accessory package.

Calibration warnings

General warnings

This symbol is identified by a yellow background, black triangular band, and a black symbol.

WARNING A failure in zeroing or calibrating airway gases may cause inaccurate readings.

WARNING Since calibration gas contains anesthetic agents, always ensure sufficient ventilation of the room during calibration.

Airway gas calibration

Follow the recommended calibration intervals (every six months in normal use and every two months in continuous use) to ensure that the measurement accuracy remains within specifications.

- E-sCAiO, E-sCAiOV, E-sCAiOVX, E-sCAiOE, E-sCAiOVE: Use calibration gas 755583-HEL.
- E-sCO, E-sCOV, E-sCOVX: Use calibration gas 755581-HEL.
- All modules: Use regulator 755534-HEL.

NOTE Calibration gas bottles with anesthetic agents must be disposed of in compliance with the guidelines regulating the disposal of products containing anesthetic agents.

For detailed instructions, see the monitor's user documentation.

Patient Spirometry calibration

Perform flow calibration if the difference between the inspiratory and expiratory volumes is permanent. For instructions, see the modules technical manual.

System compatibility

The CARESCAPE respiratory modules E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOV, E-sCAiOVX, E-sCAiOE, and E-sCAiOVE can be used for respiratory monitoring in the following host systems:

- CARESCAPE Monitor B850
- CARESCAPE Monitor B650
- CARESCAPE Monitor B450
- B40 Patient Monitor (2060600-002)
- Aisys CS^2
- Avance CS^2
- 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-CANE 05(A) 19.6 or later
- S/5 Compact Critical Care Monitor, software version L-CICU 05(A) 19.6 or later

NOTE Low sample gas flow situation is indicated with the message ***Replace D-Fend*** in the L-xxx06(A) software versions 24.1 and L-xxx05(A) software versions 19.6.

NOTE The CARESCAPE respiratory modules cannot be used in the S/5 Extension Frame.

NOTE The Neonatal Intensive Care Unit (NICU) software package of the CARESCAPE modular patient monitors may not support the use of CARESCAPE respiratory modules.

NOTE Displayed data (including but not limited to TV, MV, RR, Raw and N_2O), 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.

NOTE The following modules are considered identical and cannot be used in the same system at the same time: E-CO, E-sCO, E-COV, E-sCOV, E-COVX, E-sCOVX, E-CAiO, E-sCAiO, E-sCAiOE, E-CAiOV, E-sCAiOV, E-sCAiOVE, E-CAiOVX, E-sCAiOVX, E-miniC, N-CAiO, N-FC, N-FCREC.

Supplies and accessories

General warnings

This symbol is identified by a yellow background, black triangular band, and a black symbol.

WARNING Single-use products are not designed to be reused. Reuse may cause a risk of cross-contamination, affect the measurement accuracy and/or system performance, and cause a malfunction as a result of the product being physically damaged due to cleaning, disinfection, re-sterilization and/or reuse.

WARNING Use only approved accessories, including mounts, and defibrillator-proof cables and invasive pressure transducers. For a list of approved accessories, see the supplemental information manual. Other cables, transducers and accessories may cause a safety hazard, damage the equipment or system, result in increased emissions or decreased immunity of the equipment or system or interfere with the measurement.

Always ensure the correct size and fit of accessories according to patient type and application, especially when monitoring pediatric and neonatal patients.

The listed GE accessories may be used to perform the full respiratory gas monitoring, Patient Spirometry and gas exchange measurements.

NOTE Certain accessories are not available in all markets.

NOTE For information regarding materials used in accessories, see the instructions for use for the specific accessory.

Gas accessories

Part Number	Gas Accessory Description	Approved for use with
M1182629	D-fend Pro Water Trap for anesthesia, reusable. Recommended use: anesthesia, recommended time to replace: 2 months or when occluded.	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1200227	D-fend Pro+ Water Trap for critical care, single use. Recommended use: ICU or other humid conditions, recommended time to replace: 24 hours or when occluded.	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
73385-HEL	Straight T-adapter, 22mm/15mm, dead space: 7.5 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE

Part Number	Gas Accessory Description	Approved for use with
733856	Straight T-adapter, 22mm/15mm, dead space: 7.5 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145066	Straight T-adapter UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
73386-HEL	Elbow Adapter, 22mm/15mm, dead space: 10 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
733866	Elbow Adapter, 22mm/15mm, dead space: 10 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145067	Airway Elbow Adapter, Disposable, UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8001540	Low Dead Space Adapter for ET tubes with ID 2.5 mm, dead space: 0.1 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8001541	Low Dead Space Adapter for ET tubes with ID 3.0 mm, dead space: 0.15ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8001542	Low Dead Space Adapter for ET tubes with ID 3.5 mm, dead space: 0.2ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8001543	Low Dead Space Adapter for ET tubes with ID 4.0 mm, dead space: 1 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8000062	Low Dead Space Adapter for ET tubes with ID 4.5 mm, dead space: 1 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8000063	Low Dead Space Adapter for ET tubes with ID 5.0 mm, dead space: 1 ml	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
73318-HEL	Disposable Anesthesia Gas Sampling Line, Male/Male Luer-Lok, 2 m/7 ft., material: PVC/PE, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE

Part Number	Gas Accessory Description	Approved for use with
733188	Disposable Anesthesia Gas Sampling Line, Male/Male Luer-Lok, 2 m/7 ft., material: PVC/PE, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145069	Disposable Anesthesia Gas Sampling line, 2m/7ft, UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
73319-HEL	Disposable Anesthesia Gas Sampling Line, Male/Male Luer-Lok, 3 m/10 ft., material: PVC/PE, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
733199	Disposable Anesthesia Gas Sampling Line, Male/Male Luer-Lok, 3 m/10 ft., material: PVC/PE, inner Ø 1.2 mm, outer ØO 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145070	Disposable Anesthesia Gas Sampling Line, 3m/10ft, UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
73306	Disposable Anesthesia Gas Sampling Line, Male/Male Luer-Lok, 6 m/20 ft., material: PVC/PE, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145071	Disposable Anesthesia Gas Sampling Line, 6m/20ft, UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
733170	Disposable Anesthesia Gas Sampling Line with elbow connector Male/Male elbow Luer-Lok, 3 m/10 ft., material: PVC/PE, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145072	Disposable Anesthesia Gas Sampling Line with elbow connector Male/Male elbow Luer-Lok, 3m/10ft, UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8004383	Disposable Anesthesia Gas Sampling Line with elbow connector Male/Male elbow Luer-Lok, 2 m/7 ft., material: PVC/PE, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1145073	Disposable Anesthesia Gas Sampling Line, with elbow connector Male/Male elbow Luer-Lok, 2 m/7 ft, UK Version	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
733162-HEL	Disposable CO2 Sampling Line, Male/Male Luer-Lok, 2 m/7 ft., material: PVC, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX
M1145075	Disposable CO2 Sampling Line, Male/Male Luer-Lok, 2 m/7 ft., UK Version	E-sCO, E-sCOV, E-sCOVX

Part Number	Gas Accessory Description	Approved for use with
733163	Disposable CO2 Sampling Line, Male/Male Luer-Lok, 3 m/10 ft., material: PVC, inner Ø 1.2 mm, outer Ø 2.8 mm	E-sCO, E-sCOV, E-sCOVX
M1145076	Disposable CO2 Sampling Line, Male/Male Luer-Lok, 3 m/10 ft., UK Version	E-sCO, E-sCOV, E-sCOVX
878033	Nasal Sampling Line, pediatric, 2 m/7 ft., material: PVC	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
878034	Nasal Sampling Line, adult, 2 m/7 ft., material: PVC	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
878035	Nasal Sampling Line, large adult, 2 m/7 ft., material: PVC	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1031274	Exhaust Line for gas return or scavenging, 2 m/7 ft., disposable	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8004462	Exhaust Line with Coulter fitting, 1 m/41 in., disposable	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
8004463	Exhaust Line with Coulter fitting, 18 cm/7 in., disposable	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
755534-HEL	D-gate Calibration Gas Regulator for Quick Cal calibration gas aerosol cans	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
M1006864	Calibration Gas Regulator for Quick Cal calibration gas, aerosol cans	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
755581-HEL	Quick Cal Calibration Gas, aerosol can, contains 5.0% CO_2, 40.0% N_2O, 55.0% O_2, balance O_2, accuracy: ±0.5% relative	E-sCO, E-sCOV, E-sCOVX
755587	Quick Cal Calibration Gas, aerosol can, contains: 5.0% CO_2 ±0.03% abs, balance O_2	E-sCO, E-sCOV, E-sCOVX
755583-HEL	Quick Cal Calibration Gas, aerosol can, contains 2.0% Desflurane, 5.0% CO_2, 33.0% N_2O, 55.0% O_2, balance N_2, accuracy: ±2.0% relative	E-sCAiO, E-sCAiOE, E-sCAiOV, , E-sCAiOVX, E-sCAiOVE
2070599–001	Adult O_2 Nasal Cannula with CO_2 sampling, 2 m (7 ft)	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE

Part Number	Gas Accessory Description	Approved for use with
2070600–001	Pediatric O_2 Nasal Cannula with CO_2 sampling, 2 m (7 ft)	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
4797 (Salter Labs part number)	Salter Labs Adult oral/nasal CO_2 sampling cannula with O_2 line, 2 m (7 ft)	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
4793 (Salter Labs part number)	Salter Labs Pediatric oral/nasal CO_2 sampling cannula with O_2 line, 2 m (7 ft)	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
4000 (Salter Labs part number)	Salter Labs Adult nasal CO_2 sampling cannula, 2 m (7 ft)	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE
4100 (Salter Labs part number)	Salter Labs Pediatric nasal CO_2 sampling cannula, 2 m (7 ft)	E-sCO, E-sCOV, E-sCOVX, E-sCAiO, E-sCAiOE, E-sCAiOV, E-sCAiOVX, E-sCAiOVE

Patient Spirometry and gas exchange accessories

Part Number	Patient Spirometry and Gas Exchange Accessory Description	Approved for use with
733950	D-lite Sensor, 22mm M/15mm F-15mm M, material: yellow polystyrene, dead space: 9.5 ml, resistance: 0.5 cm H_2O at 30 l/min; patient range: TV 150 - 2000 ml	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
M1145077	D-lite Sensor, 22mm M/15mm F-15mm M, material: yellow polystyrene, UK Version	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
896952	D-lite+ Sensor, for humid conditions, 22mm M/15mm F-15mm M, material: clear polystyrene, dead space: 9.5 ml, resistance: 0.5 cm H_2O at 30 l/min; patient range: TV 150 - 2000 ml	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
8001948	Pedi-lite+ Sensor for humid conditions, 22mm M/ 15mm F - 15mm M, material: clear polystyrene, dead space 2.5 ml, resistance: 1.0 cm H_2O at 10 l/min; patient range: TV 15 - 300 ml	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
733910-HEL	D-lite Sensor, 22mm M/15mm F-15mm M, material: transparent yellow polyphenylsulfone, dead space: 9.5 ml, resistance: 0.5 cm H_2O at 30 l/min; patient range: TV 150 - 2000 ml	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
73393	Pedi-lite Sensor, 22mm M/15mm F-15mm M, material: transparent yellow polyphenylsulfone, dead space: 2.5 ml, resistance: 1.0 cm H_2O at 10 l/min; patient range: TV 15 - 300 ml	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX

Part Number	Patient Spirometry and Gas Exchange Accessory Description	Approved for use with
890031	Spirometry Tube, yellow, 2 m/7 ft.	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
M1145087	Spirometry Tube, yellow, 2 m/7 ft., UK Version	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
884101	Spirometry Tube, yellow, 3 m/10 ft.	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
M1145088	Spirometry Tube, yellow, 3 m/10 ft., UK Version	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
889560	Patient Spirometry Kit, adult, includes: • 1 disposable 3 m/10 ft. anesthesia sampling line (73319-HEL) • 1 disposable yellow, D-lite sensor (733950) • 1 disposable 3 m/10 ft. spirometry tube, yellow (884101)	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
M1145081	Patient Spirometry Kit, Adult, UK Version	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
8002718	Patient Spirometry Kit, pediatric, includes: • 1 disposable 2m/7 ft. anesthesia sampling line (73318) • 1 disposable Pedi-lite+ flow sensor (8001948) • 1 disposable 2 m/7 ft. spirometry tube (890031)	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
M1032634	Patient Spirometry Kit, pediatric, includes: • 1 disposable 3 m/10 ft. anesthesia sampling line (73319-HEL) • 1 disposable Pedi-lite+ flow sensor (8001948) • 1 disposable 3 m/10 ft. spirometry tube (884101)	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
894255	Patient Spirometry Kit for ICU, includes: • 1 disposable 2 m/7 ft. CO_2 sampling line (733162) • 1 disposable 2 m/7 ft. spirometry tube (890031) • 1 single-use D-lite sensor (733950) • 1 HMEF 1000 (557070100)	E-sCOV, E-sCOVX
8004381	Patient Spirometry Kit for humid conditions, includes: • 1 disposable 2m/7ft. anesthesia gas sampling line with elbow connector (8004383) • 1 disposable D-lite+ sensor (896952) • 1 disposable 2m/7ft. spirometry tube (890031)	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX

Part Number	Patient Spirometry and Gas Exchange Accessory Description	Approved for use with
8004382	Patient Spirometry Kit for humid conditions, includes: • 1 disposable 3m/10ft., anesthesia gas sampling line with elbow connector (733170) • 1 disposable D-lite+ sensor (896952) • 1 disposable 3m/10ft. spirometry tube (884101)	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
884202	Spirometry Tester, measurement range: tidal volumes 0-300/1200 ml, pressures 0-29 cm H_2O	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
891191-HEL	Spirometry Tube, yellow, 6m/20ft	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
M1145089	Spirometry Tube, yellow, 6m/20ft, UK Version	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX

Technical specifications

Physical characteristics

Size (H x W x D)	112 x 37 x 205 mm (4.4 x 1.5 x 8.7 in)
Weight	0.7 kg (1.5 lb)
Power consumption	3.9 W

Operating characteristics

Warm-up time	CO_2, O_2 and N_2O measurements: 1 minute Anesthetic agent measurement and identification: 5 minutes
Gas sampling rate	120 ml/min ±20 ml/min

The electronic sampling rate of the gas sensor signals is 25 Hz, equaling a new data point on the gas waveform traces every 40 ms.

Automatic compensation for ambient pressure

Operating conditions

Ambient temperature	+10°C to +40°C
Ambient pressure	660 mbar to 1060 mbar
Ambient humidity	0%RH to 98%RH, non-condensing

Storage conditions

Ambient temperature	-25°C to +60°C
Ambient pressure	500 mbar to 1060 mbar
Ambient humidity	10%RH to 90%RH, non-condensing

Airway gases specifications

General characteristics

Specifications are valid at the following normal operating conditions:

Ambient temperature	+18°C to +28°C, within ±5°C of calibration
Ambient pressure	660 mbar to 1060 mbar, ±67 mbar of calibration
Ambient humidity	20%RH to 80%RH, non-condensing, ±20%RH of calibration
Sampling line length	2 and 3 meters
Respiration rate	4 to 70 breaths/minute (Halothane 4 to 50 breaths/minute)
Airway pressure	-20 mbar to +100 mbar
Module operating time	>20 minutes continuously

The displayed ranges of parameter values depend on the host device. For more information, refer to the host device's user documentation.

Respiration rate

Breath detection	1 vol% change in CO_2 level
Measurement range	4 to 100 breaths/min
Accuracy	At 4 to 20 breaths/min: ±1 breath/min At 20 to 100 breaths/min: ±5%

RR value is updated breath-by-breath.

Respiration rate verification method

The rated respiration rate range and the corresponding end-tidal gas reading accuracy were tested with reference gases of known concentrations. The test gases were fed to the gas sampling system of the module through an electrically actuated valve with very low internal volume. Depending on its actuation status, the valve directed either room air or a test gas to the gas sampling line. The desired respiration rates were set by the electrical actuating times of the valve.

The measurement accuracy of the end-tidal gas readings was tested using 3–meter gas sampling lines connected to the gas sample port of the D-fend Pro water trap. The gas sampled to the sampling line was switched from room air to the test gases using electrically actuated valve with low internal dead space to generate step changes in the gas concentrations. The electrical actuating signal of the valve was generated using a highly accurate signal generator to accurately control the simulated respiration rate.

Expiration time and end-tidal readings

The length of expiration time has impact on the accuracy of the gas-specific end-tidal readings. The longer the expiration time, the better the module achieves the correct end-tidal reading. With I:E 2:1, the gas specific end-tidal values are within specifications up to respiration rate 45 1/min except with halothane (32 1/min with halothane). With other I:E values, the end-tidal readings are within specifications.

Carbon dioxide

Measurement range	0 vol% to 15 vol% 0 kPa to 15 kPa 0 mmHg to 113 mmHg
Accuracy	±(0.2 vol% +2% of reading)
Gas cross effects by O_2, N_2O, and anesthetic agents	<0.2 vol%
Total system response time	< 3.3 s
Rise time	< 260 ms
CO_2 drift	< 0.1 vol%

$EtCO_2$ and $FiCO_2$ values are updated breath-by-breath.

Oxygen

Measurement range	0 vol% to 100 vol%
Accuracy	±(1 vol% +2% of reading)
Gas cross effects by anesthetic agents	<1 vol%
Gas cross effects by N_2O	<2 vol%
Total system response time	< 3.3 s
Rise time	< 260 ms
O_2 drift	< 0.3 vol%

$EtCO_2$ and $FiCO_2$ values are updated breath-by-breath.

Nitrous oxide

Measurement range	0 vol% to 100 vol%
Accuracy at ($0 < N_2O < 85$ vol%)	±(2 vol% +2% of reading)
Gas cross effects by anesthetic agents	<2 vol%
Total system response time	< 3.4 s
Rise time	< 320 ms
O_2 drift	< 0.3 vol%

$EtCO_2$ and $FiCO_2$ values are updated breath-by-breath.

Anesthetic agents

Measurement range	Sevoflurane: 0 vol% to 8 vol% Desflurane: 0 vol% to 20 vol% Isoflurane, enflurane, halothane: 0 vol% to 6 vol%
Accuracy	±(0.15 vol% +5% of reading)
Gas cross effects by N_2O	0.15 vol%
Total system response time	< 3.5 s (< 3.8 s for Halothane)

Anesthetic agents

Rise time	< 420 ms (< 800 ms for Halothane)
Hal drift	< 0.1 vol%
Enf drift	< 0.1 vol%
Iso drift	< 0.1 vol%
Sev drift	< 0.1 vol%
Des drift	< 0.3 vol%

EtAA and FiAA values are updated breath-by-breath.

The module automatically identifies the anesthetic agent present in the sampled gas and measures the concentration of the identified agent.

Identification threshold	0.15 vol%
Identification time	< 20 s

The module automatically identifies mixtures of two anesthetic agents present in the sampled gas and measures the concentrations of the two identified agents.

Identification threshold for the 2nd agent

At 1 MAC of the 1st agent	0.2 vol% +10% of the concentration of the 1st agent

Non-disturbing gases

A gas is considered non-disturbing if its effects to the measured gas are as follows:

CO_2	< 0.2 vol%
O_2, N_2O	< 2 vol%
Anesthetic agents	< 0.15 vol%

The following gases are non-disturbing when tested according to ISO 21647(2004B):ethanol, acetone, isopropanol, methane, nitrogen, carbon monoxide, nitric oxide, freon R134A (for CO_2, O_2 and N_2O), water vapor.

The effects caused by N_2O to the measurement of CO_2, O_2 and anesthetic agents are automatically compensated for.

The effects caused by anesthetic agents to the measurement of CO_2 and N_2O are automatically compensated for.

Effects of interfering gases

Helium (50 vol%)	Decreases CO_2 readings by less than 0.5 vol% at 5 vol% of CO_2 Decreases O_2 readings by less than 2 vol% at 50 vol% of O_2
Xenon (80 vol%)	Decreases CO_2 readings by less than 0.5 vol% at 5 vol% of CO_2 Decreases O_2 readings by less than 1.5 vol% at 14 vol% of O_2

Patient Spirometry specifications

General characteristics

Specifications are valid at the following operating conditions:

The module has been operating continuously for 10 minutes.

Airway adapter, adult	D-lite
Airway adapter, pediatric	Pedi-lite
Respiration rate	Adults: 4 to 35 breaths/min Pediatric patients: 4 to 70 breaths/min
I:E ratio	1:4.5 to 2:1
Airway humidity	10 %RH to 100 %RH
Ambient temperature	+10°C to +40°C
Ambient pressure	660 mbar to 1060 mbar
Ambient humidity	10 %RH to 98 %RH (non-condensing)

The displayed ranges of parameter values depend on the host device. For more information, refer to the host device's user documentation.

Airway pressure

Measurement range	-20 cmH_2O to +100 cmH_2O
Accuracy	±1 cmH_2O
Time resolution	10 ms

Values calculated from the measured airway pressure data:

- Peak pressure (Ppeak)
- Plateau pressure (Pplat)
- Mean pressure (Pmean)
- Positive end expiratory pressure (PEEPtot or PEEPi and PEEPe)
- Static positive end expiratory pressure (static PEEPe and static PEEPi)

Airway gas flow

Measurement range	Adults: -100 l/min to +100 l/min Pediatric patients: -25 l/min to +25 l/min
Time resolution	10 ms

Flow measurement has automatic compensation for airway pressure and effects caused by variation in the concentrations of the gas components measured by the module.

Tidal volume

The module calculates the volume by integrating the measured gas flow over time. Tidal volumes (TVinsp and TVexp) are obtained as the change of volume during inspiration and expiration.

Measurement range	With D-lite: 150 ml to 2000 ml With Pedi-lite: 5 ml to 300 ml
Accuracy	With D-lite: ±6% or 30 ml (whichever is greater)
• Accuracy verified at ATPD conditions.	With Pedi-lite: ±6% or 4 ml (whichever is greater)

Minute volume

The module calculates the inspired and expired minute volumes as the sum of inspired (MVinsp) and expired (MVexp) gas volume during one minute.

Measurement range	With D-lite: 2 l to 20 l With Pedi-lite: 0.1 l to 5 l

Compliance

The module calculates both the compliance (Compl) and static compliance (static Compl). Compliance is calculated by dividing the expired gas volume (TVexp) by the change in the airway pressure (Pplat - PEEPtot). Static compliance is calculated by dividing TVexp by the difference of static Pplat and static PEEPtot.

Measurement range	Adults: 4 ml/cmH_2O to 100 ml/cmH_2O Pediatric patients: 1 ml/cmH_2O to 100 ml/cmH_2O

Airway resistance

The module calculates the airway resistance (Raw) by solving the lung model equation P(t) = Raw * F(t) + V(t) / Compl + PEEPtot

where: P(t), F(t) and V(t) are the time dependent waveforms of pressure, flow, and volume, respectively

Measurement range	0 cmH_2O/l/s to 200 cmH_2O/l/s

Inspiration to expiration ratio

The module measures ratio of the inspiratory and expiratory time (I:E). The inspiratory time is the time from the start of inspiration to the start of expiration. The end inspiratory pause, if one exists, is included in the inspiration. Accordingly, expiratory time is the time from the start of expiration to the start of the next inspiration.

Gas exchange specifications

General characteristics

Not valid with N_2O, Xenon, or Helium.

Specifications are valid at the following operating conditions:

The module has been operating continuously for >20 minutes.

Ambient temperature	+18°C to +28°C, within ±5°C of gas calibration
Ambient pressure	660 mbar to 1060 mbar, ±67 mbar of gas calibration

General characteristics

Ambient humidity	20 %RH to80 %RH (non-condensing), ±20 %RH of gas calibration
Sampling line length	2 meters
Airway adapter, adult	D-lite
Airway adapter, pediatric	Pedi-lite
Respiration rate	Adults: 4 to 35 breaths/min Pediatric patients: 8 to 35 breaths/min
Tidal volume	Adults: 150 to 1500 ml Pediatric patients: 50 to 300 ml
Minute volume	Adults: 4 to 14 liters Pediatric patients: 1 to 5 liters
I:E ratio	1:4.5 to 2:1
Airway humidity	10 %RH to 100 %RH
Airway compliance	Adults: 30 to 60 ml/cmH_2O Pediatric patients. 10 to 40 ml/cmH_2O
Airway resistance	Adults: 5 to 20 cmH_2O/l/s Pediatric patients: 10 to 40 cmH_2O/l/s
Airway PEEP	0 to 30 cmH_2O
FiO_2	≤ 85%

The displayed ranges of parameter values depend on the host device. For more information, refer to the host device's user documentation.

VCO_2 and VO_2 measurement range	20 to 999 ml/min
VCO_2 and VO_2 resolution	1 ml/min
VCO_2 and VO_2 accuracy (verified in room air conditions using dry gas.)	FiO_2 <65%: ±10% or 10 ml, whichever is greater FiO_2 <85%: ±15% or 15 ml, whichever is greater
VCO_2 and VO_2 measurement	Not valid with O_2+N_2O mixtures

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CE 0537

Tec 820 Vaporizer

Combining clinical performance with ergonomic design

The agent specific Tec™ 820 Vaporizer from GE Healthcare delivers isoflurane and sevoflurane effectively and efficiently. Each Tec 820 presents an improved ergonomic design, with consistent agent delivery and reliability while reducing total cost of ownership

Features

- Tec 820 agent specific vaporizers are designed to deliver isoflurane and sevoflurane anesthetic agents
- Provides output consistent with the dial setting throughout the clinical flow range
- Easy to turn dial and fine graduations help control agent delivery
- Enhanced design with consistent, reliable operation over the product life
- Tec 820 vaporizer supports the Easy-Fil agent filling mechanism
- Improved ergonomics and contemporary design complements GE Healthcare's anesthesia systems
- Attaches to GE Healthcare interlocking Selectatec™ manifold
- No planned factory service needed
- Three-year warranty

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Clinical performance

- Tec 820 Vaporizers are designed to provide consistent output throughout the clinical flow range from 200 ml/min to 15 l/min. Models are available for isoflurane and sevoflurane
- Tec 820 Vaporizers are equipped with a large diameter control dial with graduations up to 5% V/V (isoflurane models) or 8% V/V (sevoflurane models)
- The easy turning dials and small graduations on the Tec 820 Vaporizer help you fine tune anesthetic delivery over the full range of dial settings and flow rates

Enhanced ergonomics

- The ergonomic dial release on the Tec 820 Vaporizer allows either left or right hand operation
- Wide, centered liquid level indicator provides a clear indication of the fill level of the vaporizer
- Easy to turn dial with enhanced readability

Lower overall ownership costs

- The Tec 820 Vaporizer has no planned factory service, which helps lower the total cost of ownership and eliminate the logistical challenges associated with the return of vaporizers to the factory. For complete user maintenance requirements, refer to the User Reference Manual
- The Tec 820 Vaporizer comes with a three-year warranty

Reliability, convenience, and operating excellence

- Tec 820 is compatible with modern agent filling systems that simplify filling and help minimize agent leaks while filling
- To minimize filling frequency, the Tec 820 Vaporizer can hold up to 300 ml of anesthetic agent
- The Tec 820 Vaporizer can be mounted on GE Healthcare anesthesia systems equipped with the Selectatec manifold without tools and without taking the anesthesia system out of service
- The Tec 820 Vaporizer also interlocks in series with GE Healthcare Tec 7 and Tec 6 Plus Vaporizers
- The non-spill system in the Tec 820 Vaporizer limits movement of liquid agent if the vaporizer is tilted or inverted, protecting internal components and helping maintain output within clinically acceptable limits

Easy-Fil helps simplify agent filling

Tec 820 agent specific vaporizers

Physical specifications

Dimensions

Height:	25 cm
Depth:	22 cm
Width:	11 cm
Weight:	7 kg dry

Agent capacity

Total capacity:	300 ml
Capacity between min/max fill marks:	170 ml
Wick system capacity:	75 ml approximately

Pneumatics specifications

Calibration and flow resistance

Calibration:	Calibration of all models is done at 21°C using O_2 as carrier gas, 5 l/min fresh gas flow, at sea-level ambient pressure
Isoflurane models:	Control dial calibrated up to 5% V/V. The control dial is marked in steps of 0.25% up to 1% and in steps of 0.5% between 1% and 5%.
Sevoflurane models:	Control dial calibrated up to 8% V/V. Control dial is marked in steps of 0.25% up to 1% and in steps of 0.5% between 1% and 8%.
Flow resistance:	OFF: Isolated, no resistance from vaporizer ON: 5 l/min O_2: <20 cmH_2O

Accuracy

Isoflurane models:	±0.25% of delivered agent or ±20% of control dial setting (whichever is greater)
Sevoflurane models:	+0.6/-0.4% of delivered agent or ±20% of control dial setting (whichever is greater)
Fresh gas flow:	200 ml/min to 15 l/min

Environmental specifications

Operation

Temperature:	15°C to 35°C
Humidity:	15% to 95% relative humidity (non-condensing)
Ambient pressure:	500-800 mmHg

Storage and Transport

Temperature:	-25°C to 60°C
Humidity:	15% to 95% relative humidity (non-condensing)
Ambient pressure:	400-800 mmHg

Service

Planned factory service free

MRI Safety Information

MR Conditional

Agent filling systems

Isoflurane models: Easy-Fil™
Sevoflurane models: Easy-Fil

Note: may not be available in all regions

Warranty

Warranted to be free from functional defects in materials and workmanship for a period of three years from the date of original delivery.

Agent color coded Easy-Fil adapters

GE Healthcare provides transformational medical technologies and services to meet the demand for increased access, enhanced quality and more affordable healthcare around the world. GE (NYSE: GE) works on things that matter – great people and technologies taking on tough challenges.

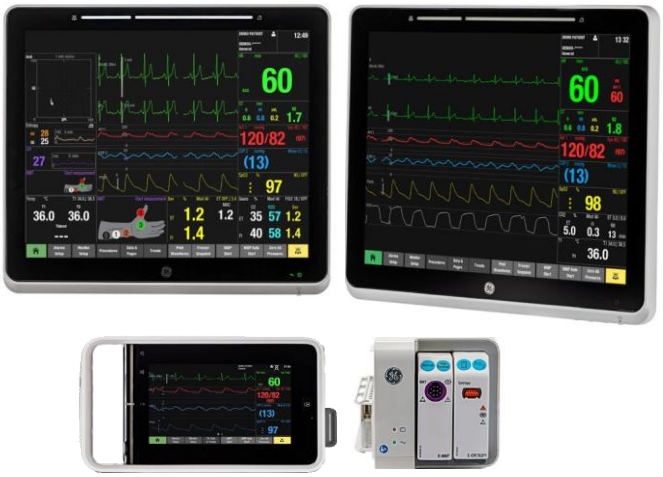
From medical imaging, software & IT, patient monitoring and diagnostics to drug discovery, biopharmaceutical manufacturing technologies and performance improvement solutions, GE Healthcare helps medical professionals deliver great healthcare to their patients.

Imagination at work

DOC2018946

Monitor pacient CARESCAPE Canvas™ 1000

Flexibilizarea artei și științei monitorizării pacienților



CARESCAPE Canvas™ este o platformă de monitorizare FlexAcuity™ destinată întregului ecosistem al spitalului dvs. Aceasta asigură o monitorizare individualizată a pacienților și niveluri de acuitate scalabile specifice fiecărui pat cu pacient, menținând în același timp peste tot aceeași experiență de utilizare, intuitivă și familiară.

O soluție de monitorizare unitară pentru întreaga dvs. întreprindere

- Valoare sustenabilă pentru întreaga durată de funcționare. Asistență orientată retrograd și spre viitor care permite transformarea sistemului dvs. de îngrijire medicală
- Pachetele software dedicate domeniului de îngrijire medicală facilitează configurarea monitorului. În plus, este disponibil un pachet de software cu licență completă pentru o flexibilitate maximă de utilizare a monitorului la nivelul întregii întreprinderi
- InSite™ RSvP™ oferă o conectivitate de la distanță între soluțiile CARESCAPE și specialiștii de asistență GE Healthcare pentru a permite diagnosticarea și actualizările de software de la distanță
- Integrarea sistemului Citrix™ Thin Client facilitează accesul la analize, radiografii, fișe și alte date chiar de la patul pacientului

O soluție FlexAcuity™

- Transportul intraspitalicesc simplificat cu ajutorul monitorului CARESCAPE ONE sau al CARESCAPE Patient Data Module oferă măsurători continue și consecvente pe durata transportului
- O unitate CPU performantă integrată cu dispozitive de colectare CARESCAPE ONE & CARESCAPE Patient Data Module. Cadrele și modulele E opționale permit scalabilitatea necesară pentru a satisface diversele nevoi ale pacienților din toate domeniile de îngrijire

Excelență clinică prin proiectare

- Algoritmii inovatori ajută la o diagnosticare precisă, inclusiv analiza aritmiei EKPro, măsurarea neinvazivă a tensiunii arteriale DINAMAP™ și ECG de diagnosticare 12 SL™ cu bază de date ECG directă cu 2 căi MUSE™, versiunea NX ECG NX
- Monitorizarea respiratorie cuprinzătoare variază de la CO_2 standard și până la schimbul de gaze și monitorizarea metabolică
- Numeroșii parametri vă ajută să evaluați gradul de adecvare a anesteziei în sala de operație, vă oferă informații cu privire la pregătirea pacienților pentru deconectarea de la aparatul de ventilație și evaluează nivelul de oxigenare a pacienților atât în mediul perioperator, cât și în cel de terapie intensivă
- Funcțiile excepționale de alarmă includ Vizualizarea automată a alarmelor, care transmite automat alarmele importante din punct de vedere clinic în cadrul și între unitățile de îngrijire, oferă flexibilitate la stabilirea limitelor și priorităților de declanșare a alarmelor, ceea ce poate contribui la optimizarea fluxului de lucru și la reducerea oboselii cauzate de alarme
- Funcția Pagini și Profiluri le oferă medicilor clinicieni posibilitatea de a optimiza cu ușurință setările monitorului în funcție de nevoile pacienților lor
- Conectarea la infrastructura de rețea CARESCAPE și la stația centrală CARESCAPE permite ca supravegherea monitorizării să nu se limiteze doar de la patul pacientului.
- Conexiunea la gateway-ul CARESCAPE permite comunicarea cu sistemele EMR prin intermediul protocolului standard HL7®
- Monitorizarea combinată permite conectarea fără probleme a pacienților cu telemetrie pentru o monitorizare mai amplă direct de la patul pacientului

Monitoarele CARESCAPE CANVAS nu poartă marcajul CE și nu pot fi introduse pe piață sau puse în funcțiune în țările relevante până când nu îndeplinesc cerințele Regulamentului privind dispozitivele medicale pentru marcajul CE sau până când nu s-au obținut toate autorizațiile de reglementare necesare. Nu sunt destinate vânzării. Nu au fost avizate, aprobate sau autorizate de către FDA (Administrația americană pentru alimente și medicamente) din SUA sau de către alte autorități naționale americane de reglementare în vederea disponibilității comerciale.

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Specificații tehnice

Monitor CARESCAPE Canvas 1000

Opțiuni software

Software principal	Versiuni de software specifice domeniului de îngrijire pentru optimizarea fluxurilor de lucru: sala de operație, unitatea de îngrijire medicală postoperatorie, unitatea de terapie intensivă, secția de urgențe, unitatea de terapie intensivă neonatală
Alte opțiuni software	Opțiuni software detaliate specifice pentru fiecare pachet software principal.

Conectarea la rețea

Compatibilitate	Rețea CARESCAPE cu comunicare peer-to-peer
Caracteristici	Vizualizare centralizată și gestionare a alarmelor de la distanță cu vizualizare de la un pat la altul și funcție de Vizualizare automată a alarmelor (AVOA)
Tipul de rețea	LAN

Conectorii intrare/ieșire

Ethernet	CARESCAPE Canvas 1000 are 3 porturi Ethernet: MC - 10/100/1000 BASE-T IX - 10/100/1000 BASE-T Rețea Unity - 10 BASE-T
Port USB 2.0	5 x USB tip A
ePort	2 x interfețe ePort (DB9)
Port serial	Disponibil prin convertor USB
Afișaj	DisplayPort
Imprimantă termică	Prin cadrul F2
Conector echipotențial	Știft de împământare echipotențial DIN 42801

Caracteristici

Dimensiune	19 in (diagonală)
Tip	Matrice activă color TFT, LCD cu îmbinare optică
Luminozitate	250 cd/m²
Rezoluție	1280x1024 @ 60Hz SXGA
Unghi de vizualizare	160 de grade orizontal/vertical
Raport de contrast panou LCD	700:1

Comenzi

Ecran tactil	Tehnologie capacitivă

Gradul de protecție împotriva pătrunderii dăunătoare a apei
IP22

Forme de undă

Până la 8 forme de undă, iar dacă este selectat 4 invP pot apărea până la 10 forme de undă. Până la 16 dacă se utilizează două afișaje opționale.

Cifre

Până la 20 sau până la 40, în cazul în care se utilizează cele două afișaje opționale și este activată zona de parametri orizontali.

Afișaj CARESCAPE Canvas D19

Dimensiune	19 in (diagonală)
Tip	Matrice activă color TFT, LCD cu îmbinare optică
Luminozitate	250 cd/m²
Rezoluție	1280x1024 @ 60Hz SXGA
Unghi de vizualizare	160 de grade orizontal/vertical
Raport de contrast panou LCD	700:1

Conectorii intrare/ieșire

Conector echipotențial	Știft de împământare echipotențial DIN 42801
Conector video	DisplayPort

Cadre

Utilizare vizată și module de susținere

F0	Monitor CARESCAPE ONE
F2	Utilizare autonomă; module E, monitor CARESCAPE ONE, dispozitiv de înregistrare local F2-01
F5	Utilizare autonomă; module E, CARESCAPE Patient Data Module
F7	Aparate de anestezie Aespire™, Aestiva™, Aisys™, Aisys CS2, Avance™, Avance CS2 Carestation™, module E

Cadrele se comandă separat.

Parametri și module

Parametri		CARESCAPE ONE
ECG cu respirație prin impedanță		3, 5, 6 și 10 cabluri de legătură
SpO_2		GE TruSignal™, Nellcor™ OxiMax™
SPI*		GE TruSignal
SpO_2	cu Pi[1] și PVi®[1]	Masimo rainbow® SET®
NIBP		Algoritm GE DINAMAP™ SuperSTAT™
InvBP		2 sau 4 canale pentru presiunile invazive
Temp		2 canale pentru temperaturi
CO_2		Flux secundar CO_2 LoFLo™, capnografie Respironics Microstream™, Medtronic
rSO_2[1]		Oximetrie regională INVOS™, Medtronic
SpHb®[1]		Masimo rainbow SET®

[1] Acest parametru este vizibil numai pe afișajul gazdă CARESCAPE Canvas și numai atunci când este disponibilă o licență corespunzătoare. Nu este disponibil pentru CARESCAPE ONE, atunci când CARESCAPE ONE este deconectat de la gazda Canvas. Monitorul CARESCAPE Canvas 1000 este compatibil cu CARESCAPE ONE SW v3.0 și 3.2. Pi, PVi, SpHb, INVOS rSO_2 și Microstream CO_2 sunt disponibile pentru CARESCAPE ONE SW v3.2.

* SPI nu beneficiază de autorizația 510(k). Indisponibil în SUA.

Parametri	CARESCAPE Patient Data Module (PDM)
ECG	3, 5, 6 și 10 cabluri de legătură
SpO_2	Masimo SET®, Nellcor™ OxiMax™
NIBP	Algoritm GE DINAMAP™ SuperSTAT™
InvBP	4
Temp	2, opțional cu C.O.
Ieșire cardiacă	Opțional cu temperatură

Monitorul și dispozitivele de parametrizare CARESCAPE ONE și CARESCAPE Patient Data Module se comandă separat.

Parametri	Module E
Module cu mai mulți parametri	
InvBP & Temp	E-PP, E-PT
SvO_2 & C.O.	E-COP, E-COPSv
Module cu un singur parametru	
SpO_2	E-NSATX, E-MASIMO
NMT	E-NMT
CCO	E-PiCCO
EEG	E-EEGX
BIS™	E-BIS
Entropy™	E-ENTROPY
Respirator[1]	
Flux secundar CO_2	E-miniC
Flux secundar CO_2 & O_2	E-sCO, E-sCOV
Flux secundar CO_2, O_2, Agenți și N_2O	E-sCAiO, E-sCAiOV, E-sCAiOE, E-sCAiOVE, E-sCAiOVX
Spirometrie pacient	E-sCOV, E-sCOVX, E-sCAiOV, E-sCAiOVE, E-sCAiOVX
Schimb de gaze sau probleme metabolice	E-sCOVX, E-sCAiOVX
Parametri CARESCAPE interconectați	
Capnografia Microstream™ de la Medtronic	E-musb & CARESCAPE CO_2 - Microstream
Oximetria regională INVOS™ de la Medtronic	E-musb & CARESCAPE rSO_2 - INVOS

Modulele de parametri se comandă separat.

OBSERVAȚIE: Pentru o listă completă a dispozitivelor compatibile, vă rugăm să consultați informațiile suplimentare furnizate.

[1] Acronimele pentru parametrii măsurați sunt următoarele:
s = Modul cu o singură lățime, C = CO_2 și N_2O, Ai = Agenți anestezici și identificarea agenților, O = O_2 pacient, V = Spirometrie pacient, E = Conector pentru sonda de gaz proaspăt pentru unele aplicații ale aparatelor de anestezie, X = Procese metabolice ale schimbului de gaze $V^{\cdot}O_2$, $V^{\cdot}CO_2$, RQ și EE

Specificații privind performanța

Alarme

Categorii	Starea pacientului și starea sistemului
Prioritate	Ridicată, medie, scăzută, în creștere și informațională
	În conformitate cu IEC 60601-1-8
Notificare	Sonoră și vizuală
Pauză audio	Configurabilă timp de 2 sau 5 minute
Tendință	
Rezoluție de 1 minut	72h
Rezoluție de 10 s	30 min
Rezoluție de 2 s	24h
Rezoluție de 1 s	24h
Instantaneu	
Formă de undă de 15 s	400 de instantanee
ST	10 instantanee
Evenimente	999 de evenimente

Dispozitiv de înregistrare termică

Opțional, dispozitiv de înregistrare termică atașat cadrului 2 F2-01 DISPOZITIV DE ÎNREGISTRARE LOCAL, care trebuie comandat separat.

Montare

Compatibil cu VESA

Specificații privind alimentarea cu energie electrică

Sursa de alimentare cu energie electrică

Intervalul tensiunii de intrare universale	De la 100 până la 240 Vca ±10%, 50/60 Hz
Consumul de energie electrică	
CARESCAPE Canvas 1000	70 VA, tipic <70 VA*
CARESCAPE Canvas D19	50 VA
Clasa de protecție	Clasa I
Împământare	Grad spitalicesc
Răcire	Convecție naturală – fără ventilatoare

* Configurație de măsurare clinică extremă cu cadru F5 integral și monitor CARESCAPE ONE complet încărcat.

Specificații privind mediul

Pentru întregul sistem, inclusiv monitorul, cadrele, modulele, afișajele, tastatura și telecomanda.

Condiții de funcționare

Temperatură	De la 10 până la 40°C (de la 50 până la 104°F)
Nivelul de umiditate la care funcționează	De la 15 până la 90% RH fără condensare
Altitudinea de funcționare	De la 700 mbar până la 1060 mbar (de la 3000 m până la -400 m)

Condiții de nefuncționare

Temperatură	De la -20 până la 60°C (de la -4 până la 140°F)
Nivelul de umiditate la care nu funcționează	De la 10 până la 90% RH fără condensare
Altitudinea de nefuncționare	De la 500 mbar până la 1060 mbar (de la 5500 m până la -400 m)

Condiții de depozitare

Temperatură	De la -20 până la 60°C (de la -4 până la 140°F)
Umiditatea de depozitare	De la 10 până la 90% RH fără condensare
Altitudinea de depozitare	De la 500 mbar până la 1060 mbar (de la 5500 m până la -400 m)

Specificații fizice

Monitor CARESCAPE Canvas 1000

Dimensiune (Î x l x A)	388 x 440 x 126 mm (15,3 x 17,3 x 5,0 in)
Greutate	7,5 kg (16,5 lb))

CARESCAPE Canvas D19 Display

Dimensiune (Î x l x A)	388 x 440 x 126 mm (15,3 x 17,3 x 5,0 in)
Greutate	7,1 kg (15,7 lb)

F0 Dock

Dimensiune (Î x l x A)	9,0 cm x 21,0 cm x 7,5 cm (3,5 in x 8,3 in x 3,0 in)
Greutate	< 0,5 kg (1,0 lb)

Cadru F2 fără module și cabluri

Dimensiune (Î x l x A)	160 × 284 × 165 mm (6,3 × 10,7 × 6,5 in)
Greutate	< 2,4 kg (5,29 lb)

Cadru F5 fără module și cabluri

Dimensiune (Î x l x A)	162 x 290 x 225 mm (6,4 x 11,4 x 8,9 in)
Greutate	3 kg (6,6 lb)

Cadru F7 fără module și cabluri

Dimensiune (Î x l x A)	138 x 314 x 215 mm (5,4 x 12,4 x 8,5 in)
Greutate	3 kg (6,6 lb)

Este posibil ca produsul să nu fie disponibil în toate țările și regiunile. Specificațiile tehnice complete ale produsului sunt disponibile la cerere. Contactați un reprezentant GE Healthcare pentru mai multe informații. Vă rugăm să vizitați www.gehealthcare.com/promotional-locations.

Datele pot suferi modificări.

CARESCAPE Canvas 1000, versiunea: 5876727
CARESCAPE Canvas D19, versiunea: 5897061

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Traducător și interpret
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Aut.M.J. 36476/2014

GE Healthcare

Tec 7 Vaporizer

Combining clinical performance with ergonomic design

The Tec® 7 Vaporizer from GE Healthcare delivers isoflurane, sevoflurane, enflurane and halothane effectively and efficiently. Each agent specific Tec 7 incorporates significant performance, convenience and ergonomic benefits with important safety features to help improve agent delivery and reliability while reducing overall operating costs.

Features

- Tec 7 agent specific vaporizers are designed to deliver isoflurane, sevoflurane, enflurane and halothane anesthetic agents
- Provides output consistent with the dial setting through-out the clinical flow range
- Easy to turn dial and fine graduations help control agent delivery
- Three filling options: Easy-fil®, funnel fill, or Quik-Fil™ (sevoflurane only)
- Enhanced design helps improve reliability, operating excellence and product life
- Easy-fil filler is designed to simplify agent filling and help minimize agent leaks while filling. Tec 7 is also available in funnel fill and Quik-Fil (sevoflurane only) variants
- Improved ergonomics and contemporary design complements GE Healthcare's anesthesia systems
- Attaches to GE Healthcare interlocking Selectatec® manifold
- Planned factory service free
- Three year warranty period

Clinical performance

- Tec 7 Vaporizers are designed to provide consistent output throughout the clinical flow range from 200 mL/min to 15 L/min. Models are available for isoflurane, sevoflurane, enflurane and halothane.
- Tec 7 Vaporizers are equipped with a large diameter control dial which incorporates fine graduations of 0.2% between 0 and 1%, and 0.5% from 1% to 8%. The dial for sevoflurane is marked in steps of 0.2% up to 1% v/v, and in steps of 1% between 1% and 8%.
- The easy turning dials and small graduations on the Tec 7 Vaporizer help you fine tune anesthetic delivery over the full range of dial settings and flow rates.

Tec 7 agent specific vaporizers

Enhanced ergonomics

- The ergonomic agent dial release on the Tec 7 Vaporizer allows either left or right hand operation.
- A prismatic site glass on the front panel of the Tec 7 Vaporizer provides clear indication of liquid agent level.

Lower overall ownership costs

- The Tec 7 Vaporizer is planned factory service free, which helps lower ownership costs and eliminate the logistical challenges associated with the return of vaporizers to the factory. For complete user maintenance requirements, refer to the User Reference Manual.
- The Tec 7 Vaporizer comes with a three year warranty.

Easy-fil helps simplify agent filling

Reliability, convenience and operating excellence

- Easy-fil filler is designed to simplify agent filling and help minimize agent leaks while filling. The Tec 7 Vaporizer is also available with funnel fill and Quik-Fil (sevoflurane only) filling mechanisms.
- To minimize filling frequency, the Tec 7 Vaporizer accommodates 225 mL of anesthetic agent.
- The Tec 7 Vaporizer can be mounted on Datex-Ohmeda anesthesia systems equipped with the Selectatec manifold without tools and without taking the anesthesia system out of service.
- The Tec 7 Vaporizer also interlocks in series with Datex-Ohmeda Tec 4, Tec 5, Tec 6 and Tec 6 Plus Vaporizers.
- An innovative non-spill system in the Tec 7 Vaporizer limits movement of liquid agent if the vaporizer is tilted or inverted, protecting internal components and helping maintain output within clinically acceptable limits.

Physical specifications

Dimensions

Height:	25 cm/9.9 in
Depth:	21 cm/8.3 in
Width:	11.4 cm/4.5 in
Weight:	7 kg/15.4 lb dry

Agent capacity

Charged:	225 mL of free volitile anesthetic agent
Charging:	300 mL (nominal) to charge dry vaporizers
Retention:	75 mL (nominal) retained by wick system

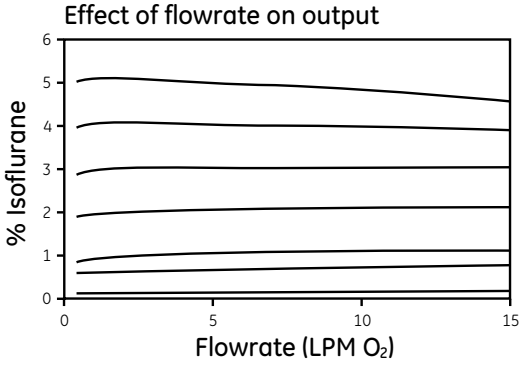
Pneumatics specifications

Calibration and resistance

Calibration:	The dials of the Tec 7 Vaporizers for enflurane, isoflurane and halothane are calibrated to 5% v/v in steps of 0.2% up to 1%, and in steps of 0.5% from 1% to 5% at 21°C using O_2 at 5 L/min as the carrier gas
Calibration of sevoflurane:	The dial of the Tec 7 Vaporizer for sevoflurane is calibrated to 8% v/v Dial is marked in steps of 0.2% up to 1% v/v, and in steps of 1% between 1% and 8%
Resistance to gas flow:	"OFF": Isolated, no resistance from vaporizer "ON": 5 L/min O_2: 10 to 15 cm H_2O at 21°C ±2°C
Accuracy:	5 L/min O_2 @ 21°C ± 2°C:

Vaporizer 5%	±0.25% of delivered agent or ±15% of dial setting (whichever is greater)
Vaporizer 8%	±0.4% of delivered agent or ±15% of dial setting (whichever is greater)

Flowrate:	Vaporizers are designed to provide consistent output throughout the clinical flow range from 200 mL/min to 15 L/min



Agent color coded Easy-fil bottle adapters

Environmental specifications

Operation

Temperature:	18° to 35°C/64° to 95°F
Humidity:	30% to 75% relative humidity (non-condensing)

Service

Planned factory service free.

Warranty

Warranted to be free from functional defects in materials and workmanship for a period of three years from the date of original delivery.

For more than 100 years, healthcare providers worldwide have relied on GE Healthcare for medical technology, services, and productivity solutions. So no matter what challenges your healthcare system faces, you can always count on GE to help you deliver the highest quality healthcare. For details, please contact your GE representative today.

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GE imagination at work

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Tec 820 Vaporizer

Combining clinical performance with ergonomic design

The agent specific Tec™ 820 Vaporizer from GE Healthcare delivers isoflurane and sevoflurane effectively and efficiently. Each Tec 820 presents an improved ergonomic design, with consistent agent delivery and reliability while reducing total cost of ownership

Features

- Tec 820 agent specific vaporizers are designed to deliver isoflurane and sevoflurane anesthetic agents
- Provides output consistent with the dial setting throughout the clinical flow range
- Easy to turn dial and fine graduations help control agent delivery
- Enhanced design with consistent, reliable operation over the product life
- Tec 820 vaporizer supports the Easy-Fil agent filling mechanism
- Improved ergonomics and contemporary design complements GE Healthcare's anesthesia systems
- Attaches to GE Healthcare interlocking Selectatec™ manifold
- No planned factory service needed
- Three-year warranty

gehealthcare.com

Clinical performance

- Tec 820 Vaporizers are designed to provide consistent output throughout the clinical flow range from 200 ml/min to 15 l/min. Models are available for isoflurane and sevoflurane
- Tec 820 Vaporizers are equipped with a large diameter control dial with graduations up to 5% V/V (isoflurane models) or 8% V/V (sevoflurane models)
- The easy turning dials and small graduations on the Tec 820 Vaporizer help you fine tune anesthetic delivery over the full range of dial settings and flow rates

Enhanced ergonomics

- The ergonomic dial release on the Tec 820 Vaporizer allows either left or right hand operation
- Wide, centered liquid level indicator provides a clear indication of the fill level of the vaporizer
- Easy to turn dial with enhanced readability

Lower overall ownership costs

- The Tec 820 Vaporizer has no planned factory service, which helps lower the total cost of ownership and eliminate the logistical challenges associated with the return of vaporizers to the factory. For complete user maintenance requirements, refer to the User Reference Manual
- The Tec 820 Vaporizer comes with a three-year warranty

Reliability, convenience, and operating excellence

- Tec 820 is compatible with modern agent filling systems that simplify filling and help minimize agent leaks while filling
- To minimize filling frequency, the Tec 820 Vaporizer can hold up to 300 ml of anesthetic agent
- The Tec 820 Vaporizer can be mounted on GE Healthcare anesthesia systems equipped with the Selectatec manifold without tools and without taking the anesthesia system out of service
- The Tec 820 Vaporizer also interlocks in series with GE Healthcare Tec 7 and Tec 6 Plus Vaporizers
- The non-spill system in the Tec 820 Vaporizer limits movement of liquid agent if the vaporizer is tilted or inverted, protecting internal components and helping maintain output within clinically acceptable limits

Easy-Fil helps simplify agent filling

Tec 820 agent specific vaporizers

Physical specifications

Dimensions

Height:	25 cm
Depth:	22 cm
Width:	11 cm
Weight:	7 kg dry

Agent capacity

Total capacity:	300 ml
Capacity between min/max fill marks:	170 ml
Wick system capacity:	75 ml approximately

Pneumatics specifications

Calibration and flow resistance

Calibration:	Calibration of all models is done at 21°C using O_2 as carrier gas, 5 l/min fresh gas flow, at sea-level ambient pressure
Isoflurane models:	Control dial calibrated up to 5% V/V. The control dial is marked in steps of 0.25% up to 1% and in steps of 0.5% between 1% and 5%.
Sevoflurane models:	Control dial calibrated up to 8% V/V. Control dial is marked in steps of 0.25% up to 1% and in steps of 0.5% between 1% and 8%.
Flow resistance:	OFF: Isolated, no resistance from vaporizer ON: 5 l/min O_2: <20 cmH_2O

Accuracy

Isoflurane models:	±0.25% of delivered agent or ±20% of control dial setting (whichever is greater)
Sevoflurane models:	+0.6/-0.4% of delivered agent or ±20% of control dial setting (whichever is greater)
Fresh gas flow:	200 ml/min to 15 l/min

Environmental specifications

Operation

Temperature:	15°C to 35°C
Humidity:	15% to 95% relative humidity (non-condensing)
Ambient pressure:	500-800 mmHg

Storage and Transport

Temperature:	-25°C to 60°C
Humidity:	15% to 95% relative humidity (non-condensing)
Ambient pressure:	400-800 mmHg

Service

Planned factory service free

MRI Safety Information

MR Conditional

Agent filling systems

Isoflurane models: Easy-Fil™
Sevoflurane models: Easy-Fil

Note: may not be available in all regions

Warranty

Warranted to be free from functional defects in materials and workmanship for a period of three years from the date of original delivery.

Agent color coded Easy-Fil adapters

GE Healthcare provides transformational medical technologies and services to meet the demand for increased access, enhanced quality and more affordable healthcare around the world. GE (NYSE: GE) works on things that matter – great people and technologies taking on tough challenges.

From medical imaging, software & IT, patient monitoring and diagnostics to drug discovery, biopharmaceutical manufacturing technologies and performance improvement solutions, GE Healthcare helps medical professionals deliver great healthcare to their patients.

Imagination at work

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