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BIS™ Module, E-BIS™ Module

For monitoring the state of the brain in the OR, ICU and procedural sedation locations with the BISx™ platform.

The E-BIS™ Module with the BISx™ digital signal processing unit from Medtronic provides a Bispectral Index™ value (BIS™), a continuous processed EEG parameter that correlates to the patient's level of hypnosis, where 100=awake and 0=flat line EEG. The BISx™ unit receives, filters, and processes patient EEG signals using bispectral analysis and the BIS™ algorithm to derive BIS™ Index values. The system complies with IEC 60601-1 3rd edition.

Benefits of BIS™ monitoring

Use of the Bispectral Index™ technology (BIS™) in adults and pediatrics may enable clinicians to:

- Assess the level of consiousness and sedation
- Titrate anesthetic drugs to individual patient requirements, and reduce the use of hypnotic anesthetics
- Aid in faster and more predictable wake-up and extubation

Features

- Improved performance in electromyogram (EMG) conditions
- Enhanced resistance to electrocautery
- Improved performance in both light and deep states of anesthesia and sedation
- Family of sensors available: BIS™ quatro 4-electrode sensor, BIS™ pediatric sensor, and BIS™ extend sensor

Display options

- BIS™ information integrated into CARESCAPE™ monitor screens
- In addition to the BIS™ value, the GE monitors display one channel of raw EEG waveform, Suppression Ratio (SR), Signal Quality Index (SQI) and Electromyography (EMG)
- Trending of BIS™ values, EMG and SR for up to 24 hours in anesthesia and 72 hours in critical care

Technical specifications

Direct function keys

BIS™	Opens BIS™ menu
Check Sensor	Starts impedance measurement of electrodes

BIS™ EEG values

EEG scales	25 to 500 µV
EEG sweep speeds	12.5/25/50 mm/sec
BIS™	0 to 100
SQI	0 to 100 %
EMG	25 to 100 dB (70 to 110 Hz)
Suppression ratio (SR)	0 to 100%
Filters	ON (2 to 70 Hz with notch), OFF (0.25 to 100 Hz)
Mode	Sensor automatically selects mode

BIS™ rates

Update rate	1 second for BIS index
Smoothing rate	User selectable in BIS menu, 15 or 30 seconds

BISx™ (Digital Signal Processing Unit)

Analog to digital converter	Noise-shaped sigma-delta
Sampling rate	16,384 samples/second
Resolution	16 bits at 256 samples/second
Input impedance	> 50 Mohms typical
Noise	< 0.3 µV RMS (2.0 µV peak-to-peak) 0.25 to 50 Hz
Common mode rejection	110 dB at 50/60 Hz to earth ground (Isolation mode)
Bandwidth	0.25 to 100 Hz (-3dB)

Sensor compatibility

BIS™ quatro 4-electrode sensor, BIS™ pediatric sensor, and BIS™ extend sensor

Monitor compatibility

CARESCAPE modular monitors

Environmental specifications

Operating conditions

Temperature	10 to 40°C (50 to 104°F)
Relative humidity	10 to 95% non-condensing

Storage conditions

Temperature	-25 to 70°C (-13 to 158°F)
Relative humidity	10 to 95% non-condensing

Physical specifications

E-BIS™ Module

Dimensions (H x W x D)	11.2 x 3.7 x 18.9 cm (4.4 x 1.5 x 7.4 in)
Weight	0.3 kg (0.66 lb)

BISx™ Digital Signal Processing Unit

Dimensions (diameter, thickness)	9.5 cm, 6.3 cm (3.75 in, 2.5 in)
Weight	0.284 kg (0.6 lb)

Integral BISx™ Cable

Length	2.7 m (9 ft)

Patient Interface Cable (PIC Plus)

Length	1.3 m (4 ft)

A NOTE ABOUT the BIS™ system: The CARESCAPE monitors use a component BISx™ device purchased from Medtronic in deriving the Bispectral Index™ (BIS™) values. It is important to recognize that this index is derived using solely that company's proprietary technology. It is recommended that clinicians review applicable information on its utility and/or risks in Medtronic's "Monitoring Consciousness - Using the Bispectral Index During Anesthesia, A Pocket Guide for Clinicians" (Second Edition), Scott D. Kelley, MD, or contact Medtronic if they have clinical-based BIS™-monitoring questions relating to this module portion of the monitor.

BIS™ technology is a complex monitoring modality intended for use as an adjunct to clinical judgment and training. Clinical judgment should always be used when interpreting the BIS™ values in conjunction with other available clinical signs. Reliance on the BIS™ values alone for intraoperative anesthetic management is not recommended. As with any monitored parameter, artifacts and poor signal quality may lead to inappropriate BIS™ values. Potential artifacts may be caused by poor skin contact (high impedance), muscle activity or rigidity, head and body motion, sustained eye movements, improper sensor placement and unusual or excessive electrical interference. BIS™ values should also be interpreted cautiously with certain anesthetic combinations, such as those relying primarily on either ketamine or nitrous oxide/narcotics to produce unconsciousness. Due to limited clinical experience in the following applications, BIS™ values should be interpreted cautiously: in patients with known neurological disorders, and those taking other psychoactive medications.

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GE Healthcare

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Entropy module, E-ENTROPY

A key measurement for personalized anesthesia

The E-ENTROPY Module is a single-width, plug-in module with the unique Entropy™ algorithm that monitors the state of the brain. It is indicated for use within the hospital for adult and pediatric patients older than two years. The module complies with IEC 60601-1 3rd edition.

Benefits of Entropy measurement [1,2]

In adults, Entropy measurement

- May be used as an aid in monitoring the effects of certain anesthetic agents
- May help the user titrate anesthetic drugs according to the individual needs
- May be associated with a reduction of anesthetic use and faster emergence from anesthesia

Measurement technology

- Utilizes the intuitive and published Entropy algorithm residing in the monitor, a GE Healthcare innovation[3]
- Based on module acquisition and processing of EEG and FEMG signals
- Features two Entropy parameters
  Response Entropy (RE) - a fast reacting parameter for detecting activation of facial muscles
  State Entropy (SE) - a steady and robust parameter for assessing the effect of anesthetic drugs in the brain in adults

Display options

- Entropy information integrated into modular CARESCAPE™ monitor screens
- Digital display and trending of the Entropy parameters and burst suppression ratio (BSR)
- Entropy EEG waveform display, one channel

1 Aime, I. *et. al.*, Does monitoring Bispectral Index or Spectral Entropy reduce sevoflurane use? *Anesth Analg.* **103(6)**, 1469-77 (Dec 2006).

2 Vakkuri, A. *et. al.*, Spectral Entropy monitoring is associated with reduced propofol use and faster emergence in propofol-nitrous oxide-alfentanil anesthesia. *Anesthesiology* **103(2)**, 274-279 (2005).

3 Viertiö-Oja, H. *et. al.*, Description of the Entropy algorithm as applied in the Datex-Ohmeda S/5 Entropy Module. *Acta Anaesthesiol Scand* **48(2)**, 154-161 (2004).

For full publication reference list please contact GE Healthcare.

Technical specifications

Direct function keys

Entropy		Opens Entropy menu
Check Sensor		Starts impedance measurement of sensor electrodes

There are two keys on the module. Depending on the module version either text (USA and its territories) or symbols appear on the keys.

Entropy

Measurement method	Entropy monitoring is based on acquisition and processing of raw EEG and FEMG signals using the Entropy algorithm. The signal is measured by placing a disposable sensor on patient's forehead. In adults, Entropy may help the anesthesiologist to assess the effect of certain anesthetics on the patient's brain.

Amplifier

Input dynamic range	±500 µV
Input offset	±300 mV
Frequency range	0.5 to > 100 Hz
Noise level	<0.5 µV RMS, <6 µV peak-to-peak
Input impedance	>400 kΩ @ 10 Hz
CMRR	>90 dB @ 50 Hz
Defibrillation protection	3000 V

Entropy EEG signals

Sampling frequency	400 Hz

Waveform display (One channel of raw EEG)

Range*	1000 μV_{pp}
Scales*	±25/50/100/250/500 µV

Numeric display (RE, SE and BSR)

Range	RE 0-100 SE 0-91 BSR 0-100%
Display resolution	1 digit
Display update	1 s

* Range and scale specifications depends on the patient monitor software version.

Impedance measurement

Measurement frequency	75 Hz
Range	1-20 kΩ
Resolution	0.1 kΩ
Accuracy	±1 kΩ or ±10%
Leads off detection	Continuous
Start of measurement	Manual/automatic

Monitor compatibility

CARESCAPE modular monitors with OR and PACU software, B20 and B40 monitors.

For detailed compatibility information, please refer to the monitor specific User's Manual. Please note that commercial availability of the patient monitors differs regionally.

Environmental specifications

Operating conditions

Temperature	10 to 40°C (50 to 104°F)
Relative humidity	10% to 90% non-condensing

Storage conditions

Temperature	-20°C to 60°C (-4°F to 140°F)
Relative humidity	10% to 90% non-condensing

Physical specifications

Dimensions (H x W x D)	11.2 x 3.7 x 18.0 cm (4.4 x 1.5 x 7.3 in)
Weight	0.35 kg (0.77 lb)

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EEG Module, E-EEGX
EEG Headbox, N-EEGX

For continuous integrated neuromonitoring

The E-EEGX Module is a single-width, plug-in module for continuous integrated neuromonitoring with four channels of EEG and with auditory evoked potentials (AEP).

The EEGX Headbox, N-EEGX, must be used with the E-EEGX Module.

Features

- Designed for anesthesia and critical care
- Referential or bipolar measurement possibility
- Automatic impedance check and leadset recognition
- Saving for user-defined measurement montages
- Supports usage of preconfigured leadsets for the most frequently used montages

EEG

- Up to four channel EEG with one channel EMG recognition
- EEG waveform displayed with user-selectable scaling
- Spectral analysis by fast fourier transform (FFT)
- Graphical trends of quantitative EEG parameters
- Graphical presentation of EEG channel asymmetries
- Compressed spectral array (CSA) display and printout
- Burst suppression detection, burst suppression ratio (BSR) and artifact detection

AEP

- Single or continuous (moving average) measurement for up to two channels
- View for averaged evoked responses
- Latencies and amplitudes can be measured and saved for printing at the end of the case
- Possibility to save a reference evoked response and display it together with the current response

Technical specifications

Direct function keys

EP Start/Stop	Starts or stops AEP measurement
Imp. Check	Check electrode impedance

EEG

Measurement

Sampling frequency	200 Hz per channel
Range	+/- 500 µV
Frequency range	0.5...50 Hz
Display resolution	0.1 µV
Noise level	< 6 µV peak-to-valley

Analysis

Parameters from power spectrum	Spectral Edge Frequency (SEF), Median Frequency (MF), relative power in frequency bands
Time-domain parameters	Amp, BSR

AEP

Stimulation

Click (condensating)	Duration 100 µs
Frequency	1.1 to 9.1 Hz (1 Hz steps at 10 ms meas.)
Intensity	10 to 90 dB normal Hearing Level (nHL), 10 dB steps

Measurement

Sampling frequency	2400 Hz for Middle Latency Auditory Evoked Potential (MLAEP) / 4800 Hz for Brainstem Auditory Evoked Potential (BAEP)
Frequency range	0.5 to 1000 Hz
Highpass filter	Off / 10 / 30 / 50 / 75 / 100 / 150 Hz

Single or continuous averaging possibility

Single average

Number of averaged responses	100 to 2000

Moving average

Gross average	100 to 2000
Update interval	After every 100 stimuli (200, when gross average is 2000)

EMG

Frequency range	60 to 300 Hz
Parameter	Root mean square (RMS) amplitude

Monitor compatibility

CARESCAPE™ modular monitors with CSP V3 software. Please, check Monitor User Manual for compatibility.

Environmental specifications, Module and Headbox

Operating conditions

Temperature	10 to 40°C (50 to 104°F)
Relative humidity	10 to 90% non-condensing

Storage conditions

Temperature	-20 to 60°C (-4 to 140°F)
Relative humidity	10 to 90% non-condensing

Physical specifications

Module

Dimensions (H x W x D)	112 x 37 x 187 mm (4.4 x 1.5 x 7.3 in)
Weight	0.3 kg (0.7 lb)

Headbox

Dimensions (H x W x D)	34 x 97 x 174 mm (1.3 x 3.8 x 6.8 in)
Weight	0.5 kg (1.1 lb) (incl. 3 m/118 in cable)

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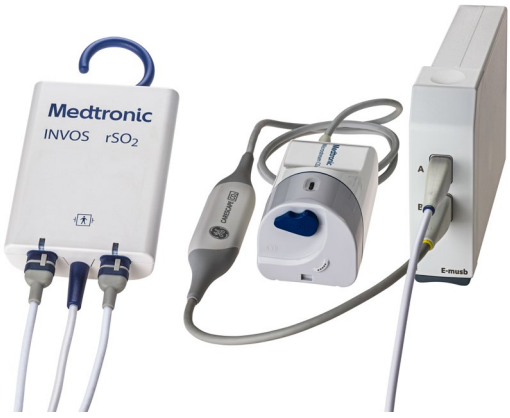
Interface module, E-musb

For CARESCAPE™ CO_2 Microstream™ and CARESCAPE™ rSO_2 INVOS™ Parameter Devices



The E-musb interface module is a plug-in module intended to connect the CARESCAPE rSO_2 INVOS and CARESCAPE CO_2 Microstream parameter devices to CARESCAPE B850, B650 and B450 monitors. The E-musb module is designed to be exclusively compatible with CARESCAPE CO_2 Microstream and CARESCAPE rSO_2 INVOS parameter devices from Medtronic. The module complies with IEC 60601-1 3rd edition.

Features

- The E-musb interface module is compatible with CARESCAPE CO_2 Microstream parameter device, where measurement technology with 50ml/min airway gas sampling rate is validated also for neonatal patient use.
- The E-musb interface module is compatible with CARESCAPE rSO_2 INVOS parameter device for regional oxygen saturation measurement with adult patients. This measurement is not approved for neonatal patients.
- The E-musb module can interface one CARESCAPE CO_2 Microstream device and up to two CARESCAPE INVOS rSO_2 devices with CARECSAPE Bx50 monitors. All supported connection combinations are shown in the Supported Configurations chapter of this document.
- The E-musb module can be used with a CARESCAPE Patient Data Module only.
- Only one E-musb module can be plugged into a CARESCAPE Bx50 monitor at a time.

Technical specifications

MONITOR COMPATIBILITY

- CARESCAPE B850, B650 and B450 monitors with software V3.2
- CARESCAPE Patient Data Module

E-musb module is not compatible with the CARESCAPE ONE monitor.

TECHNICAL and FUNCTIONAL ALARMS

E-musb module provides the following set of functional and technical alarms related to usage of this module in conjunction with compatible CARESCAPE parameter devices:

- E-musb disabled. Connect parameters to CS ONE
- Identical CO_2 device
- Identical E-musb modules
- E-musb unknown device in port x
- E-musb faulty device in port x
- Service E-musb faulty port x
- E-musb module error

Displayed data trends may vary depending on the host device.

Specifications listed represent the capability of the E-musb module.

ENVIRONMENTAL SPECIFICATIONS

Operating conditions

Operating temperature range	10 to 40°C (50 to 104°F)
Operating humidity range	10 to 90% RH non-condensing
Operating altitude range	700 to 1060 mbar
Degree of protection against harmful ingress of water	IPX1

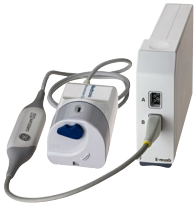
Storage conditions

Non-operating temperature range	-20°C to 60°C (-4°F to 140°F)
Non-operating humidity range	10 to 90% RH non-condensing

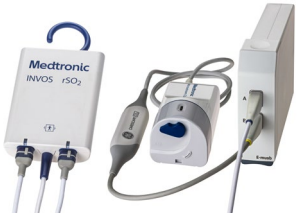
PHYSICAL SPECIFICATIONS

Size (H x W x D)	112 x 37 x 186 mm (4.4 x 1.5 x 7.3 in)
Weight	0.3 kg (0.66 lb)

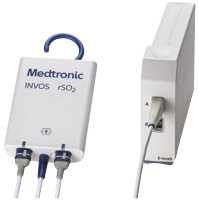
SUPPORTED CONFIGURATIONS



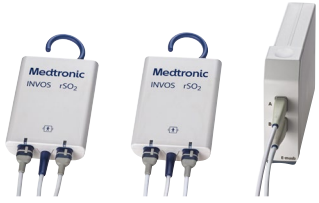
CARESCAPE CO_2 Microstream



CARESCAPE rSO_2 INVOS and CARESCAPE CO_2 Microstream



CARESCAPE rSO_2 INVOS



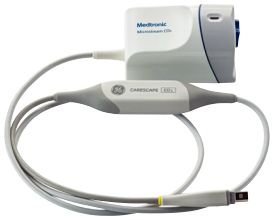
Two CARESCAPE rSO_2 INVOS parameter devices

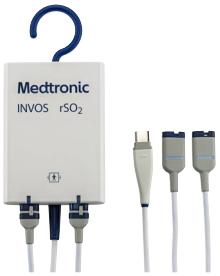
CARESCAPE PARAMETERS

The following CARESCAPE Parameter devices are compatible with the CARESCAPE interface module, E-musb:

CARESCAPE CO_2 Microstream

CARESCAPE rSO_2 INVOS





CARESCAPE CO_2 Microstream

CO_2 Measurement Range	0 to 150 mmHg
CO_2 waveform sampling	20 samples/second
Sampled Gas Flow Rate	50 ml ±5 ml/min
CO_2 Accuracy	±2 mmHg at 0-38 mmHg ±{5% x CO_2 reading + 8% x (CO_2 reading - 39 mmHg)} at 39-99 mmHg ±{0.43% x Ambient Pressure + 8% x CO_2 reading} at 100-150 mmHg
CO_2 Accuracy in the Presence of Interfering Gases	Nominal accuracy is not reduced by more than 4% of the reading in the presence of interfering gases, as detailed in ISO 80601-2.55 clauses 201.12.1.101.3, 201.101, including also Ethanol, Isopropanol, and Acetone at up to 0.1%, Methane at up to 1%, and Oxygen, Heliox up with up to 50% Helium and with up to 15% Oxygen.
Respiration Rate Range	0 to 150 breaths/minute
Respiration Rate Accuracy	± 1 bpm for 0-70 breaths/minute ± 2 bpm for 71-120 breaths/minute ± 3 bpm for 121-150 breaths/minute
Startup Time	Maximum 30 seconds, not including monitor startup time.

Power Specifications

Consumption	2.5 W
Input voltage	5 V DC ±0.25 VDC
Input current	482 mA maximum

Environmental Specifications

Operating Conditions

Temperature	0°C to 40°C (32°F to 104°F)
Humidity	10% to 95%, ambient non-condensing relative humidity
Altitude	-487 to 4572 m (-1600 to 15000 ft)

Storage and Transport Conditions

Temperature	-40°C to 70°C (-40°F to 158°F)
Humidity	10% to 90%, ambient non-condensing relative humidity
Altitude	-487 to 15240 m (-1600 to 50000 ft)
Atmospheric pressure	11 kPa (88 mmHg) to 108 kPa (805 mmHg)
Degree of protection against matter and water ingress	IP33

Physical Specifications

Product dimensions	94 mm x 60 mm x 58 mm (3.7 in x 2.4 in x 2.3 in)
Product weight	340 g (0.75 lb)

CARESCAPE rSO_2 INVOS*

Number of channels	4
Measurement units	Unitless
rSO_2 Measurement Range	15 to 95
rSO_2 Measurement Resolution	1
rSO_2 Accuracy	Clinical study results specified in the CARESCAPE rSO_2 INVOS instructions for use.

Power Specifications

Consumption	2.5 W
Input voltage	5V DC
Input current	482 mA maximum

Environmental Specifications

Operating Conditions

Temperature	10°C to 35°C (50°F to 95°F)
Humidity	10% to 95%, non-condensing
Altitude	-500 to 4000 meters (1640 to 13123 feet)
Atmospheric Pressure	616 hPa to 1075 hPa (18 inHg to 32 inHg)

Storage and Transport Conditions

Temperature	-40°C to 70°C (-40°F to 158°F)
Humidity	10% to 95%, non-condensing
Altitude	-500 to 5572 m (-1640 to 18281 ft)
Atmospheric Pressure	500 hPa to 1075 hPa (15 inHg to 32 inHg)
Ingress protection	IPX2

Physical Specifications

Product dimensions	12.8 x 8.7 x 3.4 cm (5.04 x 3.43 x 1.3 in) with hook folded down
Product weight	313g (0.69 lb)
Host cable length	428.4 cm (14 ft) (approximate)
Sensor cable length	162 cm (5.3 ft) (approximate)

* CARESCAPE rSO_2 - INVOS Parameter device is not intended to be used for neonatal patients and is not available in the NICU software package. The rSO_2 license must be enabled on CARESCAPE B850, B650 and B450 monitors the measurement to work. Specifications are for INVOS device.

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Continuous Cardiac Output Module, E-PiCCO

For less invasive continuous cardiac output monitoring

The E-PiCCO module provides continuous cardiac output (CCO) measurement based on pulse contour calculation, transpulmonary thermodilution cardiac output (C.O.) and blood pressure (P). When combined with a CARESCAPE™ modular monitor, the E-module enables a graphical view for quick hemodynamic status assessment. The system complies with IEC 60601-1 3rd edition.

Features

- Direct key on the module for zeroing invasive pressure channels
- Easy insertion/removal of module without interrupting other monitoring
- Uses Pulsion's PiCCO® catheters

When used with a CARESCAPE modular monitor the display can show:

- Up to six C.O. measurements, which can be edited for an averaged C.O.
- Hemodynamic calculation display view
- Graphical view from three to seven user-selectable parameters, including flow, volume and contractility
- Editing of calculation input data
- Trending of calculations

Technical specifications

Patient range	above 2 kg

The E-PiCCO patient module and accessories are indicated for human patients weighing over 2 kg. Index calculated only when patient is over 15 kg.

Direct function keys

Zero P8	Zeros invasive blood pressure P8

Flow
Cardiac output

Measurement method	C.O. is the amount of blood ejected by the heart to the peripheral circulation every minute. Continuous cardiac output uses the pulse contour method, and it is calibrated by using the thermodilution technique. Continuous cardiac output calculation also uses the CVP value, which is obtained automatically or can be set manually. If the algorithm does not get the CVP value automatically or manually, a default value of 5 mmHg is used.

Continuous cardiac output (CCO)

Measurement range	0.25-25 l/min (Pulse contour cardiac output)
Measurement accuracy	CoV ≤2% (coeff of variation)

Transpulmonary cardiac output (CO)

Measurement range	0.25-25 l/min
Measurement accuracy	CoV ≤2% (coeff of variation)

Stroke volume (SV)

Measurement range	1 – 250 ml
Measurement accuracy	CoV ≤2% (coeff of variation)

Cardiac index (CI)

Measurement range	0.10 – 15.0 l/min/m^2

Continuous cardiac output index (CCI)

Measurement range	0.1-15.0 l/min/m^2 (Pulse contour cardiac output index)

Stroke volume index (SVI)

Measurement range	1-125 ml/m^2

Preload
Global end-diastolic volume (GEDV)

Measurement range	40-4800 ml
Measurement accuracy	CoV ≤3% (coeff of variation)

Global end-diastolic volume index (GEDI)

Measurement range	80-2400 ml/m^2

Intrathoracic blood volume (ITBV)

Measurement range	50-6000 ml
Measurement accuracy	CoV ≤3% (coeff of variation)

Intrathoracic blood volume index (ITBI)

Measurement range	100-3000 ml/m^2

Stroke volume variation (SVV)

Measurement range	0-50%

Pulse pressure variation (PPV)

Measurement range	0-50%

Contractility
Global ejection fraction (GEF)

Measurement range	1-99%

Cardiac function index (CFI)

Measurement range	1-15 1/min

Index of left ventricular contractility (dPmx)

Measurement range	200-5000 mmHg/s

Afterload
Systemic vascular resistance (SVR)

Measurement range	1-30000 dyn*s*cm^{-5}, (when CVP is available)

Systemic vascular resistance index (SVRI)

Measurement range	1-30000 dyn*s*cm^{-5}*m^2

Organ function
Extravascular lung water (EVLW)

Measurement range	10-5000 ml
Measurement accuracy	Error ≤ ± 5% or 10ml, repeatability ≤ 6% (coeff of variation) or standard deviation ≤ 10ml

Extravascular lung water index (ELWI)

Measurement range	0-50 ml/kg

Cardiac power output (CPO)

Measurement range	0.1-9.9 W

Cardiac power index (CPI)

Measurement range	0.1-9.9 W/m2

Pulmonary vascular permeability index (PVPI)

Measurement range	0.1-9.9

Invasive blood pressure (IBP)

Measurement method	IBP is converted to an electrical signal by a pressure transducer. The signal is continuously displayed as a waveform and numeric value. The IBP setup consisting of connecting tubing, pressure transducer, an intravenous bag of normal saline all connected together by stopcocks, is attached to the catheter. The pressure transducer is placed at the same level with the heart and electrically zeroed.
Physiological measurement range	-25 to +320 mmHg
Measurement accuracy	±4% or ±4 mmHg

Pulse rate

Measurement range	30 to 250 bpm
Resolution	1 bpm
Measurement Accuracy	±5% or ±5 bpm, whichever is greater

Temperature

Injectate temperature range	0 °C to 30 °C (32 °F to 86 °F)
Blood temperature range	17 °C to 44 °C (63 °F to 111 °F)

System compatibility

CARESCAPE modular monitors.

Environmental specifications

Operating conditions

Temperature	10 to 40°C (50 to 104°F)
Relative humidity	10 to 90% non-condensing
Ambient pressure	700 to 1060 mbar

Storage conditions

Temperature	-20 to 60°C (-4 to 140°F)
Relative humidity	10 to 90% non-condensing

Physical specifications

Dimensions (H x W x D)	112 x 37 x 188 mm (4.4 x 1.5 x 7.4 in)
Weight	<0.5 kg (1.1 lb)

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E-PP and E-PT Modules

For pressure and temperature measurements

Single-width E-PP and E-PT plug-in modules designed to measure either invasive blood pressures, or blood pressure and temperature in compliance with IEC 60601-1 3rd edition. Modules also have direct function key for easy pressure channel zeroing.

Clinical measurements

- E-PP: Two invasive blood pressure channels
- E-PT: Measuring one invasive pressure channel and two temperatures
- Cerebral perfusion pressure (CPP) calculated automatically from mean arterial pressure and ICP
- Easy insertion/removal of module without interrupting other monitoring

Features[1]

- Selectable labels for invasive blood pressure channels
- Adjustable pressure scales with 10 mmHg steps
- Overlapping invasive blood pressure waveforms mode
- Automatic flushing/blood sampling detection to eliminate unwanted pressure alarms
- Special PCWP measurement display view
- Respiration artifact rejection
- Adjustable invasive blood pressure filter

[1] For detailed compatibility information, please refer to the monitor specific User's Manual. Please note that commercial availability of the patient monitors differs regionally.

Technical specifications

Direct function keys

E-PT

Zero P3/P7[2]	Zeros invasive blood pressure P3/P7

E-PP

Zero P5	Zeros invasive blood pressure P5
Zero P6	Zeros invasive blood pressure P6

Invasive blood pressure

Measurement method	Invasive blood pressure is converted to an electrical signal by a pressure transducer. The signal is continuously displayed as a waveform and numeric value. The invasive pressure setup consisting of connecting tubing, pressure transducer, an intravenous bag of normal saline all connected together by stopcocks, is attached to the catheter. The pressure transducer is placed at the same level with the heart and electrically zeroed
Measurement accuracy	±4% or ± 4 mmHg

Waveform display[1]

Scales	adjustable in 10 mmHg increments

Numerical display[1]

Range	-30 to 320 mmHg
Resolution	1 mmHg
Alarms	Adjustable high and low alarm limits for systolic, diastolic and mean pressures, or off

Pulse rate

CARESCAPE™ modular monitors[1]	PR from ART and FEM
Measurement range	30 to 250 bpm
Resolution	1 bpm
Accuracy	±5% or ± 5 bpm
Transducer sensitivity	5 µV/V/mmHg
Pressure filter	0 to 22 Hz (-3 dB) adjustable upper limit 4 to 22 Hz

Temperature

Measurement method	The temperature is measured by a probe whose resistance varies when the temperature changes
Measurement range	10 to 45°C (50 to 113°F)
Measurement accuracy with sensors	Reusable: ±0.2°C / ±0.4°F Single use: ±0.3°C / ±0.5°F
Numerical display[1]	2 temperatures differential (T3, T4)
Temperature units	°C or °F
Display resolution	±0.1°C (±0.2°F)
Probes	Use only GE Healthcare recommended temperature probes

Monitor compatibility

CARESCAPE modular monitors.[1]

For P3, please refer to the S/5 monitor specific User's Manual.

Environmental specifications

Operating conditions

Temperature	10 to 40°C (50 to 104°F)
Relative humidity	10 to 90% non-condensing

Storage conditions

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

Physical specifications

Dimensions (H x W x D)

E-PP, E-PT	11.2 x 3.7 x 18.7 cm (4.4 x 1.5 x 7.4 in)

Weight

E-PP, E-PT	0.3 kg (0.66 lb)

[1] For detailed compatibility information, please refer to the monitor specific User's Manual. Please note that commercial availability of the patient monitors differs regionally.

[2] With CARESCAPE monitors only P7 pressure channel can be used.