

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.

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, a Datex-Ohmeda innovation (3)
- Based on 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 CARESCAPE* and S/5 modular anesthesia monitor screens
- Digital display and trending of the Entropy parameters and burst suppression ratio (BSR)
- Entropy EEG waveform display, one channel



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.
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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 signal

Sampling frequency	400 Hz
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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

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
S/5 modular monitors

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 (0.8 lb)

Warranty

One year

- 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.

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Our “healthymagination” vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access and improving quality and efficiency around the world.

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