FRESENIUS KABI
caring for life

Conox®

Smart anaesthesia monitoring

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Smart Anaesthesia Monitoring

Two monitoring solutions in one device, using one single sensor

Conox is a non-invasive depth of anaesthesia monitor designed to help the anaesthesiologist assess patient brain activity and to rapidly detect how certain drugs are affecting the patient.

Two in One

- qCON index provides a rapid indication of the depth of anaesthesia of the patient

- qNOX index is based on low and high frequency EEG in order to detect any changes related to surgical stimuli

- Additional key indicators are simultaneously provided for more complete information about the patient's state

- The graphical area of the screen allows personal settings to view different index trends in different time scales

Stable

- Conox enables fast detection of consciousness state changes in patients, helping the healthcare professional to reduce risks associated with anaesthesia[1]

- With an advanced signal processing algorithm, Conox enables faster decision making and provides stable and reliable monitoring of patients under anaesthesia conditions[2]

- The Conox sensor is designed for the anaesthesiologist to achieve low impedance

Portable

- 2,5 hours battery life, for a fully portable solution

- The compact and lightweight design provides hospitals and clinics the flexibility to use Conox across different wards

- A pole clamp enables easy attachment of Conox to hospital furniture for that purpose
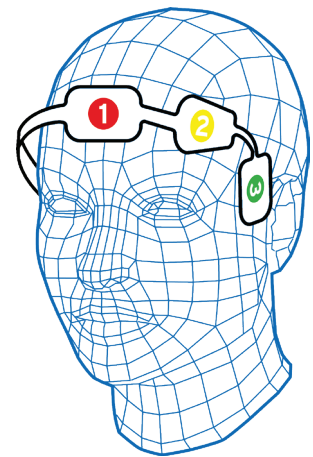
Highly conductive sensor pads allow the Conox proprietary sensor to achieve accurate EEG readings for both qCON and qNOX index calculations. Recorded using the Conox proprietary sensor.

qCON	Clinical State
99	Awake
80	Sedation
60-40	General anaesthesia
20	Deep anaesthesia
0	Isoelectric EEG

Conox's qCON index is based on an easily readable 0-99 scale, resulting from the processing of EEG readings. A qCON index of between 40-60 indicates an adequate anaesthesia level, while 0 corresponds to an isoelectric EEG.

Innovative design with touch screen display and easy to use graphical interface

qCON Index

The qCON index is derived from a quadratic generalized linear model that uses the energy of four frequency ratios as input. The model contains coefficient terms as interaction between each entry. The model can be expressed as:

$$Output = Intercept + \sum_{i=1}^{n} a_i * Input_i + \sum_{i=1}^{n} b_i * Input_i^2 + \sum_{j=1}^{n} \sum_{i=j+1}^{n} c_{j,i} * Input_i * Input_j$$

Where:

Intercept = intersection or constant term
Input = model inputs
Output = model output
a = linear terms
b = square terms
c = interaction terms between inputs
n = number of model inputs

The inputs are the energy of each normalized frequency band. The four bands used by the model are: 4-8 Hz; 8-13 Hz; 11-22 Hz; 33-44 Hz

qNOX Index

The qNOX index is based on the same equation as the qCON, but qNOX uses six frequency ratios as input, increasing the importance of very low frequency bands.

The six bands used by the model are:

- B1=1-8 Hz
- B2=4-8 Hz
- B3=8-13 Hz
- B4=16-30 Hz
- B5=21-26 Hz
- B6=33-44 Hz

References

1. Zanner R.[1], Kreuzer M.[2], Meyer A.[1], Kochs E.[2], Schneider G.[1] [1]HELIOS Clinic Wuppertal, Witten/Herdecke Universit y, Dept of Anaesthesiology, Wuppertal, Germany, 2Klinikum rechts der Isar der Technischen Universität, Dept of Anaesthesiology, Munich, Germany

2. Pineda P., Jensen E.W., Jospin M., Gambus P. Comparison of the reliability and stability of two depth of anaesthesia monitors. NAVAt, 2014.