



## SenTec Digital Monitoring System

Continuous noninvasive  
ventilation monitoring in NICU

### PCO<sub>2</sub>

Continuous | Noninvasive | Accurate | Safe | Easy to Use

# Transcutaneous, noninvasive blood gas monitoring



## Overcoming limitations of arterial blood gases, etCO<sub>2</sub> and SpO<sub>2</sub> monitoring

Assessing ventilation in neonatal patients is a challenge. Maintaining normal PaCO<sub>2</sub> ranges in neonates is important as abnormal PaCO<sub>2</sub> values may have detrimental effects on neonates' brain and lungs. Neonates in critical care units often have fluctuations of PaCO<sub>2</sub><sup>1</sup>.

### Arterial blood gas sampling

provides only a snapshot every few hours and bears the risk of invasiveness, especially in neonatal patients<sup>2</sup>, and is painful.

## End-tidal CO<sub>2</sub> (etCO<sub>2</sub>) monitoring

is sometimes inefficient in patients with small tidal volumes<sup>3</sup> and inapplicable in certain ventilation modes such as HFO<sup>4</sup>.

### Measuring SpO<sub>2</sub> alone

is not sufficient to detect hyperventilation or hypoventilation. Changes of arterial CO<sub>2</sub> levels can never be detected by SpO<sub>2</sub> monitoring alone.

## Continuous and noninvasive monitoring of tcPCO<sub>2</sub> supports therapy guidance for neonates in the NICU

Neonatal Journey in the NICU	Prevent	Stabilize	Wean	Recover
<b>Noninvasive Ventilation</b> e.g. High Flow Oxygen Therapy or nCPAP				
<b>Invasive Ventilation</b> e.g. Conventional ventilation or HFOV/HFJV				

# Dedicated to neonatal needs

SenTec digital transcutaneous (tc) sensors provide continuous and accurate measurements, supporting healthcare professionals to monitor ventilation in neonates. For better patient outcomes where it matters most.



## Different display options:

- tcPCO2 and heating power trends
- baseline and delta values

## V-Sign™ Sensor

### PCO2

PCO2 measured by a Stow-Severinghaus type electrode.

- reliable and safe
- clinically trusted for more than 10 years





### Set baseline and markers

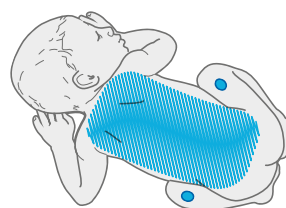
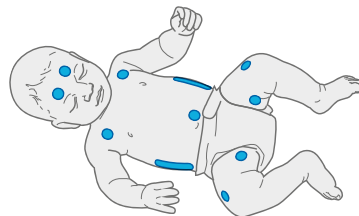
Set a baseline just before changing the treatment to assess the impact on the patient's ventilation.

### User profiles

Quickly adapt settings to your needs: select individually customized profiles stored in the monitor.



### Select from multiple recommended measurement sites



### Trendlines allow early detection of ventilation changes

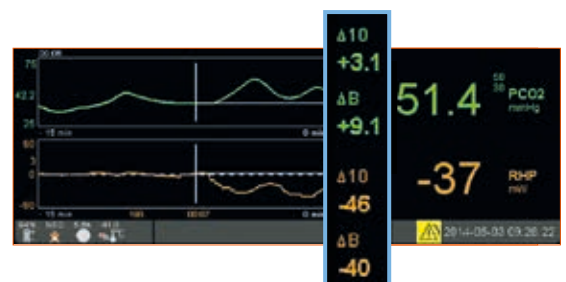
Estimates of PaCO<sub>2</sub> in trendline, baselines and delta values.

### Relative Heating Power

RHP shows the required heating power to keep the sensor at a set temperature. Changes of RHP may be attributable to changes in perfusion.

### Delta values

Numerical indication of the difference between the current reading and the reading from the set baseline and e.g. 10 min before.



# Effective and efficient monitoring

Save your time for the important tasks.



## Smart CalMem

Disconnect the sensor (e.g. to untangle cables or to move the patient) without removing the sensor from the patient. No need to recalibrate the sensor when re-connecting.



## Automatic calibration management

Simply store the sensor in the Docking Station – calibration is fully automatic. Within a few minutes, “Ready for Use” status is established and maintained until the sensor is applied to the patient.

## Multi Site Attachment Rings (MAR)

The design enables a gentle sensor application and a smooth removal without damaging the sensitive skin.



## Transportable

Lightweight, dedicated mounting plates/roll stands, and battery life up to 10 hours.

## Connectivity | Data Management

Direct connectivity to Patient Monitoring Systems:

- GE
- Philips
- Dräger
- Mindray
- Spacelabs







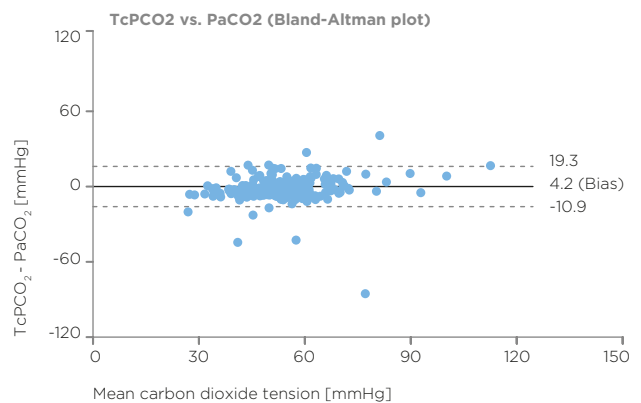
#### **Making Sensor Application Safer and Easier**

One application, one vial – Single Dose Contact Gel supports infection prevention initiatives.



#### **Excellent accuracy**

The high accuracy and safety of the SenTec tcPCO<sub>2</sub> sensor has been studied and validated in several clinical studies.



In a 2018 study<sup>5</sup>, Van Weteringen et al. demonstrated that tcPCO<sub>2</sub> measured with the SenTec Digital Monitoring System was in good agreement with conventional blood gas analysis. A total of 238 blood samples were analyzed from 69 infants with a gestational age of 24 to 31 weeks. Depending on their gestational age, infants were measured with a sensor temperature of 42 °C and 43 °C. The sensors were calibrated every two to three hours.

# Reliable and safe



## **Safe sensor temperature and site time management**

- A low sensor temperature of 41 °C for tcPCO<sub>2</sub><sup>6,7</sup> is recommended and allows for up to 8 hours continuous monitoring in neonatal patients.
- Redundant sensor temperature controls to avoid the risk of skin irritations
- Automatic, customizable site time control and site inspection intervals
- Safety-relevant parameters are password-protected.

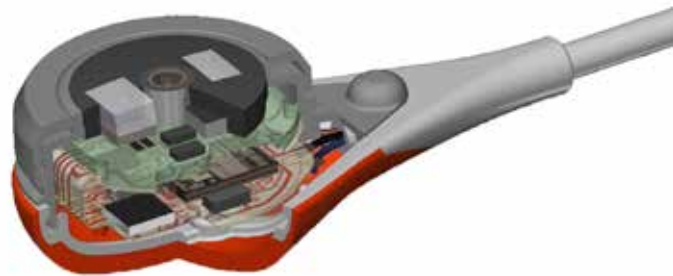


## **Automatic artifact detection**

- Automatic data quality verification and artifact detection

## **Best signal quality**

Digital Sensor with integrated CPU. Measured signals are digitized and preanalyzed in the sensor head for the best signal quality.



# Clinically validated

Numerous clinical studies have been conducted with the SenTec Digital Monitoring System in the neonatal field. Leading neonatal hospitals around the world trust SenTec every day.



## Literature

- <sup>1</sup> **Wyatt, J.S., Edwards, A.D., Cope, M., Delpy, D.T., McCormick, D.C., Potter, A., Reynolds, E.O.**  
Response of cerebral blood volume to changes in arterial carbon dioxide tension in preterm and term infants, *Pediatr Res.*, 1991, Jun 29(6): 553-7.
- <sup>2</sup> **Mukhopadhyay, S., Maurer, R., Puopolo, K. M.**  
Neonatal Transcutaneous Carbon Dioxide Monitoring - Effect on Clinical Management and Outcomes, *Respiratory Care*, 2016, 61(1), 90-97.
- <sup>3</sup> **Brouillette, R. T., Waxman, D.H.**  
Evaluation of the newborn's blood gas status, 1997, *Clinical Chemistry* 43:1, 215-221.
- <sup>4</sup> **Berkenbosch, J. W., Tobias, J.**  
Transcutaneous carbon dioxide monitoring during high frequency oscillatory ventilation in infants and children, *Crit Care Med*, 2002, Vol. 30, No. 5, 1024-1027.
- <sup>5</sup> **Van Weteringen, W., Goos, T.G., van Essen, T., Gangaram-Panday, N.H., de Jonge, R.C.J., Reiss, I.K.M.**  
Validation of a transcutaneous tcPO2/tcPCO2 sensor with an optical oxygen measurement in preterm neonates, Poster presentation at 14th European conference on pediatric and neonatal mechanical ventilation, Montreux 2018.
- <sup>6</sup> **Aly, S., El-Dib, M., Mohamed, M., Aly, H.**  
Transcutaneous Carbon Dioxide Monitoring with Reduced-Temperature Probes in Very Low Birth Weight Infants, *Am J Perinatol* 2016.
- <sup>7</sup> **Sorensen, L.C., Brage-Andersen, L., Greisen, G.**  
Effects of the transcutaneous electrode temperature on the accuracy of transcutaneous carbon dioxide tension, *Scandinavian Journal of Clinical and Laboratory Investigation*, 2011, Vol 71, 7, 548-552.

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✚ Made in Switzerland

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