VIVONOETICS

VIVOSENSE™ COMPLEX RESPIRATION ANALYSIS MODULE

VivoSense™ is the leading software in respiratory data analysis. It provides a range of tools that can be used for detailed evaluations of lung function. These tools may also be used to infer changes in psychological state from changes in complex respiratory measures.

Measurements of respiratory function are essential for assessing health, detecting and diagnosing disease, and assessing the efficacy and safety of a prescribed treatment or activity.

Respiratory abnormalities characterize a variety of disorders. In addition to physical disorders, ventilation is also profoundly affected by mental and psychophysiological states, including stress, anxiety and panic disorder.

Complex measures of respiration also have significant value in sports and hazmat applications and can be used to help assess performance, metabolic function and physiological distress.

FEATURES

• Dual band Respiratory Inductance Plethysmography (RIP) analysis

• Accurate, validated and best-in-class breath detection logic

• Automated calibrations for breathing compartment weighting

• Calibration against external measurements e.g. spirometer

• Paradoxical breathing analysis: Multiple phase relation measurements

• Interactive 2-D flow-volume loops

• Interactive 2-D Konno-Mead plots

• Synchronized visualization of respiratory channels and measures

• Over 30 validated respiratory metrics

WHAT IS COMPLEX RESPIRATION?

Complex Respiration specifically refers to respiration monitoring using dual band inductance plethysmography sensors.

Detailed monitoring of respiratory function inside and outside the laboratory greatly enhances our understanding of respiratory characteristics.

Dual band inductance plethysmography sensors are the gold standard for continuous, unobtrusive respiratory monitoring and have been used widely in clinical and research settings.

The use of a thoracic and abdominal bands allows measurements of both breathing compartments to provide accurate volume and phase relation measurements. This is in addition to simple respiration metrics of rate and timing.
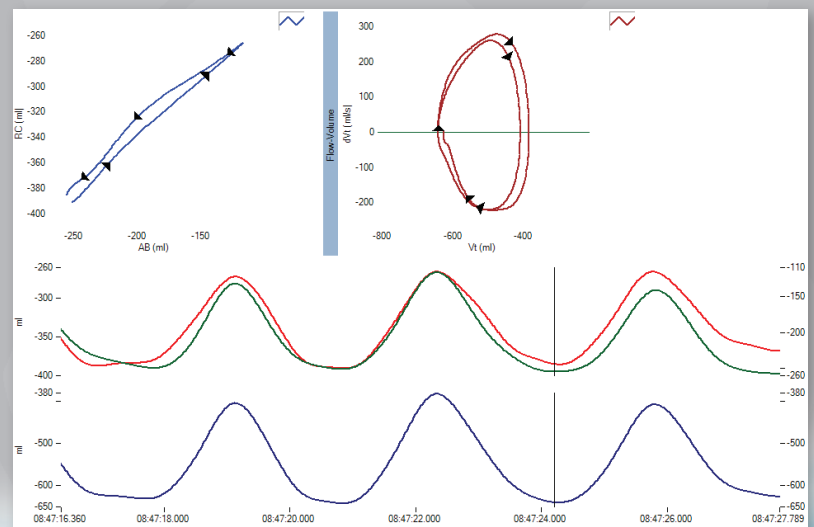
VivoSense™ CRA module showing Flow Volume Loops, Konno-Mead Plots and time synchronized RIP data.
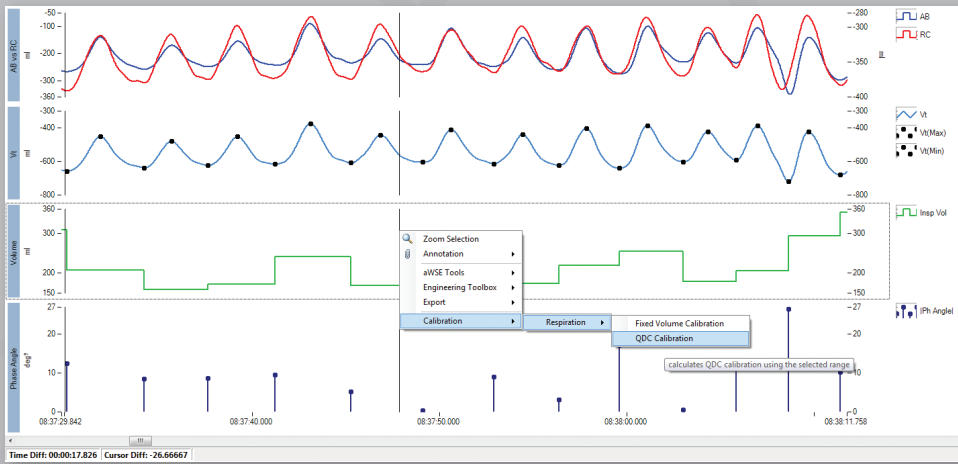
VivoSense™ Complex Respiration Module showing rib cage and abdominal waveforms, tidal volume, inspiratory volume and the phase relationship between breathing compartments. Volume calibration can be performed over a selected range with a choice between a Fixed Volume Calibration (FVC) and a Qualitative Diagnostic Calibration (QDC).

2-D PHASE PLOTS

VivoSense™ offers graphical tools that allow visualization of complex respiratory dynamics.

Flow-Volume Loops: These plots provide useful information regarding lung function and the relationship between lung volume and airflow. These may be used to study obstructive or restrictive lung disease in individual subjects.

Konno-Mead Plots: These plots allow additional analysis of thoraco-abdominal asynchrony. This is a useful, non-invasive indicator of respiratory muscle load or respiratory muscle dysfunction and can be used to study response to therapy in individual subjects.

CALIBRATION

Calibration algorithms are required to assign relative weights to the contribution from each of the Thoracic and Abdominal respiratory compartments.

Qualitative Diagnostic Calibration (QDC): This algorithm is used to automatically weight the relative gains of each respiratory compartment.

Fixed Volume Calibration: This calibrates the average breath volume over the calibration period so that it is equal to an externally measured breath volume.

Least Squares Calibration: This provides a best fit so that the RIP volumes match external, time synchronized spirometer measurements.

CUSTOMIZATION

Vivonoetics offers customizations services for VivoSense™. Contact us to discuss any additional desired functionality for the VivoSense™ framework and we will work with you to incorporate this.

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