



AQAI

SIMULATIONSZENTRUM MAINZ

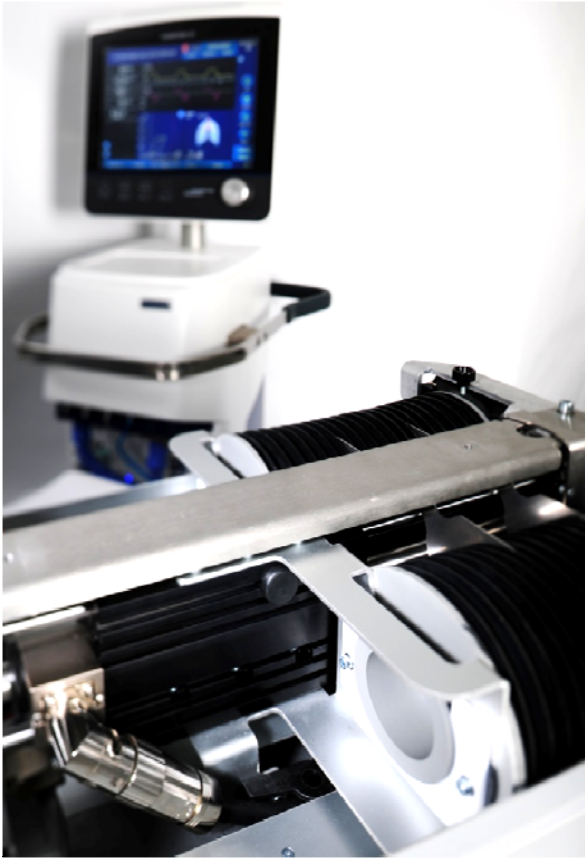
TestChest™

“Flight-Simulator for Respiratory Experts”



- ❖ Realistic patient simulator, programmable for ALI, ARDS, COPD etc.
- ❖ Fully self-contained, ideal for high intensity learning
- ❖ Includes spontaneous breathing and CO₂ production
- ❖ Responds realistically to therapeutic interventions such as pressure support, PEEP, CPAP, FiO₂, and even recruitment maneuvers
- ❖ Optional hemodynamic module provides information on oxygen saturation, heart rate and intravascular filling status
- ❖ Software package AQAI SIS adds full scale feeling, preconfigured scenarios and learning tools, easy to use interface, combinations with existing simulators and more...

TestChest – the modern way of learning respiratory therapy



Preliminary image

- ❖ **Competitive real-time teaching and training for intensive care and anesthesia**
- ❖ **Widest range of lung conditions and heart lung interactions**
- ❖ **Software Package features preconfigured scenarios and learning tools**
- ❖ **In-process testing of ventilators and anesthesia machines**
- ❖ **Performance evaluation of intensive care ventilators, home care ventilators, CPAP devices**

BACKGROUND

TestChest - For training of anesthesiologists, intensive care physicians and nurses, canine and porcine models are being used to teach the skills of mechanical ventilation, hemodynamic management and the physiology of lung-heart-interaction since organ size and physiology of these species closely resembles those of humans.

As realistic as these models may be, animal-based training is fragile, poorly reproducible and requires the full attention of a dedicated veterinarian or intensive care specialist to keep the animal alive while the trainees perform their exercises. During the course of the training event, the animals usually get sicker as more and more repetitions of the exercise are carried out. Thus, such worsening conditions until the final sacrifice dictate both, the sequence and content of the training sessions.

TestChest eliminates these disadvantages.

VENTILATION

TestChest is a simulator for passive or active ventilation. ARDS and COPD can be set. S-shaped pressure-volume curve creates realistic response to different forms of ventilatory support.

TestChest provides physiological time responses to therapy changes and thus guarantees an intense real-time experience.

TestChest provides a break-through in training by realistically simulating pulmonary mechanics, gas exchange and hemodynamic response in health and disease, from normal spontaneous breathing to mechanically ventilated severely diseased lungs.

TestChest fits on any bed and is fully self-contained.

TestChest is programmable and can be remotely operated to simulate in an unprecedented way the evolution of diseases as well as the recovery process.

TestChest combines the simplicity of a physical model with the sophistication of advanced mathematical modeling to provide - reproducibly and predictably - the feeling of a real patient's condition on mechanical ventilation.

HAEMODYNAMICS

TestChest uses an artificial "finger" simulating oxygen saturation curves and provides access for conventional pulse oximeters. Pulse amplitude can be made to vary according to different states of intravascular filling such as normo- or hypovolemia. Heart-lung interactions are modeled thus supporting the latest generations of ventilators in advanced or automatic respiratory modes.

ACTIVE LEARNING

TestChest is the key to modern learning concepts like Problem Based Learning and Student Activated Learning.

An unlimited number of patient cases can be programmed for test and educational purposes.

The consequences of adverse events such as disconnection of tubes, sensors, and monitors can be simulated but without threatening the lives of the attached subject.

REFERENCE DEVICE

TestChest features a detachable calibration module which makes it accurate for years of use.

TestChest is loaded with highly accurate sensors to make it a reference for testing ventilators, anesthesia machines, home care ventilators, sleep apnea devices, and CPAP systems.

TECHNICAL SPECIFICATIONS

TestChest consists of two bellows driven by a linear motor; *TestChest* features alveolar, airway, ambient pressure sensors as well a temperature sensor and a real-time clock.

Optionally, intrapulmonary oxygen sensor, position sensor, mass flow controller for CO₂ delivery, pulse oximeter simulator (“artificial finger”), programmable dead space and leakage are available.

Parameters	Min	Max	Unit
Total respiratory system compliance	8	60	ml/mbar BTPS
FRC measured	300	4000	ml
Spontaneous breathing activity ($P_{r,1}$)	0	15	mbar/100ms
Spontaneous breathing rate	0	60	/min
Upper and lower inflection points	0	50	mbar
Chest wall compliance	3	150	ml/mbar
FRC predicted	100	4000	ml
Alveolar pressure	-30	15	mbar
Airway pressure	-250	250	mbar
Bellows temperature measured	0	50	degrees C
Barometric pressure measured	800	1100	mbar
End expiratory lung volume	1	4000	ml
Tidal volume	1	2500	ml BTPS

Optional	Min	Max	Unit
CO ₂ production	1	600	ml/min STPD
S _{pO₂} simulation	80	100	%
Pulse rate	20	300	bpm
S _{pO₂} plethysm. variation	-30	100	%
Leak	0	3	l/min
Cardiac output	10	10000	ml/min
Hemoglobin	5	40	g/100ml blood
Dead space	100	200	ml
F _A O ₂	0	100	vol %

For more information and prices please contact:

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