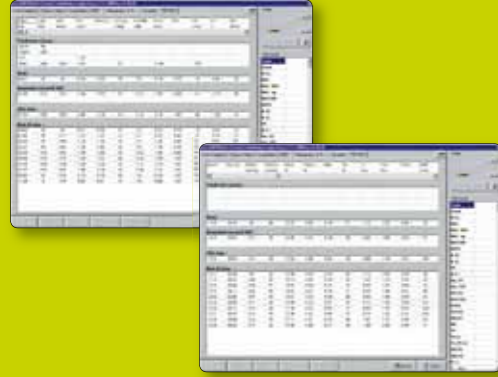
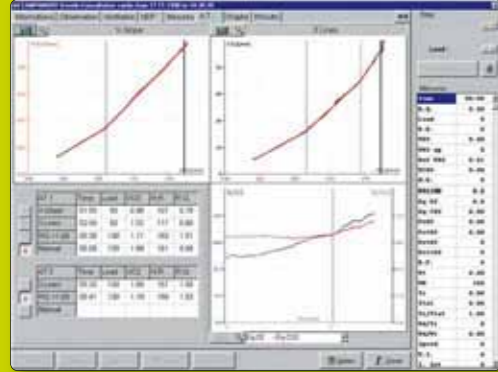


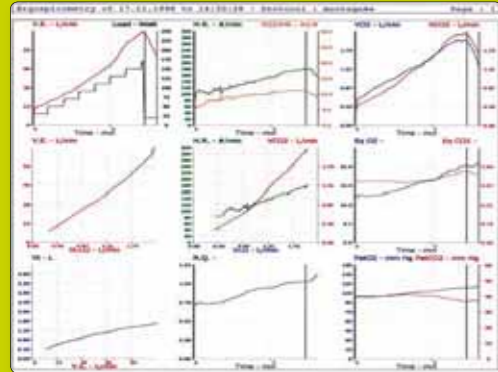
Configurable screen for displaying results after the test.



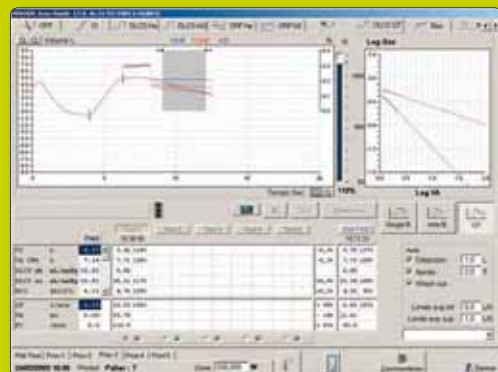
Manual and automatic computation of Ventilation Threshold 1 and 2.



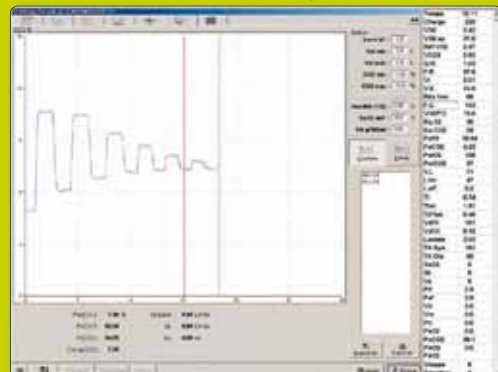
Wassermann graph configurations



Measurement of Qt by means of C₂H₂ uptake method



Measurement of Qt by CO₂ re-breathing method



EXPAIR

The most Intuitive, userfriendly and complete in basic version

- A sophisticated and powerful data-base and electronic storage function
- Exercises protocol fully user configurable for treadmill and ergometer
- Trend Report (Historic function)
- Interpretation function
- Comment function
- Off Line input and on line data transfer
- Report designer
- Predicted value maker
- Language maker
- User calculated parameters
- Full calculation function : many graphics and calculation tools to help in the results analyse
- Blood gases with blood chemistry analysis from manual entry
- Users Units capability
- Technical toolbox to enable diagnostic function and full program control
- Inbuilt quality control with calibration markers for performance
- Teleassistance

The MediSoft factory is a state of the art modern facility with clinical research, precision engineering and computer design departments.



ERGOCARD®

GENERAL SPECIFICATIONS

Dimensions	Module	Trolley
(H x W x D) cm	36 x 27 x 14	65 x 67 x 89
Weight	+/- 8 kg	+/- 35 Kg
Power requirements	230/115 VAC	50/60Hz
Power Consumption	+/- 70 VA (module)	
Warm up Time	20 min	

Conform to electrical safety requirements IEC60601/1 and CE certified

AMBIENT CONDITIONS

Temperature	10 to 40°C
Relative humidity	25 to 95% (non condensed)

O₂ ANALYSER

Type	Paramagnetic diff. P. measurement
Range	10 - 25% (0-100% Hyper/Hypoxic option)
Relative Accuracy	0.01% (0 - 25%)
Response time	± 80 msec (10-90% fs / 450 ml/min).
Software adjustment of response dynamics.	
Drift	0.015%/h.

CALIBRATION GAS BOTTLE MIXTURE

Analysers O ₂ /CO ₂	± 16 % O ₂ , +/- 4 % CO ₂ , QS N ₂
CRF N ₂	100% O ₂
DLCO CH ₄ & Qt C ₂ H ₂	0.3% CH ₄ , 0.3% CO, 0.3% C ₂ H ₂ , 21% O ₂ , QS N ₂
Qt CO ₂	100% CO ₂
	Air with 40% O ₂

OPTIONNELS MULTIGAS ANALYSER

Type	Infrared spectrometer (CH ₄ , C ₂ H ₂ , CO)
Range	0 to 0.350%
Relative Accuracy	+/- 0.1%
Response time	< 0.1 sec (10 - 90% fs)

SAMPLE GAS TECHNIQUE

Linear motorized pump (no wear) sampling system with flow and pressure regulation.
Gas sample dried to room conditions by the Nafion tubing.

EXTERNAL CONNECTIONS

Analogue input	2
Serial (RS232)	2 (For external module)

OPTIONS

- ECG - rest & stress (Medcard 3 or 12 leads)
- Two monitor version (17" TFT option)
- System of electrodes with suction cups
- Spirometry : ventilation study and pulmonary hyperinflation during exercise
- NEP
- Cardiac output C₂H₂ or CO₂ re-breathing
- FRC N₂
- DLCO CH₄
- Mixing chamber
- Occlusion pressure
- P_{O₂} with CO₂ re-breathing
- External NIBP
- Pulse oximetry integrated
- Calorimetry software
- MediSoft network
- Data Transfert & reception (HL₇, ...)
- External automatic sinusoidal pump for Pitot tube calibration
- Integrated barometer
- Paediatric pitot model
- Automatic back-up

PNEUMOTACHOGRAPH

Pneumotachograph	Pitot tube
Range	0.03 to 15 l/sec
Band width	0-35 hz
Relative accuracy	Erreur < 3%
Calibration	Automatic (option) or semi auto. with 1 to 3 L serynge with quality control
Dead space	< 13ml

Software computerized Linearisation
Volume conv. to BTPS included thermometer (optional barometer)
16-bit dependent differential triple-sensor measuring chain
Automatic zero shift correction of measuring elements.

CO₂ ANALYSER

Type	infrared
Gamme de mesure	0 - 10 % (15% option)
Relative accuracy	0.01 % (0 - 10%)
Response time	± 80 msec (10 - 90% fs / 450 ml/min).
Software adjustment of response dynamics	
Drift	0.015%/h

ANALYSERS CALIBRATION

Automatic, accurate, rapid calibration with
Quality verification of calibration factors
0 - 8 bars 15m²/h regulator

COMPUTER INTERFACE

Interface	Serial RS232 and USB compatible
Conversion	12 bit. & 16 bit
Acq. frequency	100 Hz / Channel (Multigas : 3500 Hz)
Transmission speed	115,200 baud
Isolation	System fully isolated by optical infrared
Computer	Pc Pentium, monitor 17", Hp Deskjet printer A4 color
Operating system	Windows® 2000 professional

ERGOMETER AND TREADMILL CONTROL

Analogue	0 - 10 Volts (10 bits resolution)
Serial (RS232)	Many drivers available
Treadmill	Slope & Speed RS232 controlled (Compatible with most treadmill of the market)

HEART RATE MEASUREMENT

Synchronization signals detected and measured by impulses or analogue ramp generated by external module
POLAR heart rate meter interface (option).
Automatic if MedCard option.

PARAMETRES MESURES ET CALCULÉS

- Elapsed time, Load (velocity-grade/work), V_e, V_{O₂}/kg,
- Ref. V_{O₂}, V_{CO₂}, RQ (RER), V_{O₂}/HR (O₂ Pulse), E_{O₂}, E_Q CO₂,
- Fe O₂, Fi O₂/Fe CO₂, Fi CO₂, Pet O₂, Pet CO₂, HR, HRR,
- MET, RR, Vt, Ti, Ttot, VT/TI, Estimated Vd/Vt, actual Vd/Vt,
- P(A) O₂, CO₂, P(a - A) O₂, CO₂, TRUE O₂, TRUE CO₂
- Vent. Res., energy expenditure, I eff., I int, Borgh scale
- Slow Spirometry : CVVC, ERV, IRV, IC, EC
- and forced Spirometry : FEV1, FV1, FVC, FEV1/FVC, FEV1/VC,
- PEF, F25, F50, F75, MEF, MVV (option)
- DLCO: AV, DLCO / AV, ... (option)
- NEP, RNep, Exp. Flow Lim, (option)
- MIP/MEP, SNIP, P_{O₂}, (option)



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Medisoft s.a. reserves the right to change and improve the above specifications without prior notice

CE 0344



ISO 13485 : 2000

www.ergocard.be - ERGO

ERGOCARD®

CARDIOPULMONARY EXERCISE TEST STATION



The perfect unit for :

- HEART-LUNGS differential diagnosis
- Disability assessment
- Rehabilitative evaluation
- Exercise prescription
- Sport and research medicine
- Assessment of supplemental O₂ requirements
- Evaluation of medication effects
- Nutritional and energy assessment
- Ventilator weaning evaluation



CARDIO-RESPIRATORY INSTRUMENTATION

ERGOCARD®

Cardiopulmonary exercise test station

► The Ergocard® module in association with Exp'Air software provide :

- A "Gold Standard" system
- With unequalled flexibility in use
- Software provides clinical excellence and assist full diagnoses
- Capable of full expansion

From basic to Full version, 8 optional versions & combinations

MediSoft has developed many technical options that are low maintenance and are applicable at a low cost, this sets no limits as to what is possible.

A quality check in real time of the VO_2 and VCO_2 parameters reassures signal performance and hence the reliability of measures.

► The Ergocard® provides a personalised solution. The software may be set-up with numerous configurations to provide versatility to satisfy your needs.



Flowmeter with integrated pitot tube.
Masks & mouthpiece



12 lead PC ECG.



Ergocard Giga,
integrated cardiac output



Large range of ergometers & treadmills



SAO2 finger sensor (optional)



SAO2 ear sensor (optional)



NIBP



**BREATH-BY-BREATH OR MIXING CHAMBER (Option)
STUDY OF VENTILATION AND GAS EXCHANGE AT REST AND DURING EXERCISE.**

The Pitot tube used to measure the flow rate is an excellent sensor, very reliable and extremely lightweight for subject comfort. The Ergocard covers all subjects from paediatric to the testing of top class athletes. The latest recent computer technology gives this unit the ERGONOMIC CHARACTERISTICS, FLEXIBILITY, and EASE OF USE that are indispensable for high-quality performance.



MEDCARD (12-LEAD ELECTROCARDIOGRAPH FOR RESTING AND EXERCISE ECGS) (Option)

Performance that is equal to the best references in the field. Real-time Viewing, Measurement, Interpretation, and Processing of data from 12 leads. Excellent base line stability during the most demanding stress tests. A post-processing option gives access to the automatic recording and classification of arrhythmia throughout the exercise period. The Ventilation, Gas Exchanges, and Electrocardiography functions are totally integrated and interactive. For more information consult the MedCard data sheet.



NEP (Option) EXCLUSIVE

A new and very sensitive test that is specific and reproducible for determining the degree of expiratory flow limitation both at rest and exercise, particularly with subject's known to have obstructive lung disease. The test applies a negative pressure to the mouth-piece during the expiratory phase, this permits the comparison of the flow volume loop with the tidal efforts when reviewed as a flow volume loop display. This method allows additionally the measurement of resistance indirectly (RNep) this provides a good alternative method for screening.



WITH A SPECIAL OPTION, THE ERGOCARD® CAN BECOME A COMPLETE, HIGHLY ADVANCED PULMONARY FUNCTION SYSTEM

- Vital capacity and forced spirometry (pre-, post-, and pharmacological challenge testing).
- Measurement of TLC by Nitrogen washout. The Nitrogen washout uses the accumulated volume of oxygen to wash nitrogen from the lungs as the "true" FRC value.



NON-INVASIVE MEASUREMENT OF CARDIAC OUTPUT (QT) (Option)

Two totally automated methods are available and guarantee reliable measurements at rest and during exercise. CO_2 equilibrium measured by re-breathing (indirect Fick) method or single-breath measurement by means of the C_2H_2 (acetylene) uptake method. These methods : • offer very good correlation with the Fick and thermo dilution methods • are easy to use, inexpensive, risk-free, and can be repeated every few minutes.

(For more information, consult the Cardiac Output data sheet.)



DLCO CH_4 - INTRA BREATH OR SINGLE BREATH METHOD (option)

Diffusion measurement with the CH_4 trace gas, at rest or during exercise, used alone or combined with the Qt C_2H_2 measurement. This method is fully automatic with minimal manipulation by the operator. Also it's generally well tolerated by the patient.



NON INVASIVE BLOOD PRESSURE AND SAO_2 MEASUREMENT

Several types of NIBP external module can be integrated into the chain of measurements.

Pulse oximeter (SAO_2) : an optional electronic module that is integrated into the measuring module. External module connectivity is also possible. A line of sensors for exercise tests ensures reliable measurements throughout the testing period.



OCCCLUSION PRESSURE MIP, MEP, SNIP, $P_{0.1}$ (option)

These optional parameters can also be measured by including the necessary hardware in the basic module.

$P_{0.1}$: Measuring respiratory control throughout a test under hypercapnia, by means of CO_2 rebreathing, using the CO_2 analyzer integrated into the module and an external two channel breathing valve with a bag.

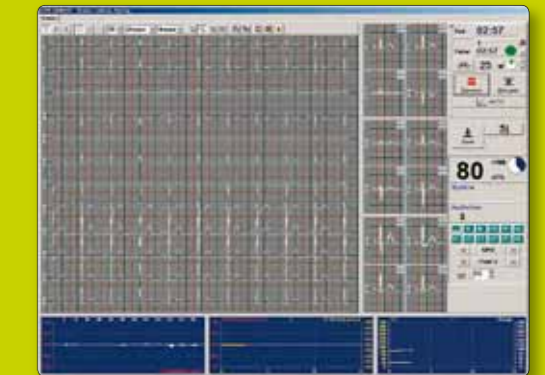
On screen visualisation guides the user through the full test procedure, making the understanding and quality control of the test a key feature. The possibility to import a VC from a separate effort is possible when the subject maybe unable to perform the best effort within the test. The measuring circuit utilises the O_2 and CO_2 analysers by subtraction to measure the nitrogen; the patient circuit consists of an automatic two-channel valve with automatic delivery of 100% O_2 with a low resistance demand valve.

- Study of ventilation and pulmonary hyperinflation during exercise. Monitoring the main parameters of tidal volume (VT) throughout the entire period of exercise and plotting them on the previously recorded flow-volume loop make it possible to measure the limits of ventilation with the utmost precision. The concurrent recording of inspiratory capacity can reveal the existence of pulmonary hyperinflation.

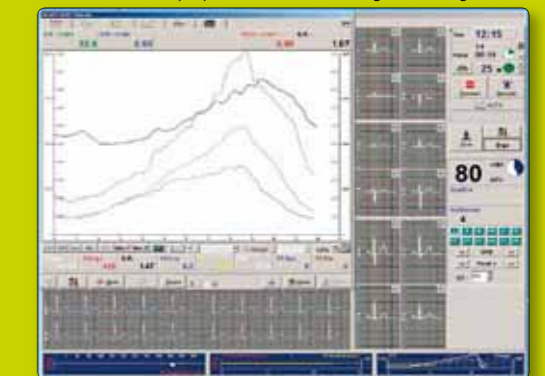
Real-time display of four configurable parameters



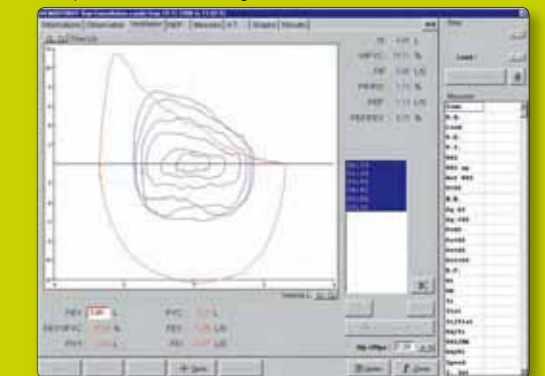
The twelve leads during exercise and the average complexes



"Simultaneous display of ECG function and gas exchange" screen



Study of "ventilation during exercise" screen



Measurement of limitation of expiratory flow rate under NEP

