

# EXPAIR software

## The most Intuitive, userfriendly and complete software basic version

- A sophisticated and powerful data-base function and electronic storage
- Trends Report (Historic function)
- Interpretation function
- Comment function
- Off Line input and on line data transfer
- Report designer
- Predicted value editor
- Choice of languages
- Choice of units for the measured parameters
- Bronchial test generation
- Blood gases with blood chemistry analysis from manual entry
- Users Units capability
- Measurement sequencing configuration
- Full calculation function : display of calculation points with manual correction capability
- Technical toolbox to enable diagnostic function and full program control
- Inbuilt quality control with calibration markers for performance
- Teleassistance or VPN assist

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



# BODYBOX 5500

## GENERAL SPECIFICATIONS

	Dim.	Standard	Double Door/XL	Paediatric
(H x W x D) cm	176x87x71	179x120x83	140x66x55	
Weight	± 130 kg	± 150 Kg	± 105 Kg	
Internal Volume	960 L	± 1250 L	± 450 L	
Patient chair	Pneumatic adjustment			
BodyBox closing door	Sturdy closing and internal handle			
Power requirements	230/115 VAC 50/60 Hz			
Power Consumption	100 VA (module)			
Warm up Time	20 min (minimum)			

Conform to electrical safety req. IEC60601/1 and CE 0029

## PRESSURE TRANSDUCERS

Sensitivity		Resolution		Calibration	
Box pres	± 0,5 cm H <sub>2</sub> O	Box Pres	0,05 cm H <sub>2</sub> O	Box Pres	Integrated 30ml pump
Mouth pres	± 50,0 cm H <sub>2</sub> O	Mouth Pres. & Flow	0,01 cm H <sub>2</sub> O	Mouth Pres.	Water column
Pres. MIP/MEP/SNIP	± 280,0 cm H <sub>2</sub> O	Linearity	Error < 0,1%	Pneumotachograph	semi. auto. with 1 to 3L syringe with ERS/ATS quality control indicator
Mouth flow	± 5,0 cm H <sub>2</sub> O	Relative Accuracy	Error < 0,01%		

## GAS ANALYZERS

<b>Helium</b>	Thermal conductivity
Range	0 to 15% He
Relative accuracy	± 0,1%
Response time	± 200 msec Fast He ± 10 sec He STD
<b>Carbon monoxide</b>	infra red/Fast or Fuel Cell
Range	0 to 0,350 % CO
Relative accuracy	± 0,1 %
Response time	± 150 msec Fast CO ± 20 sec CO Fuel Cell
<b>O<sub>2</sub></b>	Chemical Fuel Cell
Range	0 to 100 % O <sub>2</sub>
Relative accuracy	± 0,02 %
Response time	± 150 msec
<b>CO<sub>2</sub></b>	infra red
Range	0 to 10 % CO <sub>2</sub>
Relative accuracy	± 0,01 %
Response time	± 120 msec

## GAS SUPPLY SPECIFICATIONS

Body Box	Compressed air
TLCO He option	0,3% CO, 14% He, 21% O <sub>2</sub> , rem N <sub>2</sub>
TLNO option	± 450 ppm No, rem N <sub>2</sub>
TLCO CH <sub>4</sub> option	0,3% CO, 0,3% CH <sub>4</sub> , 21% O <sub>2</sub> , rem N <sub>2</sub>
Pressure regulator	0 - 8 Bars / 15 m <sup>2</sup> / h
TLCO ss	0,08 CO, 21% O <sub>2</sub> , rem N <sub>2</sub>
FRC N <sub>2</sub>	100% O <sub>2</sub>

## AMBIENT CONDITIONS

Temp. 10 - 40°C	Relative humidity 25 to 80 % non condensed
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## OPTIONS

- Mixed (Volumetric and Barometric bodyplethysmograph)
- TLCO He, TLCO NO, TLCO CH<sub>4</sub>, TLCO steady state / TLCO rebreathing
- MIP/MEP, SNIP, NEP, Rint
- Static and dynamic Compliance
- Integrated automatic nebulizer, PROVO 4.
- External compensation Box
- Computer integration trolley with electrical isolation transformer
- Double Door for wheelchair access
- Medisoft network
- Data transfer & reception (HL7, ...)
- Automatic data backup
- Disabled handrail support
- Colour Lazer Printer



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

## PATIENT VALVE

<b>Pneumotachograph</b>	Lilly cone
Range	0,03 to 15 L/sec or 20L/sec
Résistance	0,4 cmH <sub>2</sub> O/L/sec
Relative accuracy	Error < 3%
Volume conv. to BTPS	integrated thermometer (optional barometer)
Automatic zero shift correction	of measuring elements
Software	computerised linearization
<b>Patient valve</b>	Pneumatic (Time O/C : 30 mS )
Dead Space	< 60 ml / 30 ml (paediatric).
Disinfection	Simple Dismantling for cold cleaning
<b>Valve Support Arm</b>	Moveable arm with 3 joints

## VOLUMETRIC BODYBOX (OPTION)

<b>Pneumotachograph</b>	double Grid Lilly cone
Range	0,01 to 15 L/sec
Resistance	0,1cm H <sub>2</sub> O/L/sec
Relative accuracy	Error < 3%

## OPTIONAL GAS ANALYZERS

<b>Multigas analyzer</b>	Infrared spectrometer (CO, CH <sub>4</sub> , CO <sub>2</sub> , C <sub>2</sub> H <sub>2</sub> )
Range	0 to 0,350%, CO <sub>2</sub> : 0 - 10%
Relative accuracy	± 0,1 %
Response time	< 20 sec (10 - 90% FS)
<b>Nitric oxide</b>	Chemical fuel cell
Range	0 - 450 ppm
Relative accuracy	± 0,1 %
Response time	< 10 sec (10 - 90 % Fs)

## ANALYSER CIRCUIT

Automatic, rapid and accurate calibration with quality control

## COMPUTER INTERFACE

<b>Type</b>	Serial RS232 or USB
<b>Conversion</b>	12 & 16 bit.
Acq. frequency	100 Hz /channels (Multigas 3500 Hz)
Transmission speed	115,200 baud
Isolation	System fully isolated by optocoupling
<b>Computer</b>	PC Intel, 19" monitor, Printer A4 colour Deskjet
Operating system	Windows 7® 32 or 64 bit

## MEASURED AND CALCULATED PARAMETERS

- RAW (Insp. exp. tot.), SRAW, GAW, SGAW, ...
- TGV, VC, IRV, ERV, RV, TLC, ...
- Slow Spirometry : VC, ERV, IRV, IC, EC
- Foced Spirometry : FEV1, FV1, FVC, FEV1/FVC, FEV1/VC, FEV6, PEF, F25, F50, F75, MEF, MW, ...
- Bronchodilation and challenge test, dose-response curves, reactivity threshold, ...
- V Comp., P. Alv. (option)
- TLCO : AV, TLCO / AV, TLCO - NO : Dm, Vc; TLCO ss (option)
- Compliance stat./dyn., RL stat./dyn., CL stat./dyn., EL dyn., W vis. (option)
- MIP/Mep,SNIP, ... (option)
- NEP, R<sub>NEP</sub>, Exp. Flow Lim, ... (option)
- FRC N<sub>2</sub> - RV N<sub>2</sub> - TLC N<sub>2</sub> (NEW)
- Closing Volume
- Lost Volume, Intrathoracic Pressure & Partial Flow/Volume curve



120515\_Bodybox\_EN

# BODYBOX 5500<sup>®</sup>

## Barometric total bodyplethysmograph (Volumetric option)

- The reference instrument of a PFT laboratory
- An unrivaled customisation (The largest selection of optional measures)
- Environment comfortable for the patient
- High tec and high quality design
- Fast and accurate measurements
- Low running cost & easy of maintenance
- Intuitive Software



Bodybox  
(with handrail support option)

NEW

## Lost Volume, IntraTh. Pressure & Partial Flow/Volume curve analysis (See specific brochure)

**medisoft**  
GROUP  
CARDIO-RESPIRATORY INSTRUMENTATION



For more details, visit our Website

# BODYBOX 5500



Customized Bodybox:  
 - Metallic gray  
 - Acrylic seat

## ► The perfect unit for :

- Pulmonary Function Test with both children and adults
- Ventilation mechanics
- Bronchodilatation studies
- Hypersensitivity research (challenge tests)

From basic to advanced version, Medisoft is the only manufacturer able to offer you customisation at a standard price!



New trolley «Standard V2»  
 (With Wide Screen 24" option)

## ► Ergonomically adjustable to your needs :

- Bring assistance to disabled or infirm subjects with *the handrail support and the Double door version.*
- **No stress** : pleasant environment for the patient.
- Add an interactive dimension and improve the quality of your tests by choosing *the incentive screen.*
- Customise your box by choosing the *size\**, the *color* and *type of seat* you want.

\*(Standard, XL, Double door, Paediatric or Customised)



### AIRWAYS RESISTANCE and CONDUCTANCE (RAW & GAW)

The airways resistance can be measured easily and quickly. The subject establishes a resting FRC level of tidal breathing and the operator can then select to collect flow against box data for analysis. The test can be performed at both resting ventilation and with the panting method. The correlation between methods is excellent.

When the operator is satisfied with the quality of the captured data the occlusion valve can be operated to set the actual thoracic gas volume at which the measurements are made. This is essential for a meaningful measurement of Sgaw.

The software control allows manual fitting of the slope to the data, selection and de-selection of efforts for the mean, manual selection of Tidal volume and Vital capacity minimum and maximum points as well as adjustment of the FRC level.



### THORACIC GAS VOLUME, TOTAL LUNG CAPACITY AND LUNG SUB-DIVISIONS

The test calls for the subject to achieve a stable FRC level, the operator can then select occlusion mode. The powerful software then closes the valve at an end tidal point and the resulting tangent of the mouth pressure versus the box pressure is the thoracic gas volume (TGV, FRC). As subjects change their FRC level during the effort, the software monitors the baseline shift and then adds or subtracts the volume difference from the measured thoracic gas volume to show the 'True FRC' as the TGV.

A full vital capacity effort then provides the calculations of the lung sub-divisions relating to the TGV measurement. Complete control over reported parameters and information. Selection of data, movement of the tidal volume, vital capacity and FRC levels as well as deletion of poor efforts.

Five sets of measurements can be recorded at the same or different times to identify improvements in patient measurements.

Three different occlusion modes can be selected:  
 1. Insp. cycle - 2. Complete cycle - 3. Multiple cycles



### FRC MULTIBREATH N2 WASHOUT (OPTION)

Integrated or with HypAir Arts 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. On screen visualisation guides the user through the full test procedure, making the understanding and quality control of the test a key feature. Importing a VC from a separate effort is possible when the subject may be unable to perform the best effort within the test. The measuring circuit uses O2 and CO2 analysers by subtraction to measure the nitrogen; the patient circuit consists of an automatic two-channel valve with automatic delivery of 100% O2 with a low resistance demand valve.

The closing volume is calculated from N2 slope during a maximal expiration



### SLOW AND FORCED SPIROMETRY (TOTAL OR PARTIAL)

The Body Box 5500 allows full measurement of spirometry with facilities for multiple level spirometry as well as bronchial challenge testing.

Additionally, incentive spirometry assists the measurements of children. Post visualization and post treatment provide a convenience of use particularly appreciated: Choice of graphical representation, selection of calculation points, alignment of flow curves on RV, time evolution of measured parameters by numerical and graphical representation, deletion of poor effort, trend graphing and dose response curves.



### MEASUREMENT OF DIFFUSION CAPACITY TLCO (OPTION)

**UNIQUE - the only body plethysmograph offering the range of 5 diffusion methods.**



#### Single Breath using the helium trace gas He

The well known technique described by J.E. Cotes based on the Jones Meade method. Using a bag collection system the subject can be controlled for inspiratory volume, washout (discard) volume and Sample volume. This method has proven repeatability and the method was the same as that used to collect the predicted values we use today.



#### TLCO-NO (trace gas He) NEW & EXCLUSIVE

Membrane diffusion and capillary blood volume (Dm & Qc) measurement.

Regarded as the 'True' diffusion characteristic and the most useful indicator of membrane thickening, this measurement takes on a new lease of life. The powerful Exp'Air software makes the calculations painless, the combination of NO and CO follows the work of Prof. Guenard of Bordeaux. Simple to perform and rapid results add this test



to the list of favourite studies undertaken in routine practice. Additionally this measurement can be performed in conjunction with NEP, this then allows the evaluation of pulmonary blood flow and its ability to recruit from the capillary reserve.

#### Single Breath & Intra Breath using Methane trace gas (CH4)

Using fast gas analysis, this method collects the exhaled breath directly as a high resolution data array. This has the advantage that post test analysis can be performed aligning the start of sample onto the alveolar plateau after the clearances of all the dead spaces. A sample as low as 50 ml can be used to calculate the diffusion. This can overcome the volume limitation of other systems and methods.



#### Single Breath & Intra Breath using trace gas (He)

The most significant improvement to diffusion measurements is the last 10 years. Previously only possible with a mass spectrometer and rapid IR carbon monoxide analyzer. The new Medisoft rapid gas analyzer technology allows the measurements in 'real time' of exhaled diffusion gases. This is both in traditional single breath and intra breath modes. With typical responses in the range of 100-200 ms for two discrete analyzers the system is perfectly matched.

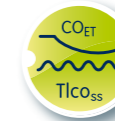
As this method is faithful to the standard by which the Predicted Values were collected, the data yields the most reproducible data for subjects related to normal data.

The method extends easily to 'steady state' diffusion in 'real time' and so has no volume limitation for the measurements of diffusion.

The properties of Helium as the traces gas is better presented for gas mixing than alternative, leading to more accurate estimates of total surface area represented by single breath total lung Capacity (TLC) the alveolar Volume (Va)

#### Intra Breath diffusion He & CH4

The sample is taken during a slow and constant exhalation in the range of 200 - 500 ml/sec. Applying linear regressions to the data array of the expiratory gas, the alveolar concentrations are calculated. As this method requires no breath holding, it will greatly benefit some subject groups.



#### Steady State diffusion Tlco ss EXCLUSIVE

Medi-soft has taken a new look at this method, using fast gas technology and replacing the older bulky instrumentation. This is a "NEW" method for a new age of diffusion measurement. Requiring minimal subject effort, this method is especially helpful for obtaining measurements with children and reluctant subjects. Performed at a steady state breathing condition, the measurement is valid as soon as the subjects ventilation is uniform and stabilized.



#### 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 during exercise, particularly with subject's known to have obstructive lung disease. The test applies a negative pressure to the mouthpiece during the expiratory phase, this allows the comparison of the flow volume loop with the tidal efforts when reviewed as a flow volume loop display.

This method also allows the indirect measurement of the resistance (RNep) which provides a good alternative to the standard screening method.



#### VENTILATION MECHANICS (OPTION)

- MIP - MEP : Maximal Inspiratory and Expiratory Pressures as an assessment of respiratory muscle strength, also useful for weaning subjects from ventilators, ...

- SNIP : measurement of the maximal nasal inspiratory pressure using a nasal canular. A non-invasive estimate of muscle fatigue.

- STATIC AND DYNAMIC COMPLIANCE AND RESISTANCE : The use of an oesophageal balloon catheter inserted into the subject allows the measurements of both static and dynamic compliance. The components of compliance and resistance are fundamental to the mechanics of the lung



#### PROVO 4 (OPTION)

Equipment for fully automated bronchochallenge test with automatic nebulizer. This option provides full control of products and doses used and of test performing criteria for bronchochallenge testing



#### LOST VOLUME (OPTION)

see specific brochure



#### INTRATHORACIC PRESSURE (OPTION)

see specific brochure