Piston

CALIBRY LINE

PULMONARY FUNCTION TEST

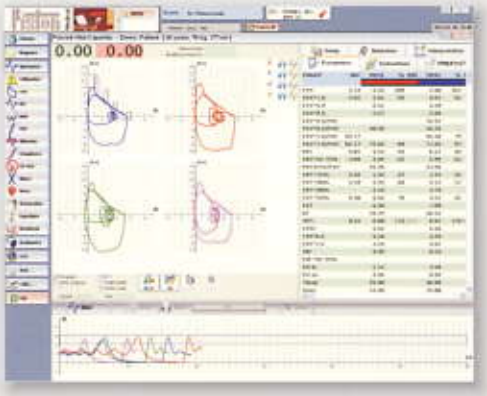
Spirometer PDD-301/sh

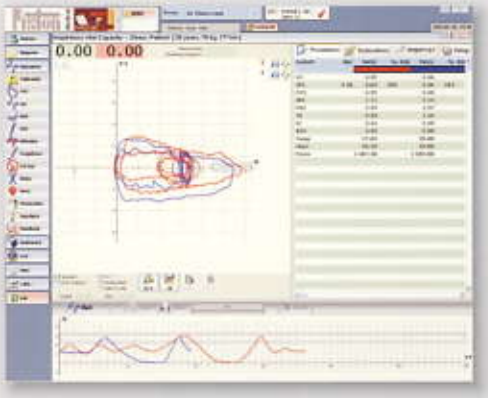
The spirometer is the basic device of the functional lung diagnostics.
It is inevitable in detecting the early malfunction of the respiratory system:

- COPD
- Asthma
- Chronic bronchitis
- Obstructive ventilation disorder
- Emphysema

Measurement modes:

- Forced ex- and inspiration
- Static vital capacity
- Maximal voluntary ventilation





Sleek hand held design with the PinkFlow* flow meter.
USB interface when connecting to a laptop PC provides full portability.

PINK FLOW®

The PinkFlow flow meter is the newest innovation of our company.
The PinkFlow flow meter is the ideal flow meter for the most demanding pulmonary function tests.

The PinkFlow flow meter fully complies with the specifications and requirements of the Standardization of Lung Function Testing ATS/ERS Task force (European Respiratory Journal 2005)

- Hygienic single-use application
- No moving parts
- Insensitive against condensation and vapour
- Integrated gas sampling port
- Fully interchangeable flow meters
- No need for recalibration after changing
- Quick pneumatic coupling
- Fully recyclable

Type	PPF-18
Principle	Symmetric Pitot tube
Flow range	±18 l/s
Accuracy	±2% or 50 ml
Dead space	36 ml
Resistance	60 $Pa \cdot L^{-1} \cdot s^{-1}$ @ 15 l/s

System overview

The whole range of our diagnostic devices provides the following features:

General features:

- Eight identical measurements can be performed simultaneously
- Pre-Post examination
- Database management
- Trend analysis
- User definable printed report
- Multiple communication languages

Selectable and enhance able reference value algorithms:

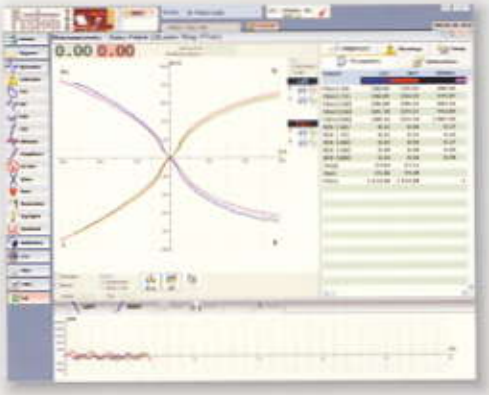
- ECCS
- Cotton & Dust
- Crapo HSU
- Knudson
- Austrian, Finnish, Swedish

System integration into information network:

- Application of standard protocols
- HL7 (Health Level 7, USA)
- GDT (Geräte Daten Träger, Germany)

Rhinomanometer and spirometer PDD-301/r

The device insures the measurement of nasal resistance and the basic pulmonary function testing.
It is inevitable in objective diagnose of rhinitis and in the ENT practice.



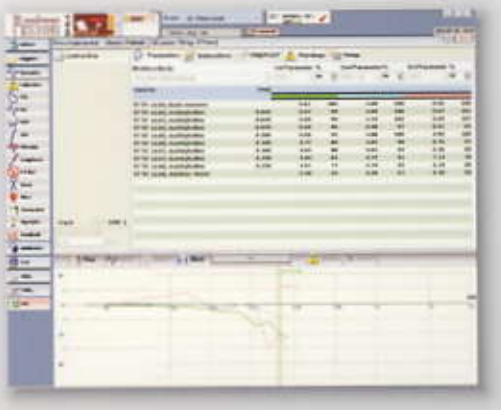
Measurement modes:

- Active anterior nasal resistance
- Active posterior nasal resistance
- Forced ex- and inspiration
- Static vital capacity
- Maximal voluntary ventilation

Dose controlled drug nebulizer PDD-301/p

The nebulizer can be integrated into a system with all Piston made lung diagnostic devices.

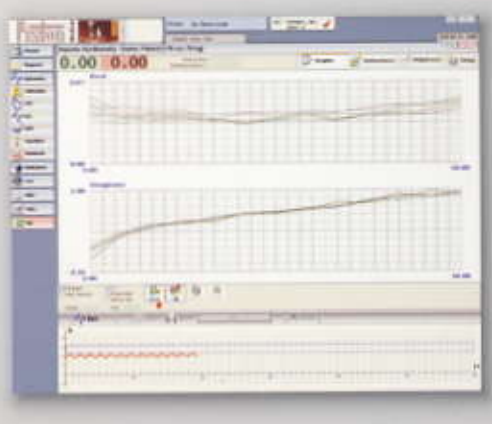
- Exact deposition of the medicine thanks to mechanical nebulizer with narrow range of particle sizes (1.2 µm or 3.5 µm)
- Full support of provocation test and broncholysis
- Constant concentration multi step protocol
- Increasing concentration, dilution row, multi step protocol
- Breath phase controlled, nebulizer runs only during inspiration
- Supervision of total inhaled dosage and automatic limitation
- Exhalation of medicine thru bacterial and viral filter or into a collecting sack to prevent the environment



Modifications of pulmonary function parameters as a function of inhaled dosage are traceable on histograms

Impulse oscillometer PDD-301/o

The Impulse oscillometry or with other name Forced Oscillometry (FOT) offers an economical alternative for measuring the impedance of airways.
During test the patient has to breathe quietly. The test can be performed successfully without any special co-operation.



- FFT Fast Fourier Transformation
- Average calculation of Reproductive Spectrums
- Model matching for Reproductive Spectrums
- Separation of Resistance / Elastance / Inertia
- Random and sequential induced frequencies
- Induced frequency range: 2-35 Hz
- Induced pressure wave: max. 0.2 kPa
- Induced power: max. 50W

Whole body plethysmograph PDT-111/p

The device insures the measurement of mechanical parameters of the pulmonary system.

- Accessible for patients sitting in a wheelchair (optional)
- Double time constant of the cabin provides tests at normal breathing frequency and with panting as well
- Diffusion capacity test (optional)
- Spacious cabin with four transparent walls and roof from hardened glass
- Fault-free electromagnetic lock
- Programmable audiovisual metronome
- Automatic BTPS correction based on the temperature, humidity and pressure measured in the cabin
- Full automatic calibration and leakage test
- Communication system with built in speaker and microphone

Measurement modes:

- Thoracic gas volume
- All components of airway resistance
- Work of breathing
- Dynamic and static compliance (optional)
- Diffusion capacity test (optional)
- Maximal occlusion pressure
- Forced ex- and inspiration
- Static vital capacity
- Maximal voluntary ventilation

Diffusion capacity test PDT-111/d

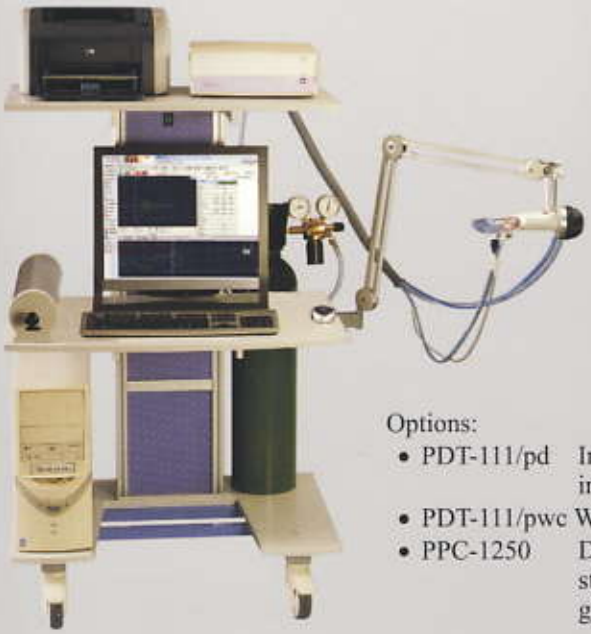
The device can be used to measure the lung's transfer factor, the oxygen bounding ability and the functional residual capacity.

Measurement modes:

- "Single breath" method with breath holding
- "Intra breath" method without breath holding
- Cardiac output (optional)
- Forced ex- and inspiration
- Static vital capacity
- Maximal voluntary ventilation

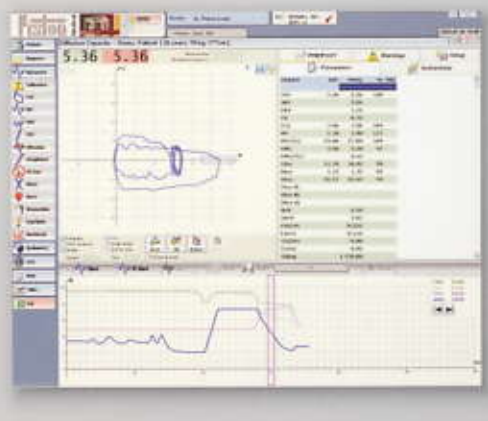
Uniquely compact patient circuit:

- Extremely low resistance and dead space
- No electrical connection
- Integrated demand valve for the effortless supply of measuring gases
- Easy to dismantle and disinfect



Non Dispersive Infra Red (NDIR) multi gas analyser

- 130 ms response time
- CO, CH4, CO2 simultaneous measurement
- Direct gas analysis without gas sampling balloon



Options:

- PDT-111/pd Integrated diffusion capacity test into the cabin
- PDT-111/pwc Wheel chair accessible cabin
- PPC-1250 Dedicated PC cart standing or sitting application gas balloon holder

Ergospirometer exercise test PRE-101

Cardiopulmonary exercise testing provides a global assessment of the integrative exercise responses involving the pulmonary and cardiovascular system.

Ergospirometry is increasingly being used in a wide spectrum of clinical applications for the evaluation of undiagnosed exercise intolerance and exercise-related symptoms.

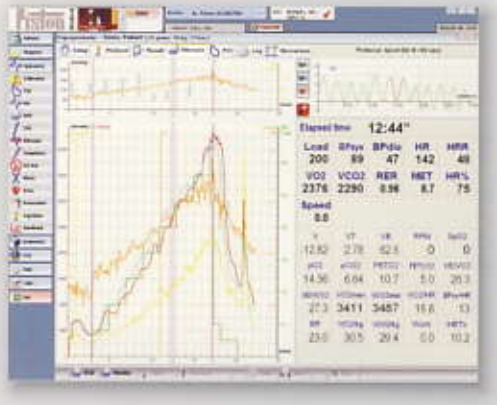
International guidelines and requirements:

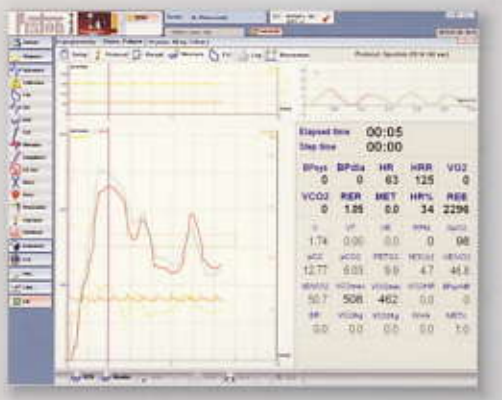
- Statement on Cardiopulmonary Exercise Testing, American Thoracic Society and American College of Chest Physicians November 1, 2001
- Clinician's Guide to Cardiopulmonary Exercise Testing in Adults A Scientific Statement from the American Heart Association, Circulation Journal, 2010-07-21
- Standardization of Lung Function Testing, ATS/ERS Task force, European Respiratory Journal 2005

PinkFlow flow meter without any moving part and extremely low resistance

Bicycle and treadmill control:

- Selectable and user definable exercise testing protocols
- Progressive incremental bicycle exercise protocols, Step and Ramp
- Maximal incremental treadmill protocols
- Bruce protocol and Balke protocol
- Constant work rate protocol
- Multistage exercise protocol with a pseudo steady state at each level
- Discontinuous incremental protocol





Options:

- PRE-101/cc Ultra fast chemical cell oxygen analyzer
- PRE-101/pm Non-depleting paramagnetic oxygen analyzer
- PRE-101/ew Wireless ECG and blood pressure meter
- PPC-1250 Dedicated PC cart with double monitor holder, electrode arm, gas balloon holder and isolating transformer

Mobile ergospirometer PRE-101/m

The mobile ergospirometer provides data acquisition of breathing, metabolism and ECG outside of PFT laboratories as well.

It is useful especially at sport medicine and rehabilitation program:

- GPS based position and work calculation
- More than half an hour battery mode
- Water resistant pouch

- More than 14 measured and calculated exercise parameters
- Wassermann's 9 basic graphs
- 17 types of VO2 graphs
- Determination of Anaerobic Threshold
  V-slope method
  RQ=1 method
  Lactate determination method

Accessories

The accuracy and reliability of Piston devices are guaranteed only with the usage of original Piston accessories and consumable parts.

Calibration syringe — PCS-3000 and PCS-3000/s

Calibration syringe is for daily calibration and validation of lung diagnostic devices.
Our precision calibration syringe is extremely well sealed and its traction is very low.

Volume	3 litre ±15 ml
Connection	ISO-30 medical taper, female
Size	520x120x110 mm
Weight	2.2 kg

PCS-3000/s
Adjustable volume with laser engraved scale

Bacterial and viral filter — PBF-100 family

Using bacterial and viral filter prevents cross-contamination during pulmonary function tests

Size	D: 100 mm, L: 75 mm
Filtrating media	Filtrete by 3M, Electrostatically charged fiber
Resistance	60 $Pa \cdot L^{-1} \cdot s^{-1}$ @ 12 l/s
Additional dead space	75 ml
Bacterium filtration efficiency	99.9999 % * and **
Virus filtration efficiency	99.9999 %* and **
* Tested by Nelson Laboratories, Salt Lake City, USA	
** Tested by HPA, Health Protection Agency, Salisbury, United Kingdom	

Weekly at least 10 billion micro orgasms can be detected in a dry closed system spirometer after 1000 measurements.

Fully recyclable

Code	Device side connection	Patient side connection	To fit spirometers
PBF-100-G	ISO-30 medical taper Female: ID 30.9 mm Basic taper 1:20	ISO-30 medical taper Male: OD 30.2 mm Basic taper 1:20	Piston Geratherm SensorMedics PK Morgan
PBF-100-G-M	ISO-30 medical taper Female: ID 30.9 mm Basic taper 1:20	Elliptic, form of lips	
PBF-100-B	Female: ID 29.9 mm Basic taper 1:50	ISO-30 medical taper Male: OD 30.2 mm Basic taper 1:20	Jaeger
PBF-100-B-M	Female: ID 29.9 mm Basic taper 1:50	Elliptic, form of lips	
PBF-100-W	Male: OD 30.0 mm Taper angle 2°	ISO-30 medical taper Male: OD 30.2 mm Basic taper 1:20	Micromedical MIR Vitalograph
PBF-100-W-M	Male: OD 30.0 mm Taper angle 2°	Elliptic, form of lips	

Mouthpieces

MPA-30
Anatomically shaped mouth piece for the basic pulmonary function tests

PMP-30
Mouthpiece with bite-on grip guarantees perfect sealing for plethysmograph, diffusion capacity test and oscillometry

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EN ISO 13485:2003
ISO 9001:2008

CE 1979

* PinkFlow Patent Pending
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